Food and Agriculture Organization of the United Nations

No. 484 4 FEB 2019

Desert Locust Bulletin

General situation during January 2019
Forecast until mid-March 2019

WESTERN REGION: CALM

SITUATION. Local breeding occurred in northwest **Mauritania** and southern **Algeria**, and isolated adults were present in northern **Niger**. Ground teams treated 100 ha in Mauritania.

FORECAST. Low numbers of adults will persist in northwest **Mauritania**, northern **Mali** and **Niger**, and southern **Algeria**. Small-scale breeding will start in March south of the Atlas Mountains in **Morocco** and in northern **Mauritania** if rains fall.

CENTRAL REGION: THREAT

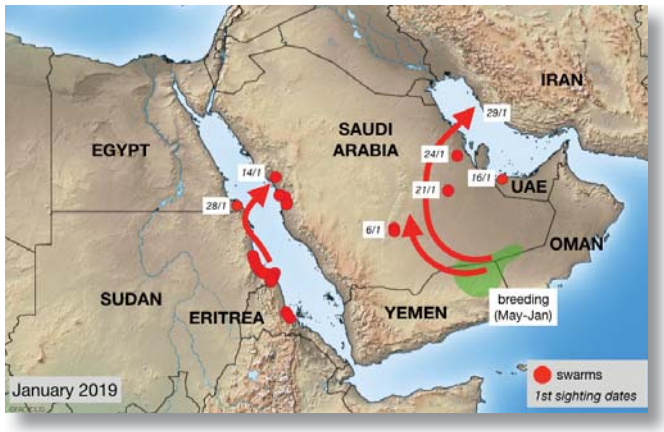
SITUATION. Locust numbers increased on the Red Sea coast of **Sudan**, **Eritrea** and **Egypt** where hopper and adult groups, hopper bands and swarms formed, and a few swarms moved to the coast of **Saudi Arabia**. Immature swarms invaded the interior of Saudi Arabia from the Empty Quarter and one swarm reached **UAE**. Control operations were in progress.

FORECAST. Second-generation breeding will cause more groups, bands and swarms to form on the Red Sea coast in **Sudan**, **Eritrea** and **Egypt**. A few swarms may move to northern Sudan and across the Red Sea to the coast and interior of **Saudi Arabia**.

EASTERN REGION: CAUTION

SITUATION. Adult groups arrived on the southern coast of **Iran** from Arabia at the end of the month and quickly matured.

FORECAST. Adult groups may move east towards southwest **Pakistan**. Laying and hatching will occur on the southern coast of **Iran**, giving rise to hopper groups and perhaps a few small bands.



Swarms form in the Central Region

An outbreak continued on the Red Sea coastal plains of Sudan and Eritrea where an increasing number of groups, bands and several swarms formed during January from a second generation of breeding. A few mature swarms appeared on the coast in southeast Egypt and northern Saudi Arabia that probably originated near the Sudan/Eritrea border. Immature swarms invaded farms along the western and northern edges of the Empty Quarter in the interior of Saudi Arabia, coming from the southeastern Empty Quarter near the Yemen/Oman border where two generations of breeding occurred after good rain from cyclones Mekunu (May) and Luban (October). A few of these swarms moved to UAE and southern Iran. Aerial operations were mounted in Sudan and Saudi Arabia in addition to ground control in both countries, Eritrea and Egypt, treating nearly 55 000 ha during January. During the forecast period, breeding will continue, causing more groups, bands and swarms to form. As vegetation dries out, adult groups and a few swarms are likely to move north along the Red Sea coast in Eritrea to Sudan, and from the Red Sea coast of Sudan to the Nile Valley in northern Sudan. There is a moderate risk that some swarms could cross the Red Sea to the coastal and interior areas of Saudi Arabia. Elsewhere, local breeding occurred in northwest Mauritania and southern Algeria. If rains fall, spring breeding is likely to commence in March along the southern side of the Atlas Mountains in northwest Africa.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity. Products are distributed by e-mail and Internet.

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Weather & Ecological Conditions in January 2019

Breeding conditions remained favourable along both sides of the Red Sea despite little rainfall. Green vegetation persisted in a few areas in the Western Region.

WESTERN REGION

No significant rain fell during January and conditions remained generally dry throughout the region. Nevertheless, small areas of green vegetation persisted in northwest Mauritania from Akjoujt to Oujeft, along the edges of irrigated agricultural perimeters in the Adrar Valley of central Algeria, and on the southern side of the Hoggar Mountains near Tamanrasset. Limited green vegetation also persisted in parts of the spring breeding area south of the Atlas Mountains in the Draa and Ziz-Ghris valleys of Morocco.

CENTRAL REGION

Light to moderate rains fell at times during January along parts of the Red Sea coast in Sudan near Tokar Delta where it was cloudy most of the month. Light showers occurred on the Eritrean coastal plains for two days only, 1 and 17 January. In Saudi Arabia, good rains fell during the last decade along parts of the northern Red Sea coastal plains between Masturah and Duba, in the northern Asir Mountains, and in the interior near Khaybar, Tabuk, Al Jawf and between Riyadh and Gassim. Ecological conditions were favourable for breeding on the Red Sea coast and in subcoastal areas of southeast Egypt, in Wadi Oko/ Diib in northeast Sudan, and along the coast from Port Sudan to Mersa Cuba, Eritrea. Breeding conditions were also favourable on the central and northern coastal plains of the Red Sea coast in Saudi Arabia between Lith and Yenbo but were less favourable on the southern coast and on the Tihama of Yemen because of poor rainfall during January. Favourable breeding conditions persisted along the southeastern edge of the Empty Quarter in Saudi Arabia near the Yemen/Oman border as a result of rains from Cyclone Luban in October. These conditions extended south into eastern Yemen and Al Maharah province on the plateau between Thamud and the Oman border.

EASTERN REGION

Very little rain fell during January except for showers on the southwest coastal plains in Iran near Bushehr. Nevertheless, ecological conditions were favourable along parts of the coast to Bandar Abbas. Light showers also fell coastal and subcoastal areas of Baluchistan in southwest Pakistan between Gwadar and Omara.

Area Treated

Nearly 55 000 ha were treated during January.

Egypt	1 660 ha (29–31 January)
Eritrea	6 965 ha (January)
Mauritania	100 ha (January)
Saudi Arabia	12 165 ha (6–30 January)
Sudan	34 028 ha (January)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

During January, scattered late instar solitarious hoppers, immature and mature solitarious adults were present at two places to the southwest and southeast of Oujeft (2003N/1301W) where breeding had occurred in December. Ground teams treated 100 ha.

• **FORECAST**

Local breeding may continue in the northwest between Akjoujt, Oujeft and Atar. Low numbers of adults may be present in the north where small-scale breeding could occur as temperatures warm up and if rains fall.

Mali

• **SITUATION**

No surveys were carried out and no locusts were reported in January.

• **FORECAST**

Low numbers of locusts are likely to be present and persist in the Tilemsi Valley as well as parts of Timetrine and the Adrar des Iforas.

Niger

• **SITUATION**

In early January, isolated immature and mature solitarious adults were seen at a few places in the Air Mountains to the north and east of Iferouane (1905N/0824E).

• **FORECAST**

Low numbers of locusts are likely to persist in parts of the Air Mountains and perhaps on the northern Tamesna Plains.

Chad

• **SITUATION**

No locust activity was reported during January.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during January.

• **FORECAST**

No significant developments are likely.

Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During January, small-scale breeding continued west of Tamanrasset (2250N/0528E) where low numbers of third and fourth instar solitarious and *transiens* hoppers mixed with immature solitarious adults were seen at two places along Wadi Amded. No locusts were seen in the Adrar Valley of the Central Sahara.

• **FORECAST**

Low numbers of adults are likely to persist near Wadi Amded in the south and near irrigated perimeters in the Adrar Valley.

Morocco

• **SITUATION**

No surveys were carried out and no locusts were reported in January.

• **FORECAST**

Isolated adults may be present in parts of the Draa Valley and W. Sakia El Hamra in the Western Sahara. Small-scale breeding could commence at the end of the forecast period if rains fall.

Libya

• **SITUATION**

No reports were received in January.

• **FORECAST**

No significant developments are likely.

Tunisia

• **SITUATION**

No locust activity was reported during January.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During January, first-generation hoppers and adults continued to mature in outbreak areas on the central coast of the Red Sea from north of Port Sudan (1938N/3713E) to Tokar Delta (1827N/3741E). An increasing number of adult groups and swarms formed, matured and laid eggs as the month progressed, initially on the southern coast between Aiterba (1753N/3819E) and the Eritrean border, and then extending to the central coast. This led to substantial hatching and the formation of early instar hopper groups and bands after mid-month on the southern coast. Control operations treated 34 028 ha, of which 23 860 ha were by air. In the northeast, solitarious adults were maturing in Wadi Oko south of Tomala (2002N/3551E) and along the western side of the Red Sea Hills. No surveys were conducted near the Egyptian border where groups and a few small swarms may be present. No locusts were seen in the Nile Valley or in the northern interior near Merowe (1830N/3149E) and Dongola (1910N/3027E).

• **FORECAST**

Second-generation hatching and the formation of hopper groups and bands will continue on the central and southern coastal plains. Immature groups and small swarms are likely to start forming during the second half of February. There remains a high risk of cross-border movement on the coast between Sudan and Eritrea. Breeding is also likely to be in progress in Wadi Diib, giving rise to groups and a few small swarms. If conditions start to dry out, locusts are likely to move towards the Nile Valley or across the Red Sea.

Eritrea

• **SITUATION**

During January, groups of late-bred first-generation immature adults were maturing on the Red Sea coastal plains while a second generation of egg-laying by mature groups was in progress mainly on the central coast from south of Mehimet (1723N/3833E) to Mersa Cuba (1616N/3911E) and, to a lesser extent, near the Sudanese border. Substantial hatching occurred in both areas, giving rise to hopper groups and a few small bands. By the end of the month, some hoppers had reached fifth instar. Ground teams treated 6 965 ha.

• **FORECAST**

Second-generation breeding will continue on the central and northern Red Sea coastal plains with additional laying and hatching, causing more groups and bands to form. Second-generation fledging will commence at the beginning of February and increase during the month, giving rise to adult groups and small swarms. There remains a high risk of cross-border movement on the coast between Eritrea and Sudan. If conditions start to dry out, locusts are likely to move north along the coast or across the Red Sea.

Ethiopia

• **SITUATION**

No surveys were carried out and no locusts were reported in January.

• **FORECAST**

No significant developments are likely.

Djibouti

• **SITUATION**

No reports were received during January.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

No reports were received in January.

• **FORECAST**

Low numbers of adults may be present on the northwest coastal plains; however, breeding is not expected unless additional rains fall.

Egypt

• **SITUATION**

During January, additional egg-laying and hatching caused locust numbers to increase along the southern coastal plains of the Red Sea between Shalatyn (2308N/3535E) and the Sudan border. Solitarious hoppers of all instars were present and fledging started at mid-month. Limited breeding was detected in a few places north of Berenice (2359N/3524E). On 29–31 January, several mature groups and one small swarm were copulating and laying near Abu Ramad (2224N/3624E) and south of Halaib (2213N/3638E), and ground teams treated 1 660 ha. No locusts were present in the Lake Nasser area near Tushka (2247N/3126E), Abu Simbel (2219N/3138E) and Garf Husein (2317N/3252E).

• **FORECAST**

Additional hatching will occur in about mid-February, causing hopper groups and perhaps a few small bands to form along the Red Sea coast and adjacent subcoastal areas between Shalatyn and the Sudanese border. This could be supplemented by a few groups and small swarms arriving from adjacent areas of northeast Sudan.

Saudi Arabia

• **SITUATION**

During January, scattered immature and mature solitarious adult numbers increased along the Red Sea coast between Lith (2008N/4016E) and Yenbo (2405N/3802E). Small-scale breeding continued in a few places, giving rise to low numbers of solitarious hoppers of all instars. A small mature swarm arrived on the coast near Masturah (2309N/3851E) on the 14th, and several groups and small mature swarms appeared and laid eggs on the central coast near Lith and on the northern coast between Thuwal (2215N/3906E) and Yenbo during the last week. These populations may have arrived from outbreak areas on the western side of the Red Sea. In the interior, a small immature swarm arrived in farms along the western edge of the Empty Quarter northeast of Wadi Dawasir (2028N/4747E) on the 6th. Immature adult groups and a few more immature swarms continued to appear during the remainder of the month and moved north along the western and northern edges of the Empty Quarter to Al Aflaj (2206N/4657E) and Yabreen (2315N/4859E). An immature swarm reached Al Ahsa (2523N/4941E) on the 24th. These locusts originated from two generations of breeding in the Empty Quarter near the border of Oman and Yemen where good rains fell from cyclones Mekunu (May) and Luban (October). No locusts were seen along the Yemen border between Najran (1729N/4408E) and Sharawrah (1729N/4706E). Control operations treated 12 165 ha of which 3 300 ha were by air.

• **FORECAST**

Hatching and the formation of small hopper groups and bands are expected to occur on the central and northern Red Sea coastal plains that will start to fledge by mid-March. This could be supplemented by immature swarms arriving from the western side of the Red Sea from late February onwards. A few more groups and small swarms may appear south of Riyadh from breeding in the southeast Empty Quarter.

Yemen

• **SITUATION**

On 28 January, several groups of mature gregarious adults were seen copulating in Wadi Seaf (1618N/5100E) in the eastern province of Al Maharah near Remah (1727N/5034E). Two generations of breeding are thought to have occurred in Al Maharah on the southern edge of the Empty Quarter and along the Omani border where good rains fell in May and October from cyclones Mekunu and Luban, respectively.

• **FORECAST**

Breeding will continue in the eastern region between Thamud and the Omani border that is likely to lead to the formation of additional groups and small swarms. Scattered locusts are almost certainly present and breeding on a small scale along parts of the Red Sea coastal plains, and this will continue during the forecast period. This risk of any swarms arriving from across the Red Sea is low.

Oman

• **SITUATION**

During January, no locusts were seen in the northern interior near Buraimi (2415N/5547E), Ibri (2314N/5630E), Nizwa (2255N/5731E), the Wahiba Sands, and on the Batinah coast and the Musandam Peninsula. There were no reports of locusts in the southern province of Dhofar along the edge of the Empty Quarter where vegetation is thought to be drying out.

• **FORECAST**

As vegetation dries out near the edge of the Empty Quarter in Dhofar, breeding will come to an end and remaining adults are likely to concentrate, form groups or perhaps a few small swarms that will move towards the north and west.

Bahrain

• **FORECAST**

There is a low to moderate risk of a few adult groups or small swarms arriving from adjacent areas of the Arabian Peninsula that will most likely transit through the country.

Kuwait

• **FORECAST**

There is a low to moderate risk of a few adult groups or small swarms arriving in the south from adjacent areas of the Arabian Peninsula that will most likely transit through the country.

Qatar

• **FORECAST**

There is a low to moderate risk of a few adult groups or small swarms arriving from adjacent areas of the Arabian Peninsula that will most likely transit through the country.

UAE

• **SITUATION**

On 16 January, there were reports of an immature swarm on the western coast at Al Ruwais (2406N/5243E) and in the Al Dhafra district of Abu Dhabi (2417N/5429E). Control operations were mounted, and the situation was said to be under control the next day. The locusts most likely originated from breeding in the Empty Quarter of the Arabian Peninsula.

• **FORECAST**

There is a low to moderate risk of a few adult groups or small swarms arriving in the south and west from adjacent areas of the Arabian Peninsula.

Iraq, Israel, Jordan, Kenya, Lebanon, Palestine, South Sudan, Syria, Tanzania, Turkey and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During the first decade of January, no locusts were seen on the southeast coast near Jask (2540N/5746E). On the 29th and 30th, groups of immature and mature *transiens* and gregarious adults appeared on the southwestern coastal areas between Bushehr (2854N/5050E) and Bander-e Lengheh (2634N/5452E). The locusts are likely to have migrated on about 24–27 January from the Arabian Peninsula where breeding occurred in the southeastern Empty Quarter.

• **FORECAST**

There remains a moderate risk of a few more adult groups or small swarms arriving along the southern coast from adjacent areas of the Arabian Peninsula. Laying and hatching will occur near Bander-e Lengheh, giving rise to hopper groups and perhaps a few small bands. Some adult groups may move further east towards Chabahar and Jaz Murian and breed in areas that receive rainfall.

Pakistan

• **SITUATION**

No surveys were carried out and no locusts were reported in January.

• **FORECAST**

There is a low to moderate risk that a few adult groups may appear from the west in coastal areas of Baluchistan and breed in areas of rainfall by the end of the forecast period.

India

• **SITUATION**

No locusts were seen in Rajasthan and Gujarat during January.

• **FORECAST**

No significant developments are likely.

Afghanistan

• **SITUATION**

No reports received.

• **FORECAST**

No significant developments are likely.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation within 48 hours of the latest survey.

Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week.

Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.

Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be

included in the FAO Desert Locust Bulletin for the current month; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Jelle Hielkema

It is with deep regret that we announce the death of Jelle Hielkema on 16 January 2019. Mr. Hielkema, a former FAO staff member, was instrumental in the introduction and use of remote sensing technologies for Desert Locust monitoring, forecasting and early warning. We would like to express our sincere condolences to his family and his government.

Calendar

The following activities are scheduled or planned:

- **CLCPRO. Preparation and validation of a new regional training plan IV (2019–2022), Oran, Algeria (4–7 February)**
- **CRC.** 31st Session, Amman, Jordan (17–21 February)
- **CRC.** 6th Regional aerial training course, Oman (March) [tbc]
- **CLCPRO.** 9th Regional workshop on Desert Locust information management in the Western Region, Tunis, Tunisia (8–11 April)
- **CLCPRO.** New survey officer training, Agadir, Morocco (21–27 April)
- **SWAC.** 25th Desert Locust joint survey in the spring breeding areas of Iran and Pakistan (April)
- **CRC/SWAC.** 11th Interregional workshop for Desert Locust Information Officers, Addis Ababa, Ethiopia (24–28 June)
- **CLCPRO.** 14th Executive committee meeting, Agadir, Morocco (24–28 June)
- **DLCC.** 41st Session [tbc]

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague

- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline

- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green

- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow

- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange

- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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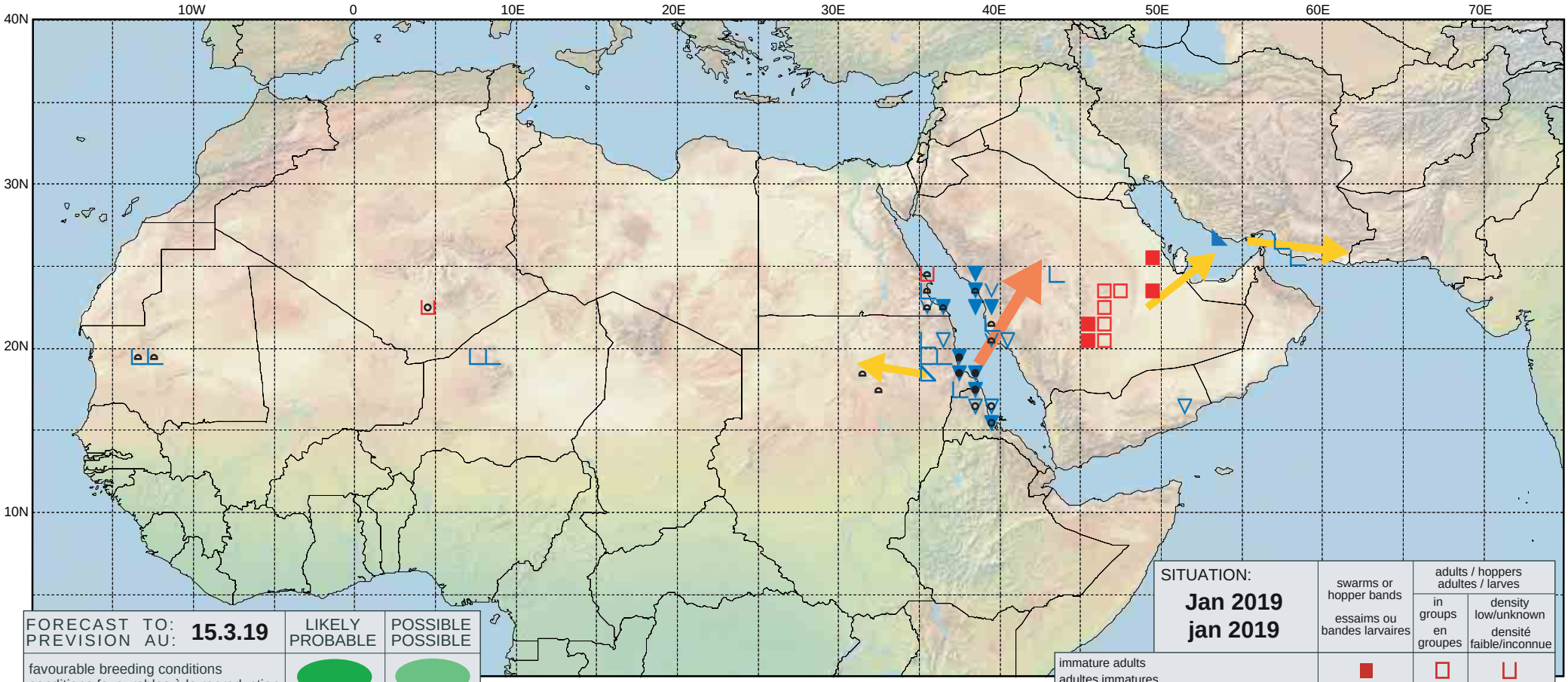

FORECAST TO: / PREVISION AU: **15.3.19**	LIKELY PROBABLE	POSSIBLE POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Jan 2019** / **jan 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves: in groups en groupes	adults / hoppers adultes / larves: density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	∟
adults, maturity unknown adultes, maturité inconnue	▲	△	∧
egg laying or eggs pontes ou œufs	▼	▽	∨
hoppers larves	●	○	◡
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊎

Food and Agriculture Organization of the United Nations

No. 485 4 MAR 2019

Desert Locust Bulletin

General situation during February 2019
Forecast until mid-April 2019

WESTERN REGION: CALM

SITUATION. Local breeding commenced south of the Atlas Mountains in **Morocco**. There were reports of small-scale breeding in northern **Mali**.

FORECAST. Small-scale breeding will occur south of the Atlas Mountains in **Morocco** and **Algeria,** but locust numbers will remain low. Limited breeding may continue in northern **Mali**.

CENTRAL REGION: THREAT

SITUATION. Control operations continued against a second-generation of breeding on the Red Sea coast of **Sudan**, **Eritrea**, **Egypt** and **Saudi Arabia** where hopper and adult groups, hopper bands and swarms formed. Breeding continued in eastern **Yemen**.

FORECAST. Any residual adult groups and swarms that are not detected or controlled along the Red Sea coast will move to the interior of **Saudi Arabia** and the Nile Valley in northern **Sudan** and breed. Adult groups and perhaps a few small swarms will move from eastern **Yemen** to Hadhramaut and the central interior of Yemen, and breed if rains fall.

EASTERN REGION: CAUTION

SITUATION. Control operations were mounted against adult groups and a few small swarms on the southern coast of **Iran** where laying took place.

FORECAST. Hatching and the formation of hopper groups and perhaps a few bands will occur in southern **Iran**. Small-scale breeding will commence in western **Pakistan**.

Control operations continue along the Red Sea coast

The Desert Locust situation remained serious during most of February along both sides of the Red Sea as second-generation breeding continued in Egypt, Sudan, Eritrea and Saudi Arabia, causing the formation of additional groups of hoppers and adults, bands and swarms. Control operations continued in all countries, treating 80 000 ha. By the end of the month, there were indications that the situation was improving as infestations declined in some areas, mainly in Eritrea, due to the intensive control operations and drying ecological conditions. This will continue during the forecast period as vegetation dries out further along both sides of the Red Sea where a few adult groups and perhaps small swarms are likely to form from residual populations that were not detected or could not be treated. These populations are expected to migrate to spring breeding areas in the interior of Saudi Arabia and, to a lesser extent, the Nile Valley in northern Sudan. One generation of breeding is expected to occur in these areas between March and June, and intensive monitoring and control efforts will be required by the affected countries. Breeding continued in eastern Yemen on the edge of the Empty Quarter in areas that received good rain from cyclones Mekunu and Luban in May and October respectively. From there, adults and at least one swarm moved to cropping areas in Wadi Hadhramaut. In Iran, control operations were mounted against adult groups and a few small swarms that were laying eggs along the southern coast. The situation remained calm in the Western Region.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in February 2019

Vegetation began drying out along parts of the Red Sea coastal plains. Limited rain fell in parts of the spring breeding areas in the Central Region and southwest Asia.

WESTERN REGION

No significant rain fell during February and conditions remained generally dry throughout the region except for small patches of green vegetation in parts of the spring breeding area south of the Atlas Mountains in the Draa and Ziz-Ghris valleys of Morocco near the Algerian border, and in the Adrar Valley in the central Sahara of Algeria.

CENTRAL REGION

Rainfall declined during February in winter breeding areas along both sides of the Red Sea. Light showers fell on the coast of Eritrea and adjacent southern coastal areas of Sudan and on the coast of Saudi Arabia near Qunfidah. Moderate rains fell on the northern coast in Saudi Arabia between Yenbo and Umm Lajj. As a result, vegetation began drying out on the Red Sea coastal plains in Eritrea where it was mostly dry by the end of the month. In Egypt, large areas were drying out near Shalatyn, Egypt and adjacent areas of Wadi Oko/Diib in northeast Sudan. Vegetation was also starting to dry out on the central Red Sea coast in Saudi Arabia south of Jeddah and near Tokar Delta in Sudan. However, vegetation remained green and soil was moist on the northern coast of Saudi Arabia and on the southern coastal plains in Sudan. In the spring breeding areas in the interior of Saudi Arabia, light rains fell on 8 February between Gassim and Tabuk. In Yemen, vegetation remained green on the plateau in the eastern region between Thamud and the Oman border. Mainly dry conditions prevailed in Oman.

EASTERN REGION

Light to moderate rains fell at times during the first half of February in a few places on the southern coast of Iran between Bushehr and Chabahar as well as inland areas of Jaz Murian. Consequently, ecological conditions remained favourable for breeding along the coast from Bushehr to Bandar Abbas and were improving between Jask and Chabahar, and in Jaz Murian. In southwest Pakistan, good rains fell on the 19–20th in coastal and interior areas of Baluchistan that are likely to cause ecological conditions to improve for breeding between Gwadar and Kharan.

Area Treated

Nearly 80 000 ha were treated during February.

Egypt	4 022 ha (February)
Eritrea	22 219 ha (February)
Iran	4 852 ha (3–23 February)
Saudi Arabia	18 468 ha (February)
Sudan	38 207 ha (February)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

No locust activity was reported during February.

• **FORECAST**

No significant developments are likely.

Mali

• **SITUATION**

Although surveys were not carried out during February, there were reports of immature and mature adults mixed with mainly fifth instar hoppers present in the north.

• **FORECAST**

Low numbers of locusts are likely to be present in parts of the Adrar des Iforas where small-scale breeding may occur.

Niger

• **SITUATION**

No locust activity was reported during February.

• **FORECAST**

No significant developments are likely.

Chad

• **SITUATION**

No locust activity was reported during February.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during February.

• **FORECAST**

No significant developments are likely.

Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During February, no locusts were seen in the Adrar (2753N/0017W) valley of the central Sahara, and no locusts were reported elsewhere in the country.

• **FORECAST**

Low numbers of adults may be present near Wadi Amded in the south and near irrigated perimeters in the Adrar Valley. Small-scale breeding will occur in parts of the Central Sahara that receive rainfall, causing locust numbers to increase slightly.

Morocco

• **SITUATION**

During February, low numbers of immature and mature solitarious adults were present at a few places along W. Draa south of Foum El Hassan (2901N/0853W) and Tata (2944N/0758W) near the Algerian border. Some of the mature adults were seen copulating during the third decade. No locusts were seen throughout the Western Sahara.

• **FORECAST**

Small-scale breeding will occur along the Draa Valley with hatching from mid-March onwards. This will be supplemented by breeding in other areas that receive rainfall south of the Atlas Mountains, causing locust numbers to increase slightly.

Libya

• **SITUATION**

No reports were received in February.

• **FORECAST**

Small-scale breeding is likely to occur between Ghat and Ghadames if rains fall.

Tunisia

• **SITUATION**

No locust activity was reported during February.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During February, second-generation breeding continued along the Red Sea coastal plains from Port Sudan (1938N/3713E) to the Eritrean border where groups of first-generation mature adults and at least two swarms continued to lay, hatching was in progress, hoppers formed groups and small bands, and fledglings formed small immature adult groups. One immature swarm was reported on the Eritrean border on the 22nd. Control operations treated 38 207 ha during of which 23 715 ha were by air. In the northeast, scattered immature and mature solitarious adults and a few immature and mature groups were present in Wadi Oko/Diib. In the Nile Valley, scattered mature adults were seen laying on the 25th at one place north of Dongola (1910N/3027E).

• **FORECAST**

Second-generation hatching should end by mid-March on the Red Sea coast. Hoppers and adults that are not detected or treated are expected to form groups, small bands and perhaps a few swarms. This could be supplemented by adult groups and a few small swarms arriving on the southern coast from further south. As vegetation dries out, adult groups may move to the Nile valley and perhaps the Gasht valley near Kassala. Any swarms that escape detection and control are likely to emigrate east across the Red Sea. The situation is expected to improve on the Red Sea coast by the end of the forecast period due to control operations, drying vegetation and emigration.

Eritrea

• **SITUATION**

During February, a few late first-generation mature adult groups were present on the northern Red Sea coast near Mehimet (1723N/3833E). Second-generation breeding continued along the coast between Foro (1515N/3937E) and the Sudanese border where hoppers formed groups and small bands, and fledglings formed groups of immature adults. One immature swarm was reported on the 15th. By the end of the month, the situation was improving as infestations declined due to control operations and drying vegetation. Ground teams treated 22 219 ha in February.

• **FORECAST**

The situation is expected to improve further on the Red Sea coastal plains as a result of control operations, drying conditions and the possible emigration of any immature groups and perhaps a few small swarms that were not detected or could not be treated. Consequently, residual populations of hoppers and adults may still concentrate and form a few small groups in those areas that remain green early in the forecast period.

Ethiopia

• **SITUATION**

No surveys were carried out and no locusts were reported in February.

• **FORECAST**

No significant developments are likely.

Djibouti

• **SITUATION**

No surveys were carried out and no locusts were reported in February.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

No reports were received in February.

• **FORECAST**

No significant developments are likely.

Egypt

• **SITUATION**

During February, scattered first-generation late instar solitarious hoppers were present at a few places on the coast between Abu Ramad (2224N/3624E) and Shalatyn (2308N/3535E) in the first decade. Numerous mature groups continued to appear throughout the month on the Red Sea coast and in Wadi Diib between Abu Ramad and Halaib (2213N/3638E) where they laid eggs. One swarm was seen laying on the 10th. Hatching commenced shortly after mid-month and second-generation hoppers formed small groups and bands. By the end of the month, some of the hoppers had reached second instar. Ground teams treated 4 022 ha. No locusts were present in the Lake Nasser area near Tushka (2247N/3126E), Abu Simbel (2219N/3138E) and Garf Husein (2317N/3252E).

• **FORECAST**

Second-generation breeding will continue with additional hatching until about mid-March and the formation of hopper groups and small bands. Any infestations that are not detected or controlled will start to fledge by the end of March, causing the formation of immature groups and perhaps a few small swarms.

Saudi Arabia

• **SITUATION**

During February, second-generation breeding continued along the Red Sea coast from Lith (2008N/4016E) to south of Al Wajh (2615N/3627E) where groups of adults and two swarms laid eggs and hoppers, groups and bands were present near Lith, between Thuwal (2215N/3906E) and Masturah (2309N/3851E), and near Yenbo (2405N/3802E). Control operations treated 18 468 ha during February of which 4 125 ha were by air. Residual populations of scattered immature and mature solitarious adults were present on the western and northern edges of the Empty Quarter, and one copulating swarm was seen south to the northwest of Jubail (2700N/4939E) and south of Kuwait on the 24th. In the spring breeding areas of the interior, adult groups laid eggs between Zalim (2248N/4210E) and Gassim (2621N/4358E) during the first week.

• **FORECAST**

Hopper and adult groups, small bands and probably a few small swarms will continue to form on the Red Sea coast. As vegetation dries out on the coast, any adult groups or swarms that escape detection and control are expected to move to the spring breeding areas of the interior, mature and lay in areas that receive rainfall. This could be supplemented by immature swarms arriving from the western side of the Red Sea from early March onwards.

Yemen

• **SITUATION**

During February, breeding continued in the eastern province of Al Maharah on the plateau between Remah (1727N/5034E) and Hat (1719N/5205E) where adult groups were seen laying and solitarious and *transiens* hoppers of all instars were present at densities up to 30 hoppers/m^2. Scattered immature and mature solitarious adults were present throughout these areas as well as in W. Hadhramaut east of Sayun (1559N/4844E), north of W. Hadhramaut and on the coast near Al Ghaydah (1612N/5210E). Limited breeding occurred on the coast near Al Ghaydah. One mature swarm appeared in a few cultivated areas of W. Hadhramaut east of Sayun on the 26th. No locusts were seen elsewhere on the southern coast to Aden (1250N/4503E) or northwest of Thamud.

• **FORECAST**

Another generation of hatching is expected about mid-March that will cause hopper groups and perhaps a few small bands to form in the eastern region between Thamud and the Omani border. Adult groups and a few small swarms could start to form at the end of the forecast period and move to Wadi Hadhramaut, Shabwah and Marib, and eventually breed in areas that receive rainfall. Scattered locusts are likely to be present on the Red Sea coast, but breeding is likely to be limited unless further rains fall.

Oman

• **SITUATION**

During February, isolated immature solitarious adults were present at three places in the northern interior near Ibri (2314N/5630E) and Buraimi (2415N/5547E). No locusts were seen elsewhere in the northern interior, on the northern Batinah coast and on the Musandam Peninsula. In the southern region of Dhofar, no locusts were seen near the Yemen border at Maziuna (1750N/5239E) and on the edge of the Empty Quarter on 20–21 February.

• **FORECAST**

Small-scale breeding will occur in areas that receive rainfall in the northern interior and on the Batinah coast, causing locust numbers to increase slightly.

Jordan

• **SITUATION**

During the last decade of February, no locusts were seen during surveys carried out in the southwest near the Gulf of Aqaba between Aqaba (2932N/3500E) and the border of Saudi Arabia.

• **FORECAST**

There is a very low risk of a few adult groups or perhaps a small swarm arriving in the south during periods of southerly winds.

Israel

• **FORECAST**

There is a very low risk of a few adult groups or perhaps a small swarm arriving in the extreme south during periods of southerly winds.

Bahrain, Iraq, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During February, several immature groups and swarms, and laying mature groups and swarms were seen on the southern coast in the Nakhilou area (2652N/5329E) to the west of Bander-e Lengheh (2634N/5452E) in the first week. Several mature groups and swarms were also seen laying further east in subcoastal areas near Minab (2708N/5705E) on the 23rd. Scattered mature solitarious adults were seen copulating on the southwest coast between Bushehr (2854N/5050E) and the Iraq border during the second and third weeks while scattered mature solitarious adults were present in the Jaz Murian Basin near Ghale Ganj (2731N/5752E) and on the southeast coast near Jask (2540N/5746E). Control operations treated 4 582 ha on 3–23 February of which 480 ha were by air.

• **FORECAST**

Breeding will occur on the southern coastal plains from Bushehr to Minab, causing hopper groups and perhaps small bands to form. Fledging is expected to start by the end of March that could give rise to immature groups and perhaps a few small swarms. Smaller-scale breeding is likely to occur in the Jaz Murian Basin and on the southeast coastal plains from Jask to Chabahar.

Pakistan

• **SITUATION**

No surveys were carried out and no locusts were reported in February.

• **FORECAST**

Low numbers of adults are expected to appear in coastal and interior areas of Baluchistan and breed on a small scale in areas that receive rainfall.

India

• **SITUATION**

No locusts were seen in Rajasthan and Gujarat during February.

• **FORECAST**

No significant developments are likely.

Afghanistan

• **SITUATION**

No reports received.

• **FORECAST**

No significant developments are likely.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.
Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.
Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.
Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin for the current month; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled or planned:

- **CLCPRO.** 9th Regional workshop on Desert Locust information management in the Western Region, Tunis, Tunisia (8–11 April)
- **CLCPRO.** Training of master trainers on Desert Locust survey techniques, Agadir, Morocco (21–27 April)
- **SWAC.** 25th Desert Locust joint survey in the spring breeding areas of Iran and Pakistan (April)
- **CRC/SWAC.** 11th Interregional workshop for Desert Locust Information Officers, Addis Ababa, Ethiopia (24–28 June)
- **CLCPRO.** 14th Executive committee meeting, Agadir, Morocco (24–28 June)
- **DLCC.** 41st Session [tbc]

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague
- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline
- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green
- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow
- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange
- *Threat*. Threat to crops; survey and control operations must be undertaken

Red
- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western
- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central
- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel,

Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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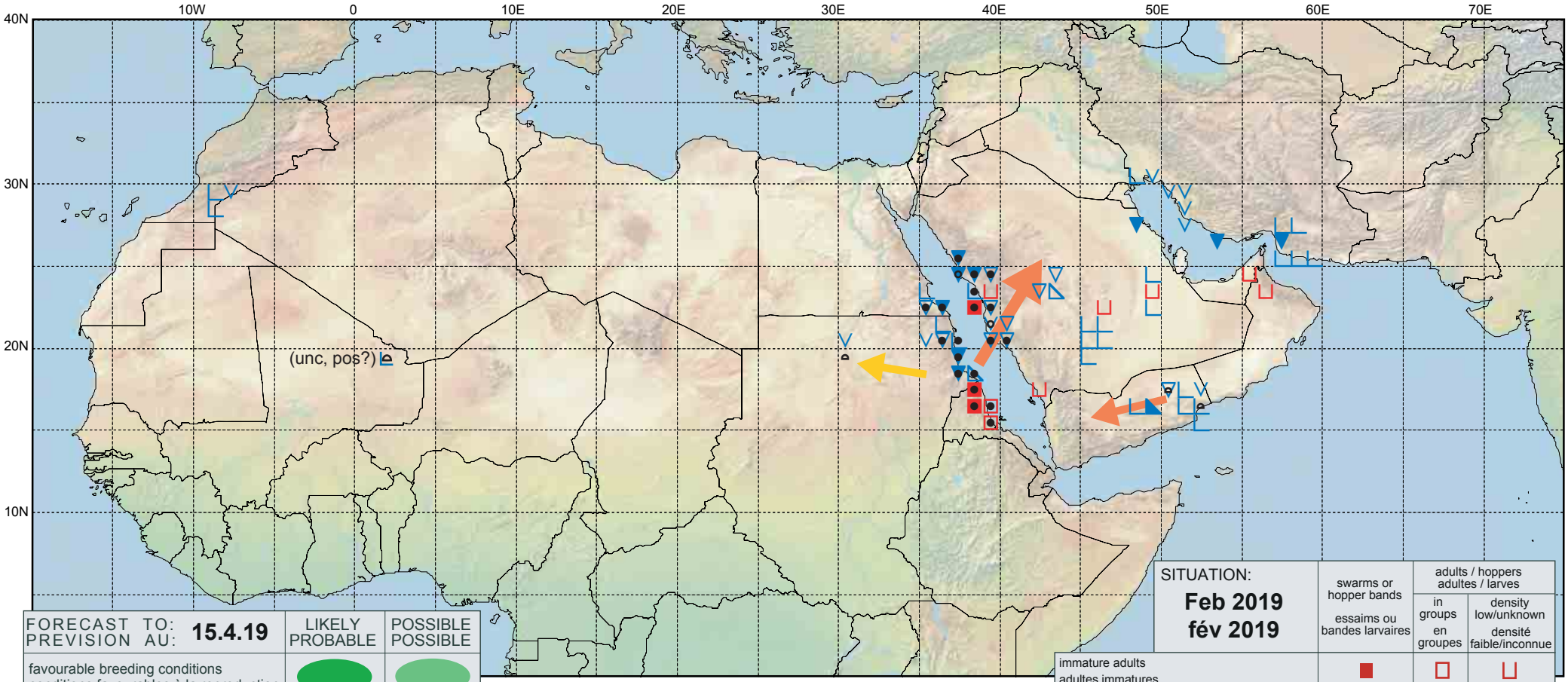

FORECAST TO: PREVISION AU: **15.4.19**	LIKELY PROBABLE	POSSIBLE POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Feb 2019 fév 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves in groups en groupes	density low/unknown densité faible/inconnue
immature adults adultes immatures			
mature or partly mature adults adultes matures ou partiellement matures			
adults, maturity unknown adultes, maturité inconnue			
egg laying or eggs pontes ou œufs			
hoppers larves			
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)			

Food and Agriculture Organization of the United Nations

No. 486 3 APR 2019

Desert Locust Bulletin

General situation during March 2019
Forecast until mid-May 2019

WESTERN REGION: CALM

SITUATION. Local breeding commenced in eastern **Algeria**. There were unconfirmed reports of hoppers and adults in northern **Mali**.

FORECAST. Small-scale breeding will occur south of the Atlas Mountains in **Morocco** and **Algeria,** but locust numbers will remain low. Limited breeding may continue in northern **Mali**.

CENTRAL REGION: THREAT

SITUATION. Control operations continued against second-generation breeding on the Red Sea coast of **Sudan**, **Eritrea**, **Egypt** and **Saudi Arabia** where hopper and adult groups, hopper bands and swarms formed. Breeding continued in eastern **Yemen** and started in the interior of Saudi Arabia.

FORECAST. Breeding will decline on the Red Sea coast but increase in the interior of **Saudi Arabia** where hopper groups and bands are likely to form. Adults may appear and breed in the Nile Valley of northern **Sudan**. Adult groups and perhaps a few small swarms will move from eastern **Yemen** to Hadhramaut and the central interior of Yemen, and breed if rains fall.

EASTERN REGION: CAUTION

SITUATION. Control operations were undertaken in southern **Iran** and southwest **Pakistan** where breeding by adult groups and a few swarms was in progress.

FORECAST. Breeding will continue in **Iran** and **Pakistan**, giving rise to hopper groups and bands.

Situation improving on Red Sea coast

The Desert Locust situation was slowly improving along both sides of the Red Sea during March as a result of intensive control operations that treated more than 80 000 ha and due to drying conditions. Nevertheless, second-generation breeding continued in those areas of Sudan and Saudi Arabia where ecological conditions remained favourable, giving rise to additional hopper and adult groups, bands and a few swarms. Some adult groups moved to the spring breeding areas in the interior of Saudi Arabia and laid eggs. In southwest Asia, adult groups and a few swarms were breeding on the southern coast of Iran and hatching commenced at the end of March. Adult groups and at least one swarm appeared in adjacent areas of southwest Pakistan in mid-March where they were laying eggs. Control operations were in progress in both countries. Elsewhere, local breeding occurred in eastern Algeria. During the forecast period, locust numbers will decline along both sides of the Red Sea but will increase in the spring breeding areas in the interior of Saudi Arabia, and coastal and interior areas of southern Iran and southwest Pakistan where hopper groups and bands are expected to form. Some of these could eventually form adult groups and perhaps a few small swarms by late May. Adults groups may also appear in the Nile Valley in northern Sudan and breed near cropping areas. Smaller-scale breeding will occur in areas south of the Atlas Mountains in Morocco and Algeria that receive rainfall.

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Weather & Ecological Conditions in March 2019

Conditions were becoming dry in the winter breeding areas along both sides of the Red Sea except in northwest Saudi Arabia. Good rains fell in the spring breeding areas of eastern Saudi Arabia, southern Iran and southwest Pakistan.

WESTERN REGION

Very little rain fell during March except for a few light showers in some areas of the central Sahara in Algeria. Consequently, ecological conditions remained generally dry and unfavourable for breeding except for Morocco, south of the Atlas Mountains in parts of the Draa and Ziz-Ghris valleys near the Algerian border, in Wadi Sakia El Hamra, and in Algeria near the edges of irrigated perimeters in the Adrar Valley in the central Sahara, and in the east near Illizi.

CENTRAL REGION

Very little rain fell during March in winter breeding areas along both sides of the Red Sea except for light to moderate showers on the northern coast of Saudi Arabia. Consequently, vegetation remained green on the northern coast from Yenbo to Al Wajh but was drying out elsewhere on the coastal plains along both sides of the Red Sea. Good rains fell in the spring breeding areas of the interior of Saudi Arabia during the last decade of the month from east of Riyadh to the Persian Gulf while vegetation was already green between Gassim and Hail. Although light showers fell at times in northern Oman, breeding conditions remained generally unfavourable.

EASTERN REGION

Light to moderate rains fell along the coast of southern Iran and southwest Pakistan during March. Rainfall was particularly heavy during the second and third decades between Bushehr and Bandar Abbas in Iran. Light rain fell in the adjacent interior areas of both countries. Consequently, ecological conditions were favourable for breeding in nearly all coastal areas of Iran and were improving in the interior areas of Jaz Murian as well as coastal and interior areas of Baluchistan, Pakistan.

Area Treated

Nearly 86 000 ha were treated during March.

Egypt	4 021 ha (March)
Eritrea	7 115 ha (1–18 March)
Iran	100 ha (24–28 Feb)
	2 760 ha (1–26 March)
Pakistan	345 ha (March)
Saudi Arabia	45 705 ha (March)
Sudan	25 950 ha (March)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

No locust activity was reported during March.

• **FORECAST**

No significant developments are likely.

Mali

• **SITUATION**

On 4–12 March, there were unconfirmed reports by nomads, travellers and locals of immature and mature solitarious adults mixed with late-instar solitarious hoppers present in the north at three places in the Tilemsi Valley to the west of Aguelhoc (1927N/0052E).

• **FORECAST**

Low numbers of locusts will persist in parts of the Adrar des Iforas. No significant developments are likely.

Niger

• **SITUATION**

No locust activity was reported during March.

• **FORECAST**

Isolated adults may be present in parts of the Air Mountains. No significant developments are likely.

Chad

• **SITUATION**

No locust activity was reported during March.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during March.

• **FORECAST**

No significant developments are likely.

Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During March, low numbers of mature solitarious adults were present in the east near Illizi (2630N/0825E) where a few adults were copulating, and at one place in the Central Sahara near Reggane. No locusts were seen in the northwest between Bechar (3135N/0217W) and Beni Abbes (3011N/0214W), in the Adrar (2753N/0017W) valley, and in the southern Sahara west of Tamanrasset (2250N/0528E).

• **FORECAST**

Small-scale hatching will occur near Illizi and limited breeding is expected to occur in other areas of the Sahara that receive rainfall, causing locust numbers to increase slightly.

Morocco

• **SITUATION**

No surveys were carried out and no locusts were reported in March.

• **FORECAST**

Low numbers of adults are almost certainly present and breeding on a small scale along the Draa Valley and W. Sakia El Hamra. Hatching may have commenced about mid-March and will continue during the forecast period, causing locust numbers to increase slightly.

Libya

• **SITUATION**

No reports were received in March.

• **FORECAST**

Small-scale breeding is likely to occur between Ghat and Ghadames if rains fall.

Tunisia

• **SITUATION**

No locust activity was reported during March.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During the first week of March, several immature swarms were reported on the southern coastal plains of the Red Sea along the Eritrean border near Karora (1745N/3820E). Second-generation breeding continued along the coast from Karora to Bir Salalah (2034N/3702E) where adult groups were copulating, and hatching occurred during the first half of the month. Consequently, additional hopper groups and bands as well as groups of immature and mature adults formed throughout the month. Control operations treated 25 950 ha during March of which 13 940 ha were by air. In the northeast, scattered immature and mature solitarious adults were present in a few places along Wadi Oko/Diib.

• **FORECAST**

Late second-generation hatching and the formation of hopper groups and bands, adult groups and perhaps a few small swarms are likely to continue during April. Thereafter, the situation is expected to improve along the Red Sea coast due to control operations, drying conditions and emigration to the Nile Valley or east across the Red Sea by any infestations that are not detected or treated.

Eritrea

• **SITUATION**

During March, the situation improved dramatically along the Red Sea coastal plains due to control operations and drying conditions. Consequently, only residual infestations of immature adults and groups, some of which were maturing, were present between Massawa (1537N/3928E) and Embere (1628N/3856E) and, to a lesser extent, near Mehimet (1723N/3833E) and the Sudan border. Ground teams treated 7 115 ha on 1–18 March.

• **FORECAST**

No significant developments are likely.

Ethiopia

• **SITUATION**

No surveys were carried out and no locusts were reported in March.

• **FORECAST**

No significant developments are likely.

Djibouti

• **SITUATION**

No surveys were carried out and no locusts were reported in March.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

No reports were received in March.

• **FORECAST**

No significant developments are likely.

Egypt

• **SITUATION**

During the first half of March, egg-laying by mature adult groups and hatching continued on the Red Sea coastal plains and in Wadi Diib between Abu Ramad (2224N/3624E) and Halaib (2213N/3638E), causing hopper groups and bands to form in a few places. By the end of the month, fledging had started in some areas. Ground control operations treated 4 021 ha during March. Mature solitarious adults were present in coastal and subcoastal areas near Berenice (2359N/3524E) and El Sheikh El Shazly (2412N/3438E) while no locusts were seen between Marsa Alam (2504N/3454E) and Hurghada (2717N/3347E),

and near Lake Nasser. In the southwest, numerous maturing solitarious adults were seen at Jebel Uweinat (2154N/2458E) near the Libya/Sudan border.

• **FORECAST**

Fledgling will continue during April and, as vegetation dries out, a limited number of immature adult groups and perhaps a few very small swarms could form between Abu Ramad and Halaib. Thereafter, the situation is expected to improve due to control operations and drying conditions.

Saudi Arabia

• **SITUATION**

During March, second-generation laying by mature adult groups and swarms continued on the northern Red Sea coast near Umm Lajj (2501N/3716E) in the first week, giving rise to additional hopper groups and bands. Elsewhere on the Red Sea coastal plains, hopper groups and bands and immature adult groups were present between Lith (2008N/4016E) and Umm Lajj. One immature swarm formed on the 20th near Thuwal (2215N/3906E) while some of the adult groups along the coast became mature from mid-month onwards. In the spring breeding areas of the interior, a mature swarm was seen copulating on the 20th west of Jubail (2700N/4939E) and mature adult groups were copulating to the northwest and southeast of Gassim (2621N/4358E). Control operations treated 45 705 ha during March of which 4 300 ha were by air.

• **FORECAST**

The situation on the Red Sea coast is expected to improve due to control operations, drying conditions and emigration to spring breeding areas. Nevertheless, adult groups and perhaps a few small swarms are likely to form from any infestations that are not detected or treated and move to the interior between Gassim, Hail and Jubail where one generation of breeding is likely to lead to the formation of hopper groups and small bands.

Yemen

• **SITUATION**

During 1–3 March, no locusts were seen on the southern coastal plains near Aden (1250N/4503E). In the eastern province of Al Maharah, early instar hopper groups and bands were reported on the 21st in Wadi Seaf (1618N/5100E) where breeding occurred during February. No surveys were carried out in Wadi Hadhramaut or the interior.

• **FORECAST**

Hopper groups and bands are likely to be present in the eastern region between Thamud and the Omani border, giving rise to adult groups and a few small swarms that are expected to move to Wadi Hadhramaut, Shabwah and Marib where they could eventually breed in areas that receive rainfall.

Oman

• **SITUATION**

During March, isolated immature solitarious adults were present at one place on the Batinah coast near Jamma (2333N/5733E). No locusts were seen elsewhere on the northern coast, in the northern interior near Buraimi (2415N/5547E), Nizwa (2255N/5731E), Ibra (2243N/5831E) and to the west and east of the Wahiba Sands.

• **FORECAST**

Small-scale breeding will occur in areas that receive rainfall in the northern interior and on the Batinah coast, causing locust numbers to increase slightly.

Jordan

• **SITUATION**

No locusts were reported during March.

• **FORECAST**

No significant developments are likely.

Israel

• **SITUATION**

No locusts were reported during March.

• **FORECAST**

No significant developments are likely.

Bahrain, Iraq, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During March, breeding continued on the southeast coast where a mature swarm was seen copulating near Minab (2708N/5705E) on the 3rd, adult groups laid eggs near Chabahar (2517N/6036E) throughout the month, and solitarious adults continued to lay eggs on the southwest coast near Bushehr (2854N/5050E) and Bander-e Lengheh (2634N/5452E). Hatching started during the second week and, by the 25th, groups of first to third instar hoppers formed in the Nakhilou area (2652N/5329E) to the west of Bander-e Lengheh. During the last week, hatching of solitarious hoppers commenced on the southeast coast west of Chabahar. Ground control operations treated 2 760 ha on 1–26 March.

• **FORECAST**

Breeding will continue on the southern coastal plains from Bushehr to Chabahar where further hatching is expected between Jask and Chabahar with the possibility of hoppers forming groups and small bands. Fledging is expected to start by mid-April initially on the southwest coast, followed by the southeast, which could give rise to immature groups and perhaps a few small swarms. Breeding is likely to extend to the Jaz Murian Basin.

Pakistan

• **SITUATION**

During March, isolated immature and mature solitarious adults first appeared on the Baluchistan coast in the Uthal (2548N/6637E) area west of Karachi. On the 16th, a small mature swarm was seen copulating on the coast at Pasni (2515N/6328E). During the following week, an immature adult group and several groups of mature adults were reported in the Kulanch Valley to the west of Pasni. The mature adults were copulating and laying eggs. Ground teams treated 345 ha. No locusts were seen between Uthal and Khuzdar (2749N/6639E) and along the coast east of Pasni.

• **FORECAST**

Hatching will commence in early April in the Kulanch Valley, giving rise to hopper groups and a few small hopper bands that will start to fledge at the end of the forecast period and form immature adult groups. Additional breeding will occur in coastal and interior areas that receive rainfall. Local infestations may be further supplemented by additional adults, small groups and perhaps a swarm arriving from adjacent areas of southeast Iran.

India

• **SITUATION**

No locusts were seen in Rajasthan and Gujarat during March.

• **FORECAST**

No significant developments are likely.

Afghanistan

• **SITUATION**

No reports received.

• **FORECAST**

No significant developments are likely.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.

Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.

Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.

Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin for the current month; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled or planned:

- **CLCPRO.** 9th Regional workshop on Desert Locust information management in the Western Region, Tunis, Tunisia (8–11 April)
- **CLCPRO.** Training of master trainers on Desert Locust survey techniques, Agadir, Morocco (21–27 April)
- **SWAC.** 25th Desert Locust joint survey in the spring breeding areas of Iran and Pakistan (5 April – 8 May)
- **CRC/SWAC.** 11th Interregional workshop for Desert Locust Information Officers, Addis Ababa, Ethiopia (24–28 June)
- **CLCPRO.** 14th Executive committee meeting, Agadir, Morocco (24–28 June)
- **DLCC.** 41st Session [tbc]

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)

- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)

- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group

- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small

- swarm: less than 1 km²
- band: 1–25 m²

Small

- swarm: 1–10 km²
- band: 25–2,500 m²

Medium

- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large

- swarm: 100–500 km^2
- band: 10–50 ha

Very large

- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light

- 1–20 mm

Moderate

- 21–50 mm

Heavy

- more than 50 mm

Summer rains and breeding areas

- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas

- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas

- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding

- The process of reproduction from copulation to fledging

Recession

- Period without widespread and heavy infestations by swarms

Remission

- Period of deep recession marked by the complete absence of gregarious populations

Outbreak

- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge

- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague

- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline

- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green

- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow

- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange

- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

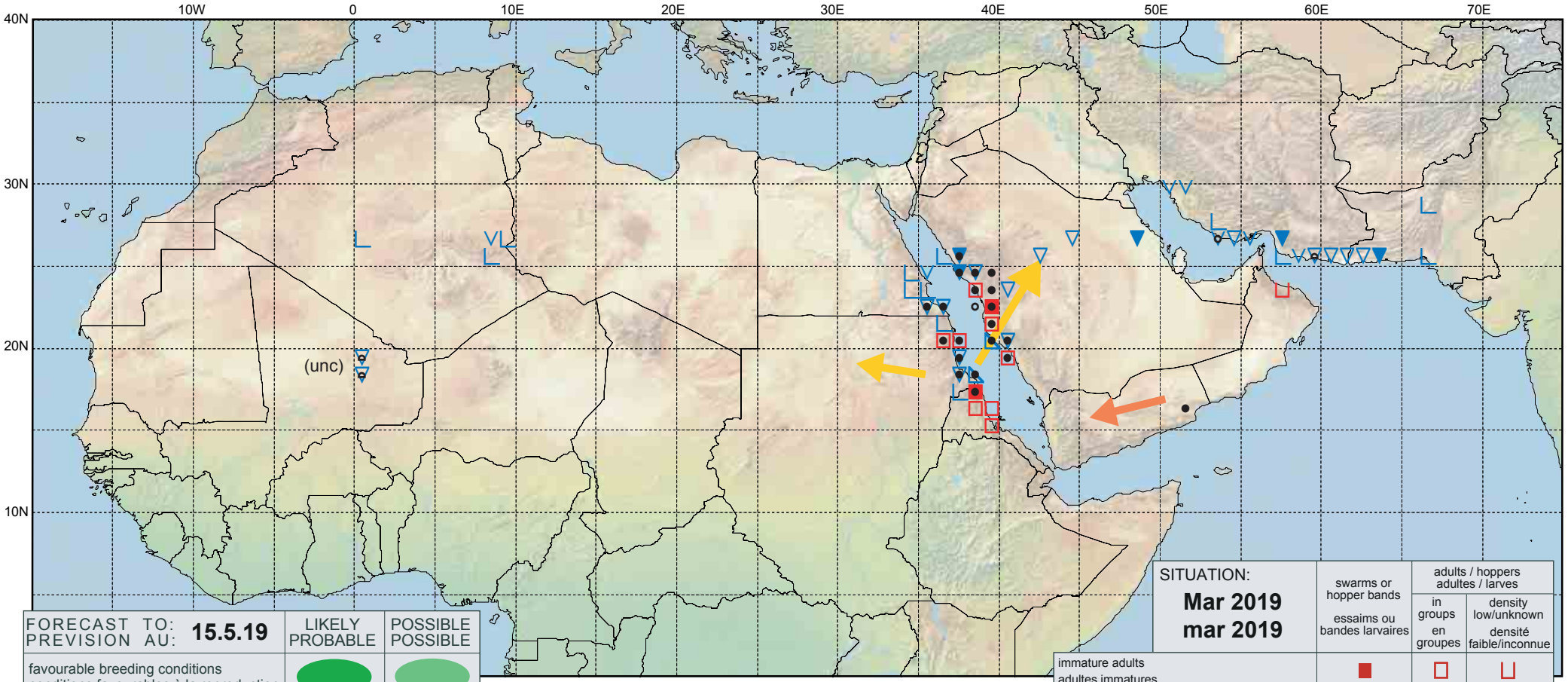
FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

486



FORECAST TO: / PREVISION AU: **15.5.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Mar 2019 mar 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves	
		in groups en groupes	density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	L
adults, maturity unknown adultes, maturité inconnue	▲	△	Λ
egg laying or eggs pontes ou œufs	▼	▽	V
hoppers larves	●	○	⌓
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊟

Food and Agriculture Organization of the United Nations

No. 487 3 MAY 2019

Desert Locust Bulletin

General situation during April 2019
Forecast until mid-June 2019

WESTERN REGION: CALM

SITUATION. Local breeding occurred in northwest **Mauritania**, where control was undertaken, and in eastern **Algeria**. Isolated adults were present in **Morocco**.

FORECAST. Small-scale breeding will occur south of the Atlas Mountains in **Morocco** and **Algeria,** but locust numbers will remain low. Scattered adults will persist in northwest **Mauritania**.

CENTRAL REGION: THREAT

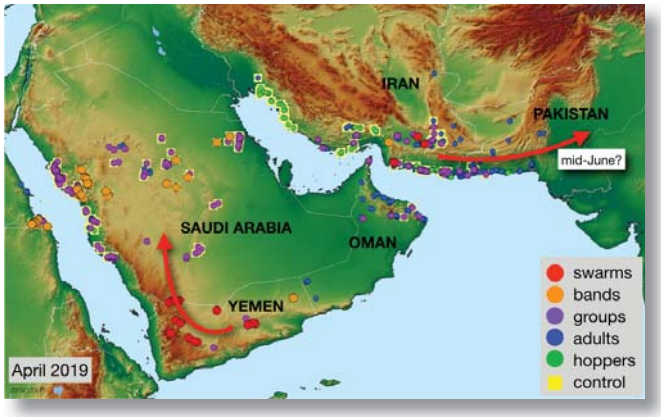
SITUATION. Control operations declined in winter breeding areas on the Red Sea coast in **Egypt** and **Saudi Arabia** but increased in the interior of Saudi Arabia where spring breeding was underway and hopper groups and bands formed. Swarms formed in **Yemen** and moved throughout the interior. Control was undertaken against adult groups that moved to northern **Oman** and bred.

FORECAST. Breeding will continue in the interior of **Saudi Arabia** where hopper and adult groups, bands and perhaps small swarms could form. Breeding will cause hopper bands to form in the interior of **Yemen**. Hopper groups may form in northern **Oman**. Adults may appear and breed in the Nile Valley of northern **Sudan**.

EASTERN REGION: THREAT

SITUATION. Control operations were undertaken in southern **Iran** and southwest **Pakistan** where breeding by adult groups and a few swarms was in progress.

FORECAST. Any infestations that are not detected or controlled in the spring breeding areas are likely to form adult groups and a few small swarms that could move towards the **Indo-Pakistan** border summer breeding areas by mid-June.



Locust infestations increase in spring breeding areas

While the Desert Locust situation improved along both sides of the Red Sea during April, it intensified in spring breeding areas of Saudi Arabia and Iran. Substantial aerial and ground control operations treated more than 86 000 ha in Iran where breeding continued for a third consecutive month within a large portion of the south, giving rise to groups of hoppers and adults, hopper bands and a few swarms. Smaller-scale breeding occurred in adjacent areas of southwest Pakistan and control was undertaken. There is a moderate risk that adult groups and perhaps a few small swarms will move early towards the Indo-Pakistan summer breeding areas in about mid-June. Spring breeding commenced in the interior of Saudi Arabia where hoppers formed groups and bands. Aerial and ground teams treated more than 27 000 ha on the coast and in the interior. Swarms formed in Yemen from earlier breeding in the southern Empty Quarter and moved throughout the interior of the country where survey and control operations were not possible, so locals were catching and eating locusts. Several swarms moved to Najran, Saudi Arabia. A few small adult groups moved from eastern Yemen to northern Oman where they laid eggs and limited control operations were conducted. Nevertheless, small-scale breeding is expected. In Yemen, hatching will cause locust numbers to increase significantly in the interior where hopper bands are expected to form. Elsewhere local breeding occurred in northwest Mauritania where control was undertaken and in eastern Algeria, but the situation will remain calm.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in April 2019

Good rains fell in the spring breeding areas of Saudi Arabia, Yemen, southern Iran and southwest Pakistan where conditions were favourable for breeding.

WESTERN REGION

Very little rain fell during April except for light to moderate showers in eastern Algeria and southwest Libya. Consequently, ecological conditions remained generally dry and unfavourable for breeding except in Algeria near Illizi and along the edges of irrigated perimeters in the Adrar Valley, and in Morocco south of the Atlas Mountains in parts of the Draa and Ziz-Ghris valleys near the Algerian border.

CENTRAL REGION

Light to moderate rains fell in the spring breeding areas of the interior of Saudi Arabia and the western portion of the interior in Yemen. Consequently, ecological conditions were favourable for breeding in Saudi Arabia between Riyadh and Hail and along the western edge of the Empty Quarter near Wadi Dawasir and south of Riyadh. In Yemen, conditions were favourable between Al Hazm, Ataq and Shabwah, mainly along the western edge of Ramlat Sabatyn and in wadis that received run-off from the highlands. Good rains fell at times in the interior and coast of northern Oman where breeding conditions were favourable in some areas and improving in other places. In the winter breeding areas along both sides of the Red Sea, vegetation continued to dry out and ecological conditions were not favourable for further breeding.

EASTERN REGION

Light to moderate rains fell mainly during the second decade of April in the spring breeding areas of southeast Iran and southwest Pakistan. Showers were heaviest in coastal areas of both countries. Good rains also fell in southwest Iran during the first decade of the month, causing widespread flooding similar to the previous month. Ecological conditions remained favourable for breeding throughout coastal and interior areas of southern Iran and, to a lesser extent, in adjacent areas of Baluchistan, Pakistan.

Area Treated

Nearly 123 000 ha were treated during April.

Egypt	7 470 ha (April)
Iran	200 ha (27–30 March)
	86 570 ha (April)
Mauritania	88 ha (April)
Oman	12 ha (April)
Pakistan	540 ha (April)
Saudi Arabia	27 812 ha (April)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

During April, small-scale breeding occurred in the northwest where solitarious and *transiens* hoppers of all instars and immature adults were present at a few places between Akjoujt (1945N/1421W) and Atar (2032N/1308W) and southwest of Chinguetti (2027N/1221W). Control teams treated 88 ha.

• **FORECAST**

Low numbers of locusts are likely to persist in a few places of southwest Adrar.

Mali

• **SITUATION**

No locust activity was reported during April.

• **FORECAST**

Low numbers of locusts are likely to be present and will persist in parts of the Adrar des Iforas. No significant developments are likely.

Niger

• **SITUATION**

No locust activity was reported during April.

• **FORECAST**

Isolated adults may be present in parts of the Air Mountains. No significant developments are likely.

Chad

• **SITUATION**

No locust activity was reported during April.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No reports were received in April.

• **FORECAST**

No significant developments are likely.

Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During April, low numbers of mature solitarious adults were present in the Adrar (2753N/0017W) valley, in the east near Illizi (2630N/0825E), and in the southern Sahara west of Tamanrasset (2250N/0528E). No locusts were seen in the northwest near Bechar (3135N/0217W). Breeding was reported near Illizi.

• **FORECAST**

Small-scale hatching will occur near Illizi and limited breeding is expected to occur in other areas of the central Sahara that received rainfall, causing locust numbers to increase slightly.

Morocco

• **SITUATION**

During the first half of April, isolated mature solitarious adults were present at two places in the Draa Valley near the Algerian border to the south of Tata (2944N/0758W) and southwest of Erfoud (3128N/0410W). No locusts were seen elsewhere in the Draa Valley.

• **FORECAST**

Small-scale breeding will cause locust numbers to increase slightly in the Draa Valley and may occur in W. Sakia El Hamra, especially if further rains fall in these areas.

Libya

• **SITUATION**

No reports were received in April.

• **FORECAST**

Small-scale breeding is likely to occur between Ghat and Ghadames if rains fall.

Tunisia

• **SITUATION**

No locust activity was reported during April.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

No reports were received in April.

• **FORECAST**

Residual hoppers, adults and groups are almost certainly present along parts of the Red Sea coast between Suakin and the Eritrean border; however, infestations will decline as conditions dry out further and no significant developments are likely. Scattered adults and perhaps a few small groups could appear in the Nile Valley and breed near cropping areas.

Eritrea

• **SITUATION**

No surveys were carried out and no locusts were reported in April.

• **FORECAST**

No significant developments are likely.

Ethiopia

• **SITUATION**

No reports were received in April.

• **FORECAST**

No significant developments are likely.

Djibouti

• **SITUATION**

No surveys were carried out and no locusts were reported in April.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

No reports were received in April.

• **FORECAST**

No significant developments are likely.

Egypt

• **SITUATION**

During April, hatching concluded by mid-month on the Red Sea coastal plains and subcoastal areas in the southeast between Abu Ramad (2224N/3624E) and Halaib (2213N/3638E). As a result, hopper groups and bands of second to fifth instar hoppers were present south of Halaib, near Abu Ramad and west of Abu Ramad in Wadi Boway (2217N/3546E). By the end of the month, many hoppers had fledged to form gorups of immature adults, and the situation was improving. Ground teams treated 7 470 ha during April. Isolated immature and mature solitarious adults were seen further north along the coast between Berenice (2359N/3524E) and Marsa Alam (2504N/3454E). No locusts were seen near Lake Nasser.

• **FORECAST**

Locust infestations will continue to decline on the Red Sea coastal plains while scattered adults and perhaps a few small groups could appear near Lake Nasser.

Saudi Arabia

• **SITUATION**

During April, mature adult groups finished laying by the second week on the northern Red Sea coast between Umm Lajj (2501N/3716E) and Al Wajh (2615N/3627E). Hopper groups and bands, and immature and mature adult groups persisted along the coast between Bader (2346N/3847E) and Al Wajh and, to a lesser extent, near Thuwal (2215N/3906E). Immature adult groups were present near Lith (2008N/4016E). In the spring breeding areas of the interior, hatching occurred between Riyadh (2439N/4642E) and Gassim (2621N/4358E) and west of

Jubail (2700N/4939E) in the east, and hoppers formed groups and bands. Mature adults and groups were scattered and laying between Gassim and Hail (2731N/4141E) as well as a few places along the western edge of the Empty Quarter between Wadi Dawasir (2028N/4747E) and Riyadh. On the 27–28th, an immature and several mature swarms were seen near Najran (1729N/4408E) flying northwards from Yemen. Control operations treated 27 812 ha during April of which 3 200 ha were by air.

• **FORECAST**

The situation on the Red Sea coast will continue to improve due to control operations, drying conditions and emigration to spring breeding areas. Spring hatching and band formation will continue in the interior between Gassim and Hail and near Jubail and commence along the western edge of the Empty Quarter. Immature groups and perhaps a few small swarms could form by the end of the forecast period. Current infestations may be supplemented by immature and mature swarms arriving from Yemen.

Yemen

• **SITUATION**

During April, a late instar hopper band was reported in the east near the Oman border northwest of Hat (1719N/5205E) on the 3rd. There were increasing reports of immature and mature swarms moving progressively westwards in the interior after mid-month. On the 18th, swarms appeared in Wadi Hadhramaut near Sayun (1559N/4844E), Al Hazm (1610N/4446E) on the 22nd, Marib (1527N/4519E) on the 24th, Bayhan (1452N/4545E), Ataq (1435N/4649E) and the border of Saudi Arabia at Al Wadiah (1656N/4700E) on the 25th, and Sana'a (1521N/4412E) on the 26th. Several immature and mature groups were seen on the plateau northeast of Wadi Hadhramaut. Egg-laying occurred between Marib and Bayhan. Swarms continued to be reported in the interior until the end of the month, originating from eastern Yemen and the edge of the Empty Quarter where at least two generations of breeding occurred in areas that received heavy rains from two cyclones in May and October 2018. Locust survey and control operations could not be undertaken; however, locals were collecting and eating the locusts.

• **FORECAST**

Locust numbers are expected to increase significantly in the interior as hatching commences by mid-May, causing hopper groups and bands to form in areas of recent rainfall between Al Hazm, Ataq and Wadi Hadhramaut.

Oman

• **SITUATION**

During April, a low-density group of adults was seen in the south near the Yemen border and Maziuna (1750N/5239E) on the 19th. During the last decade of the month, a few small groups of immature and mature *transiens* adults appeared in the northern interior near Nizwa (2255N/5731E) and Ibri (2314N/5630E) and on the coast between Muscat (2337N/5833E) and Sur (2234N/5930E). Ground teams treated a total of 12 ha in four farms. Copulating was reported near Nizwa by adult groups on the 23rd and on the Batinah coast near Jamma (2333N/5733E) by scattered gregarious adults. On the 25th, groups of mature adults were seen flying on the Musandam Peninsula near Khasab (2610N5615E) that flew to Iran on the following day. Scattered immature and mature solitarious adults were present elsewhere along the Batinah coast and in the northern interior.

• **FORECAST**

Hatching will commence by mid-May in the northern interior and coastal areas, causing locust numbers to increase slightly with perhaps a few small groups of hoppers and adults forming. There is a low risk that a few additional groups may appear in the south from adjacent areas of eastern Yemen and move northwards.

Bahrain, Iraq, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During April, widespread laying by adult groups and hatching continued for a third consecutive month on the southern coastal plains between Bander-e Lengheh (2634N/5452E) and the Pakistan border, inland from Bandar Abbas (2711N/5619E), and in the Jaz Murian Basin of the interior between Kahnuj (2757N/5742E) and Iranshahr (2712N/6042E). Solitarious adults were also laying eggs in these areas as well as unusually far north in South Khorasan province near Nehbandan (3133N/6002E). Hopper groups were present on the southeast coast between Jask (2540N/5746E) and Chabahar (2517N/6036E), in the Jaz Murian Basin and, to a lesser extent, on the coast west of Bander-e Lengheh while solitarious hoppers were present on the coast near Bushehr (2854N/5050E). An early instar hopper band was seen at mid-month near Minab (2708N/5705E). By the end of the month, there was an increasing number of immature adults as hoppers fledged. Control operations treated 86 570 ha during April of which 15 920 ha were by air.

• **FORECAST**

Breeding will continue on the southern coastal plains from Bushehr to Chabahar where further hatching and the formation of hopper groups and bands is expected. As more hoppers fledge, immature adults will form groups and a few small swarms. There may be a risk of a second generation of breeding if conditions remain favourable; otherwise, any locusts escaping detection and control are likely to begin

moving towards the Indo-Pakistan summer breeding areas in June.

Pakistan

• **SITUATION**

During April, small groups of gregarious first to fourth instar hoppers were present in coastal areas from Pasni (2515N/6328E) to the Iranian border from breeding that occurred in late February and March. Scattered mature solitarious adults were present mainly on the coast between Gwadar (2508N/6219E) and the Iran border and, to a lesser extent in the interior near Turbat (2600N/6303E), Panjgur (2658N/6406E), Kharan (2832N/6526E), Khuzdar (2749N/6639E), and in the Uthal (2548N/6637E) area west of Karachi. Breeding was still in progress at mid-month when a mature group was seen copulating at Gwadar while scattered solitarious adults were copulating nearby and at a few places on the coast between Pasni and Ormara (2512N/6438E) and near Uthal. First to fourth instar solitarious hoppers were seen near Ormara. A few immature groups were seen until mid-month in the southwest near Pasni and in the Shooli Valley south of Turbat that probably arrived from adjacent infestations in Iran. Ground teams treated 540 ha.

• **FORECAST**

Breeding will continue mainly in coastal areas of Baluchistan but will also extend on a smaller scale to the interior. As a result, further hatching will occur, and hoppers could form small groups in some areas. Fledging from earlier breeding will also take place that could give rise to a few small immature adult groups. There is a moderate to high risk of a few groups arriving from adjacent areas in Iran, some of which could move towards the summer breeding areas by the end of the forecast period.

India

• **SITUATION**

No locusts were seen in Rajasthan and Gujarat during April.

• **FORECAST**

There is a moderate risk that adult groups and perhaps a few small swarms could arrive from spring breeding areas at the end of the forecast period in Rajasthan ahead of the monsoon.

Afghanistan

• **SITUATION**

No locusts were reported during April.

• **FORECAST**

There is a low to moderate risk that a few small groups could appear in the south from adjacent spring breeding areas to the south and southwest.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.

Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.

Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.

Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin for the current month; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled or planned:

- **SWAC.** 25th Desert Locust joint survey in the spring breeding areas of Iran and Pakistan (5 April – 8 May)
- **CRC/SWAC.** 11th Interregional workshop for Desert Locust Information Officers, Addis Ababa, Ethiopia (24–28 June)
- **CLCPRO.** 14th Executive committee meeting, Agadir, Morocco (24–28 June)
- **DLCC.** 41st Session [tbc]

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)

- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague
- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline
- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green
- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow
- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange
- *Threat*. Threat to crops; survey and control operations must be undertaken

Red
- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western
- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central
- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern
- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

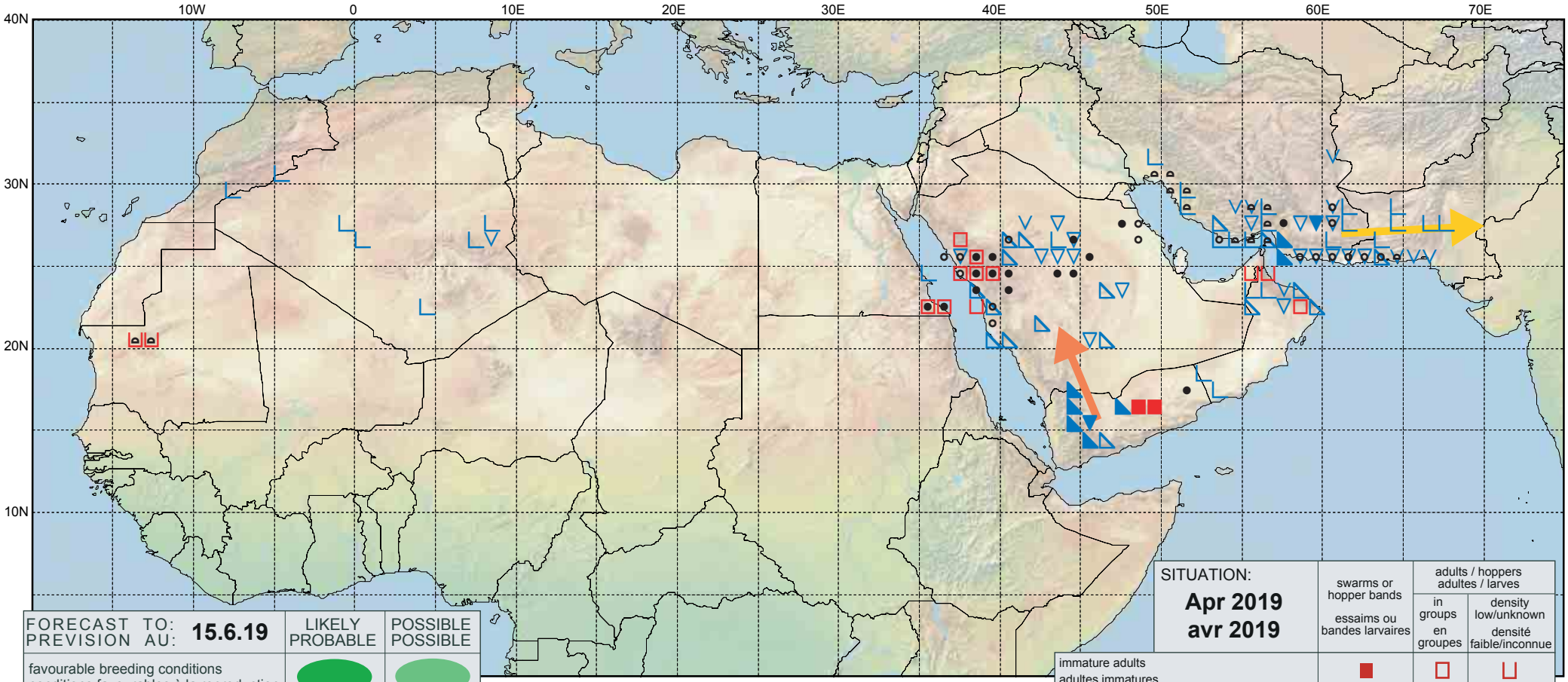
FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

487



FORECAST TO: / PREVISION AU: **15.6.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Apr 2019 avr 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves	
		in groups en groupes	density low/unknown densité faible/inconnue
immature adults adultes immatures			
mature or partly mature adults adultes matures ou partiellement matures			
adults, maturity unknown adultes, maturité inconnue			
egg laying or eggs pontes ou œufs			
hoppers larves			
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)			

Food and Agriculture Organization of the United Nations

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Desert Locust Bulletin

General situation during May 2019
Forecast until mid-July 2019

WESTERN REGION: CAUTION

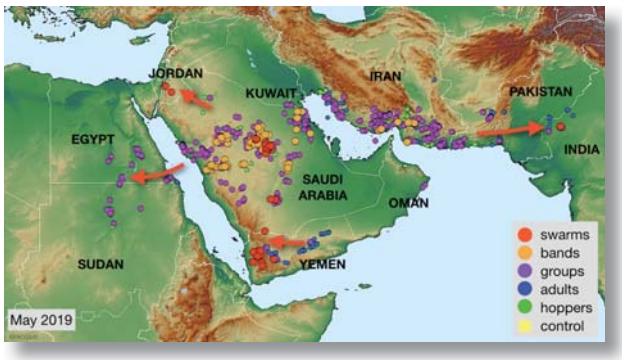
SITUATION. Limited control was carried out in central **Algeria** (16 ha) from local breeding. Scattered adults were present in northwest **Mauritania** and northern **Mali**.
FORECAST. Small-scale breeding may commence earlier than normal in **Niger** and **Chad** followed by **Mauritania** and **Mali**, causing locust numbers to increase slightly. A few swarms could reach eastern Chad from Arabia.

CENTRAL REGION: THREAT

SITUATION. Saudi Arabia treated nearly 75 000 ha of hopper and adult groups, bands and swarms caused by up to two generations of breeding. Swarms moved from eastern **Yemen** to the highlands and Saudi Arabia while others moved from Saudi Arabia to **Jordan** (2 900 ha treated) and **Kuwait** (15 603 ha). Control ended on the Red Sea coast in **Egypt** (3 341 ha) but adult groups moved to the interior in southern Egypt and northern **Sudan** (790 ha treated).
FORECAST. Spring breeding will decline in **Saudi Arabia** and swarms that are not detected or controlled will move to **Sudan** and, to a lesser extent, **Yemen** and through the Persian Gulf to India and Pakistan. Summer breeding may start early in Sudan and perhaps Yemen due to good rains in May.

EASTERN REGION: THREAT

SITUATION. Intensive control operations continued in southern **Iran** (346 180 ha) and **Pakistan** (4 135 ha) against hopper and adult groups, and hopper bands from up to two generations of breeding. Adults and groups migrated to the Indo-Pakistan border area where **India** initiated control operations (1 560 ha).
FORECAST. Spring breeding will end in **Iran** and **Pakistan** and infestations that are not detected or controlled will form adult groups and a few small swarms that will move to the **Indo-Pakistan** border areas and breed.



Spring-bred locust infestations threaten summer areas

Intensive ground and aerial control operations continued during May against widespread infestations of hopper and adult groups, bands and swarms in Saudi Arabia and Iran that developed from two generations of unprecedented spring breeding. Swarms moved from eastern Yemen into the central highlands and a few continued into southern Saudi Arabia. A few swarms moved to southern Jordan during a brief period of unusual southerly winds while hopper bands and immature adult groups were present along the Kuwait / Saudi Arabia border. Winter-bred immature adult groups persisted on the northern Red Sea coast of Saudi Arabia and the coast in southeast Egypt. At the end of May, adult groups appeared in the interior along both sides of the Egypt/Sudan border. While the control operations have reduced locust infestations in the spring breeding areas, populations that are not detected or cannot be treated will form groups and small swarms that will move to summer breeding areas in the interior of Sudan and Yemen, and along the Indo-Pakistan border. As rains have occurred some six weeks earlier than normal in these areas, breeding could commence in June. Depending on the summer rains, two generations of breeding may be possible this year, causing a further increase in locust numbers by October. All efforts should be undertaken to control the current situation and be prepared for the summer. Very little breeding occurred in the Western Region this spring so locust numbers remain low for the beginning of summer breeding that may start earlier than normal in Niger and Chad.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.
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Facebook/Twitter: faolocust

Weather & Ecological Conditions in May 2019

Good rains fell in the spring breeding areas of the Arabian Peninsula and in southwest Asia, but vegetation started to dry out. Good pre-monsoon rains fell along the Indo-Pakistan border and early summer rains fell in parts of Niger, Chad and Sudan. This may allow summer breeding to commence earlier than normal.

WESTERN REGION

Very little rain fell during May in the spring breeding areas on Northwest Africa except for light to moderate showers in the northern Sahara of Algeria and from eastern Algeria near Illizi to southwest Libya near Ghat. Consequently, ecological conditions remained generally dry and mostly unfavourable for breeding except near irrigated perimeters in the Adrar Valley of the Central Sahara in Algeria. In the Sahel of West Africa, the Inter-Tropical Convergence Zone (ITCZ) remained mostly south of the summer breeding areas except during the last decade of May when it was about 200 km further north than normal over central Niger and Chad. Consequently, light to moderate rains fell earlier than usual near Tahoua and Tasker in Niger, and near Nokou and Abeche in Chad.

CENTRAL REGION

Good rains fell in the spring breeding areas of the interior of Saudi Arabia during the first two decades of May, mainly between Zalim, Gassim, Riyadh and Jubail. Good rains also fell further south near Najran, extending to the interior of Yemen during the second and third decades of the month. These rains are likely to allow ecological conditions to become favourable for breeding during the summer in Yemen. Good rains also fell on the Red Sea coastal plains of Yemen. In the summer breeding areas of Sudan, the Inter-Tropical Convergence Zone (ITCZ) was located about 175 km further north than usual throughout May, reaching Mellit, Darfur and Sodiri, North Kordofan by the end of the month. This caused rains to fall in southern parts of the summer breeding areas much earlier than normal, mainly near El Fasher, El Obeid and El Geneina.

EASTERN REGION

Good rains fell during the second decade of May in coastal areas of Hormozgan and Sistan-Baluchistan provinces in southern Iran, extending to Baluchistan, Pakistan where heavier rains occurred in coastal and subcoastal areas. Lighter rains fell in the Jaz Murian Basin of southeast Iran. Despite these rains, vegetation began drying out in the spring breeding areas due to high temperatures. During the first decade of May, unusually good pre-monsoon rains fell along the Indo-Pakistan border, mainly in West Rajasthan, India and adjacent parts of Cholistan, Pakistan. This was followed by widespread heavier showers during the second decade from Jodhpur, India to Rohri, Pakistan, covering Rajasthan in India and Nara and Cholistan deserts in Pakistan. Lighter showers fell in these same areas at the end of the month. This will allow favourable ecological conditions to develop much earlier than normal in the summer breeding areas along both sides the Indo-Pakistan border.

Area Treated

Nearly 450 000 ha were treated during May.

Algeria	16 ha (May)
Egypt	3 341 ha (May)
India	1 560 ha (May)
Iran	346 180 ha (May)
Jordan	2 900 ha (May)
Kuwait	50 ha (April)
	15 603 ha (May)
Pakistan	4 135 ha (May)
Saudi Arabia	74 237 ha (May)
Sudan	790 ha (May)

Desert Locust Situation and Forecast

WESTERN REGION

MAURITANIA

• **SITUATION**

During May, immature adults and groups, at densities of 4 500 adults/ha, mixed with a few mature solitarious adults were present at one place in southwest Adrar to the southeast of Oujeft (2003N/1301W) from earlier breeding. Immature solitarious adults at densities up to 760 adults/ha were seen at a few places northwest of Oujeft and mature isolated solitarious adults were present at one place in Tagant northwest of N'Beika (1758N/1215W).

• **FORECAST**

Low numbers of locusts are likely to persist in a few places of southwest Adrar and Tagant. Scattered adults are likely to appear by the end of the forecast period in the south and southeast where small-scale breeding will commence with the onset of the summer rains.

MALI

• **SITUATION**

During the first week of May, scattered immature adults were reported at three places in the Adrar des Iforas near Aguelhoc (1927N/0052E).

• **FORECAST**

Low numbers of locusts will persist in parts of the Adrar des Iforas and breed on a small scale once the summer rains commence.

Niger

• **SITUATION**

No locust activity was reported during May.

• **FORECAST**

Scattered adults are likely to appear in areas of recent rainfall near Tahoua and Taker and breed on a small scale that will eventually extend to Tamesna.

Chad

• **SITUATION**

No locust activity was reported during May.

• **FORECAST**

Scattered adults are likely to appear in areas of recent rainfall in the centre and northeast and breed on a small scale. There is a low risk that a few small swarms may arrive in the east from Arabia.

Senegal

• **SITUATION**

No locust activity was reported during April and May.

• **FORECAST**

No significant developments are likely.

Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During May, small-scale breeding occurred near a few agricultural areas in the central Sahara between Reggane (2643N/0010E) and In Salah (2712N/0229E) where solitarious and *transiens* hoppers of all instars were present mixed with immature solitarious and *transiens* adults and mature solitarious adults. Ground teams treated 16 ha. Isolated mature solitarious adults were seen near Illizi (2630N/0825E) in the east. No locusts were seen in the northwest near Bechar (3135N/0217W), in the central Sahara near Adrar (2753N/0017W) and in the southern Sahara west of Tamanrasset (2250N/0528E).

• **FORECAST**

Low numbers of locusts may persist near agricultural areas in the Central Sahara where small-scale breeding could continue. No significant developments are likely.

Morocco

• **SITUATION**

No surveys were carried out and no locusts were reported in May.

• **FORECAST**

No significant developments are likely.

Libya

• **SITUATION**

No reports were received in May.

• **FORECAST**

No significant developments are likely.

Tunisia

• **SITUATION**

No locust activity was reported during May.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During the last week of May, groups of mature adults appeared near irrigated schemes in the Nile Valley of River Nile and Northern states near Abu Hamed (1932N/3320E) and between Dongola (1910N/3027E) and Wadi Halfa (2147N/3122E). Late instar hoppers and a hopper group were present near Ed Debba (1803N/3057E) from egg-laying that occurred in mid-April.

• **FORECAST**

Small-scale breeding is likely to continue in parts of the Nile Valley between Berber and Wadi Halfa. There is a moderate to high risk of small immature swarms arriving from the Arabian Peninsula, initially in the Nile Valley and then in the summer breeding areas of North Darfur, North Kordofan and White Nile states. Breeding will commence with the onset of the summer rains.

Eritrea

• **SITUATION**

No surveys were carried out and no locusts were reported in May.

• **FORECAST**

No significant developments are likely.

Ethiopia

• **SITUATION**

No locusts were seen during surveys carried out in the east near Ayasha (1045N/4234E) and in the Afar region on 25–26 May.

• **FORECAST**

No significant developments are likely.

Djibouti

• **SITUATION**

No surveys were carried out and no locusts were reported in May.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

No surveys were carried out and no locusts were reported in May.

• **FORECAST**

No significant developments are likely.

Egypt

• **SITUATION**

During May, control operations against immature adult groups ended on the Red Sea coast near Abu Ramad (2224N/3624E) at mid-month after treating 2 940 ha; thereafter, only isolated and scattered immature solitarious adults remained. During the last week of the month, several medium density groups of immature and maturing solitarious and *transiens* adults appeared in farms along Lake Nasser near Abu Simbel (2219N/3138E), Tushka (2247N/3126E) and Garf Husein (2317N/3252E), in the New Valley of the Western Desert south of Baris (2448N/3035E), and in the Nile Valley north of Aswan (2405N/3256E). Ground teams treated 401 ha. These groups most likely originated from winter breeding on the Red Sea coast. Isolated third to fifth instar solitarious hoppers were present at one place from earlier breeding.

• **FORECAST**

Additional groups are likely to appear near farms in the Lake Nasser and Western Desert areas. These may be supplemented by a few small immature swarms arriving from the Arabian Peninsula. Some of the adults may remain near farms and breed, giving rise to small groups of hoppers, while other adults are likely to move south towards the summer breeding areas in central Sudan.

Saudi Arabia

• **SITUATION**

During May, a second generation of spring breeding occurred in the central interior between Riyadh (2439N/4642E) and Gassim (2621N/4358E) where mature adult groups and a few swarms laid eggs, and early instar hopper bands formed after hatching. First-generation breeding continued along the western edge of the Empty Quarter between Riyadh and Wadi Dawasir (2028N/4747E), along the eastern foothills of the Asir Mountains between Zalim (2248N/4210E) and Khaybar (2542N/3917E), north of Gassim near Hail (2731N/4141E) and Al Jawf (2948N/3952E), and in the northeast between Al Hofuf (2523N/4935E) and Hafar Al Batin (2821N/4556E). Hopper groups and bands of all instars, and groups of immature and mature adults were present in most of these areas. Immature and mature swarms were seen near Wadi Dawasir and between Riyadh and Gassim throughout the month, some of which may have arrived from Yemen. On the northern Red Sea coast, groups of hopper and immature adults persisted near Umm Lajj (2501N/3716E). Control operations treated 74 237 ha during May of which 3 700 ha were by air.

• **FORECAST**

As conditions dry out, spring breeding will end in the interior. Any infestations that are not detected or cannot be treated will concentrate further to form groups and a few small immature swarms. The majority of the swarms are expected to move southwest to the summer breeding areas in Sudan, but a few swarms may move south to the interior of Yemen and east through the Persian Gulf to the Indo-Pakistan summer breeding areas.

Yemen

• **SITUATION**

In early May, immature and mature groups and small swarms began appearing from the east in the central highlands between Sana'a (1521N/4412E) and Dhamar (1433N/4424E) where they were reported thoughout the month. In addition, a few swarms were seen along the eastern foothills between Bayhan (1452N/4545E) and Al Hazm (1610N/4446E) and at least one swarm was reported in the western foothills east of Hodeidah (1450N/4258E). In the east, scattered immature and mature solitarious and *transiens* adults were present in Wadi Hadhramaut and on the plateau north of Sayun (1559N/4844E) to Thamud (1717N/4955E) and Remah (1727N/5034E) as well as one immature group on the plateau. Control operations were not possibile.

• **FORECAST**

A portion of the swarms are likely to move south towards the Aden coast and then migrate to the Indo-Pakistan summer breeding areas while some swarms may remain in parts of the highlands, the Red Sea coast and the edges of Ramlat Sabatyn to breed in areas of recent rains, giving rise to small hopper groups and bands.

Oman

• **SITUATION**

During May, mature adult groups were laying south of Sur (2234N/5930E) in Sharqiyah during the first week. Small-scale breeding was in progress on the Batinah coast near Jamma (2333N/5733E) where second to fifth instar solitarious hoppers mixed with immature solitarious adults were present as a result of egg-laying from mid-April to mid-May. Solitarious hoppers and mature solitarious adults were seen at one place on the Musandam Peninsula. No locusts were seen elsewhere in the northern interior near Buraimi (2415N/5547E), Nizwa (2255N/5731E) and Adam (2223N/5731E) and in the south near Shehan (1746N/5229E) and the Yemen border.

• **FORECAST**

A few small groups of hoppers and adults may form in Sharqiyah while elsewhere locust numbers are expected to

remain low. There is a low risk that a few small immature swarms may be temporarily seen along the eastern coast as they migrate from Yemen to the Indo-Pakistan summer breeding areas.

Kuwait

• **SITUATION**

On 27 April, late instar hopper groups were seen marching from the border of Saudi Arabia to the Al-Wafra (2832N/4759E) agricultural area. Several more hopper groups and an increasing number of fledglings were subsequently reported from the same area, supplemented by the arrival of immature adult groups during the second week of May. On about the 20th, immature adult groups were also seen in several places in the Al Salmi region about 100 km to the west near the Iraq/Saudi Arabia border. Ground teams treated 15 653 ha from 28 April to 30 May.

• **FORECAST**

There is a moderate risk that groups and a few small immature swarms could arrive from adjacent areas in Saudi Arabia and continue to the Indo-Pakistan summer breeding areas.

Jordan

• **SITUATION**

During a brief period of unusual southerly winds, an immature swarm arrived in the south near Al Jafr (3019N/3610E) on 4 May and a second immature swarm flew northwest towards Tafilah (3050N/3537E) on the 5th where it dispersed to two areas to the south and southeast. Ground teams treated 900 ha near Al Jafr while aerial operations treated 2 000 ha near Tafilah.

• **FORECAST**

No significant developments are likely.

Bahrain, Iraq, Israel, Kenya, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During May, a second generation of breeding occurred in the Jaz Murian Basin of the interior in South Kerman and Sistan-Baluchistan provinces and in a few coastal areas of Hormozgan province near Chah Deraz (2657N/5526E) and Jask (2540N/5746E) where adult groups were laying. Hatching and the formation of hopper groups and bands started from the second week onwards. In the meantime, first generation hoppers, adults, groups and bands matured in these provinces as well as parts of Khuzestan, Bushehr and Fars provinces in the southwest. Control operations treated 346 180 ha during May of which 33 660 ha were by air.

• **FORECAST**

As conditions continue to dry out, breeding will end, and the remaining hoppers will fledge and form immature groups and small swarms. Infestations that are not detected or cannot be treated will concentrate further to form groups and a few small immature swarms that will move east to the Indo-Pakistan summer breeding areas. There is a moderate to high risk that this will be supplemented by a few small immature swarms arriving from the Arabian Peninsula and moving rapidly east along the southern coast to Pakistan and India.

Pakistan

• **SITUATION**

During May, breeding continued near the Baluchistan coast between Turbat (2600N/6303E) and Gwadar (2508N/6219E), near Uthal (2548N/6637E) and in the interior near Kharan (2832N/6526E) where solitarious and gregarious hoppers and hopper groups of all instars mixed with scattered mature adults were present. A few mature adult groups were seen on the coast and a limited second generation of breeding commenced in the Shooli Valley south of Turbat where scattered adults were seen laying at mid-month. Ground teams treated 3 025 ha on 1–27 May. In the summer breeding areas, scattered solitarious and gregarious adults appeared during the last week of the month near the Indian border southeast of Rahimyar Khan (2822N/7020E) and started to lay eggs.

• **FORECAST**

As vegetation dries out, breeding will come to an end in Baluchistan and remaining locusts will form small groups that will move to summer breeding areas of Cholistan, Nara and Tharparkar where breeding will cause locust numbers to increase. This is likely to be supplemented by additional groups and perhaps a few small swarms arriving from spring breeding areas of Iran and the Arabian Peninsula.

India

• **SITUATION**

During the first fortnight of May, no locusts were seen in Rajasthan and Gujarat. On the 17th, the first solitarious adults of the season were seen in West Rajasthan near Jaisalmer (2652N/7055E). On the 21st, a group of mature *transiens* adults first appeared west of Phalodi (2706N/7222E) and laid eggs. Several more mature groups and a few small swarms arrived during the remainder of the month between Sam (2649N/7030E) and Phalodi where they were copulating. Scattered mature solitarious adults were seen in a few places between Bikaner (2801N/7322E) and the Pakistan border. Ground teams treated 1 560 ha on 22–31 May.

• **FORECAST**

Locust numbers will increase in West Rajasthan as hatching

starts about the second week of June. Some hopper groups and perhaps a few small bands may form. Breeding will extend to other areas with the onset of the monsoon rains. This is likely to be supplemented by additional groups and perhaps a few small swarms arriving from spring breeding areas in the region and the Arabian Peninsula, maturing and laying eggs.

Afghanistan

• **SITUATION**

No locusts were seen during surveys carried out in the southern provinces up to 23 May.

• **FORECAST**

There is a low risk that a few small groups or swarms could pass through southern provinces on their way to the Indo-Pakistan summer breeding areas.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.
Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.
Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.
Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **CRC/SWAC.** 11th Interregional workshop for Desert Locust Information Officers, Addis Ababa, Ethiopia (24–28 June)
- **CLCPRO.** 14th Executive committee meeting, Agadir, Morocco (24–28 June)
- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding

- The process of reproduction from copulation to fledging

Recession

- Period without widespread and heavy infestations by swarms

Remission

- Period of deep recession marked by the complete absence of gregarious populations

Outbreak

- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge

- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague

- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline

- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green

- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow

- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange

- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

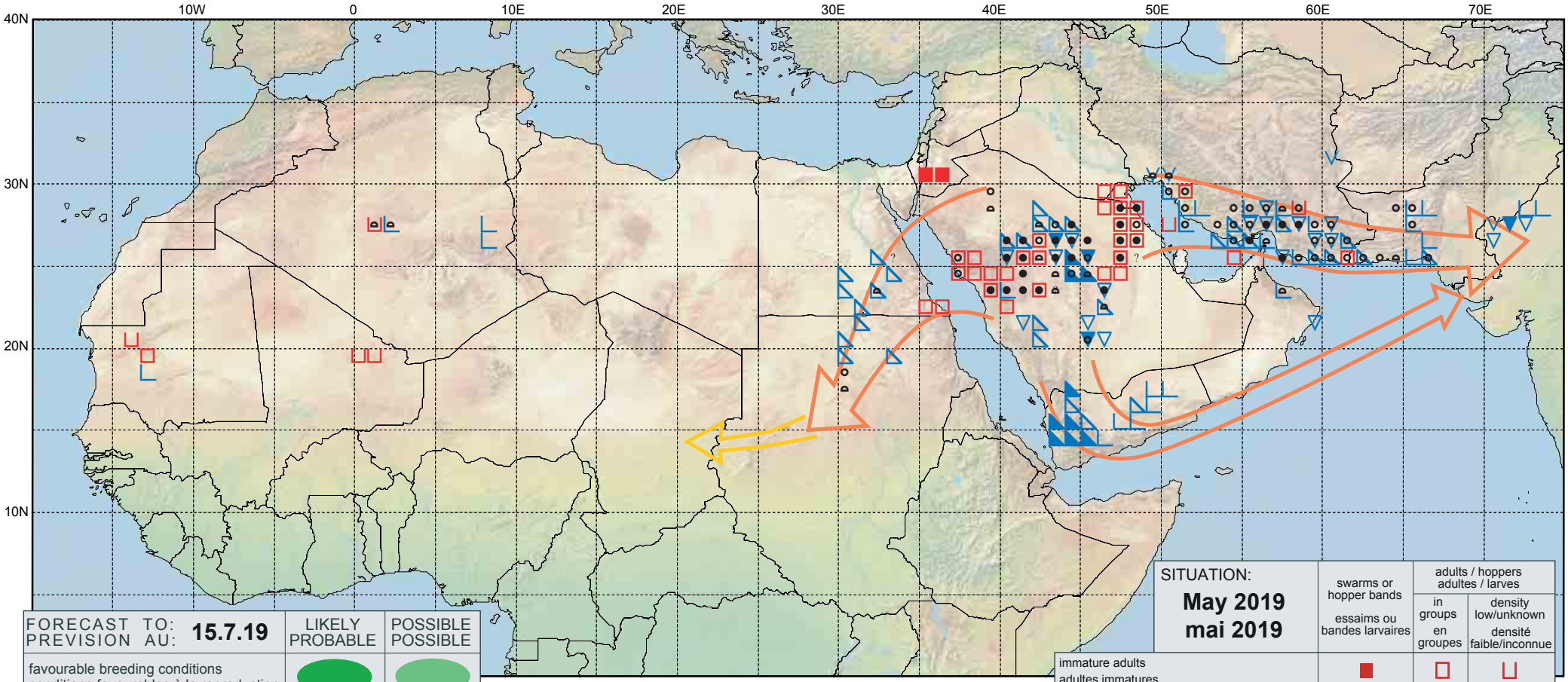
FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

488



FORECAST TO: / PREVISION AU: **15.7.19**	LIKELY PROBABLE	POSSIBLE POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION:
May 2019
mai 2019

	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves: in groups en groupes	adults / hoppers adultes / larves: density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	∟
adults, maturity unknown adultes, maturité inconnue	▲	△	∧
egg laying or eggs pontes ou œufs	▼	▽	∨
hoppers larves	●	○	◡
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊟

Food and Agriculture Organization of the United Nations

No. 489 4 JULY 2019

Desert Locust Bulletin

General situation during June 2019
Forecast until mid-August 2019

WESTERN REGION: CALM

SITUATION. Small-scale breeding occurred in **Algeria** (399 ha treated). There were unconfirmed reports of adults in northeast **Niger**.

FORECAST. Small-scale breeding will occur in **Mali**, **Niger** and **Chad** followed by **Mauritania**, causing locust numbers to increase slightly.

CENTRAL REGION: THREAT

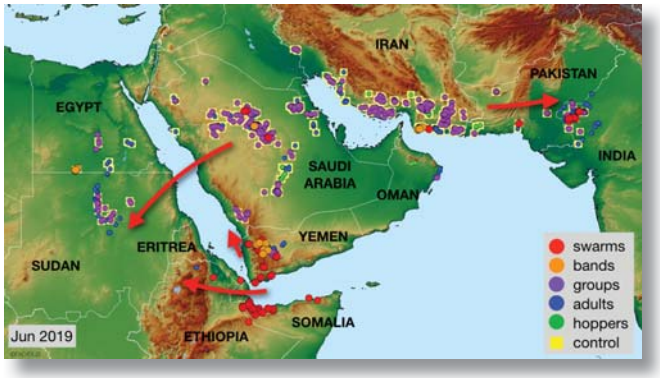
SITUATION. Control operations continued in **Saudi Arabia** (39 270 ha) against declining spring-bred populations. Numerous swarms were in the **Yemen** highlands and some moved to northern **Somalia** and **Ethiopia**. Adult groups persisted in northern **Sudan** (3 700 ha treated). Hopper bands and adult groups were treated in **Egypt** (604 ha).

FORECAST. Breeding will continue in **Yemen**, giving rise to hopper bands. Breeding will start in the interior of **Sudan** and western **Eritrea** and may also occur in Ethiopia and along the coast of northern Somalia. A few small swarms may arrive in these areas from the spring breeding areas.

EASTERN REGION: THREAT

SITUATION. Control operations continued in southern **Iran** (247 270 ha) and **Pakistan** (8 684 ha) against declining infestations of spring-bred hopper and adult groups. Swarms arrived and laid eggs in **India**, and control was undertaken (3 991 ha).

FORECAST. Remaining spring-bred adult groups and perhaps small swarms will move to the **Indo-Pakistan** border for summer breeding, giving rise to hopper groups and bands.



Spring breeding declines but swarms appear in the Horn of Africa

Spring-bred infestations in Iran, Saudi Arabia and Pakistan declined during June due to continued intensive control operations, drying conditions and increasing temperatures. However, locusts increased along the Indo-Pakistan border as breeding continued and several swarms arrived in Rajasthan to lay eggs. Control operations were undertaken in both countries. Numerous mature swarms were seen in Yemen where some remained to lay eggs while others crossed the sea to northern Somalia, southern Eritrea and eastern Ethiopia. Some of these swarms could continue moving to the interior of Sudan while others could breed on the northern Somalia coast, in eastern Ethiopia, and on the Red Sea coast in Yemen and adjacent areas in Saudi Arabia because all of these areas received good rainfall in June. There remains a moderate risk that small spring-bred swarms may have escaped detection and control in the Arabian Peninsula and could arrive in the summer breeding areas of Sudan to lay eggs. Groups of mature adults appeared in the Western Desert of Egypt at the end of June. This year's summer breeding is anticipated to be heavier than normal, resulting in hopper bands and perhaps small swarms along the Indo-Pakistan border where two generations may be possible, in Yemen where survey and control operations are limited, in Ethiopia and northern Somalia, and in the interior of Sudan. In comparison, only small-scale breeding is expected this summer in the Western Region.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in June 2019

Seasonal rains commenced in the southern portion of the summer breeding areas in the Sahel from Mali to Sudan. Good rains fell in the Horn of Africa and along the Red Sea coast in Yemen. Breeding conditions remain favourable along the Indo-Pakistan border from May rains.

WESTERN REGION

The Inter-Tropical Convergence Zone (ITCZ) continued to move northwards over the Sahel in West Africa, reaching Tamchekket (Mauritania), Kidal (Mali), the northern Tamesna Plains in Niger, and Iriba in eastern Chad by the end of the month. The seasonal position was some 175 km further north from Mali to Chad. Consequently, good rains fell in the southern Adrar des Iforas in Mali, in the pasture areas and southern Tamesna in Niger, and in parts of eastern Chad. Mauritania remained mostly dry during the month. As a result, breeding conditions were starting to improve in the southern portions of the summer breeding areas throughout the Sahel except for Mauritania.

CENTRAL REGION

The Inter-Tropical Convergence Zone (ITCZ) continued to move northwards over the interior of Sudan, reaching just south of Abu Uruq in North Kordofan by the end of the month. Consequently, good rains fell in West and North Darfur, North Kordofan as far north as about Sodiri, White Nile and near Kassala in the east. Breeding conditions are likely to be improving in most of these areas. In Saudi Arabia, temperatures increased and ecological conditions dried out in the spring breeding areas of the interior while good rains fell mainly during the first decade in the southern parts of the Asir Mountains in the southwest, extending to the highlands of Yemen and to adjacent areas on the Red Sea coastal plains in both countries. Good rains also fell along parts of the southern coast of Aden as well as in northern Somalia and eastern and northern Ethiopia. Consequently, breeding conditions may be favourable in coastal areas and in parts of eastern Ethiopia.

EASTERN REGION

Temperatures continued to increase, and ecological conditions dried out further in the spring breeding areas of southern Iran and southwest Pakistan. Pre-monsoon rains fell in parts of Cholistan, Pakistan at mid-month and scattered showers fell in some places of Rajasthan. Nevertheless, breeding conditions remained favourable in Nara and Cholistan Desert and adjacent areas of Jaisalmer district in West Rajasthan, India from earlier rains in May.

Area Treated

Some 300 000 ha were treated during June, compared to nearly 450 000 in May.

Algeria	399 ha (June)
Egypt	604 ha (June)
India	3 991 ha (June)
Iran	247 270 ha (June)
Pakistan	8 684 ha (June)
Saudi Arabia	39 270 ha (1–26 June)
Sudan	3 700 ha (1-18 June)
Yemen	5 ha (June)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

No reports were received in June.

• **FORECAST**

Scattered adults are likely to appear in the south and southeast where small-scale breeding will commence with the onset of the summer rains.

Mali

• **SITUATION**

No locust activity was reported during June.

• **FORECAST**

Small scale will commence with the onset of the summer rains, causing locust numbers to increase slightly.

Niger

• **SITUATION**

No surveys were carried out and no locusts were reported in June. However, there were unconfirmed reports of a few locusts at three places in the Tenere Desert near Bilma (1846N/1304E) and one place southwest of Agadez (1658N/0759E) during the first half of the month.

• **FORECAST**

Scattered adults are likely present in southern Air and Tamesna where they will persist and breed on a small scale. Breeding may also be in progress between Tahoua and Tanout, and it is expected to extend to northern Tamesna in areas that receive rainfall.

Chad

• **SITUATION**

No surveys were carried out and no locusts were reported in June.

• **FORECAST**

Scattered adults are likely to appear in areas of recent rainfall in the centre and northeast and breed on a small scale.

Senegal

• **SITUATION**

No locust activity was reported during June.

• **FORECAST**

No significant developments are likely.

Burkina Faso

• **SITUATION**

No locust activity was reported during June.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During June, small-scale breeding occurred in the northern Sahara south of El Bayadh (3341N/0102E) and continued in the central Sahara near irrigated perimeters in the Adrar (2753N/0017W) Valley and In Salah (2712N/0229E) where solitarious hoppers of all instars mixed with immature and mature solitarious adults were present. Ground teams treated 399 ha. A few immature transiens adults were reported near In Salah. Isolated mature solitarious adults were seen in the south to the west of Tamanrasset (2250N/0528E). No locusts were seen south of Bechar (3135N/0217W).

• **FORECAST**

Low numbers of locusts may persist near agricultural areas in the Central Sahara where small-scale breeding could continue. No significant developments are likely.

Morocco

• **SITUATION**

No surveys were carried out and no locusts were reported in June.

• **FORECAST**

No significant developments are likely.

Libya

• **SITUATION**

No reports were received in June.

• **FORECAST**

No significant developments are likely.

Tunisia

• **SITUATION**

No locust activity was reported during June.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During the first two decades of June, groups of immature and mature adults persisted near irrigated schemes in the Nile Valley of River Nile and Northern states between Abu Hamed (1932N/3320E) and Dongola (1910N/3027E), and at least one group was reported laying eggs near Dongola. Control teams treated 3 700 ha. Scattered immature and mature solitarious adults appeared further south in the Baiyuda Desert north of Khartoum (1533N/3235E).

• **FORECAST**

Small-scale breeding is likely to continue in parts of the Nile Valley between Berber and Wadi Halfa. There is a moderate to high risk of small immature swarms arriving from the Arabian Peninsula, initially in the Nile Valley and then in the summer breeding areas of North Darfur, North Kordofan and White Nile states. A few small swarms may also arrive from northern Ethiopia. Breeding will commence with the onset of the summer rains.

Eritrea

• **SITUATION**

On 20–22 June, several mature swarms from Yemen arrived on the southern coastal plains between Assab (1301N/4247E) and the Djibouti border where they were seen flying from east to west.

• **FORECAST**

Low numbers of adults are expected to appear in the western lowlands and breed on a small scale in areas that receive rains. This could be supplemented by a few small swarms crossing the southern coast from Yemen and moving through adjacent areas of northern Ethiopia.

Ethiopia

• **SITUATION**

During June, scattered immature solitarious adults were present in the northern Tigray region east of Axum (1407N/3843E) on the 6th and scattered mature adults were seen south of Mekele (1329N/3928E) and 10th. There were reports from the 21st onwards of several mature swarms arrived in the east and the north between Ayasha (1045N/4234E) and Dire Dawa (0935N/4150E), near Jijiga (0922N/4250E), in the Afar and Tigray regions, and west of Addis Ababa near Jarso (0908N/3731E) in Oromiya.

• **FORECAST**

Breeding will occur in areas of recent rainfall in northern and eastern regions, which could give rise to hopper groups and bands.

Djibouti

• **SITUATION**

On 23 June, mature gregarious adults were seen west of Tadjourah (1147N/4253E) near Day (1146N/4238E).

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

From 20 June onwards, there were reports of small mature swarms arriving from Yemen on the northern coast from Zeylac (1121N/4328E) near the Djibouti border to Lughaye (1041N/4356E), Berbera (1028N/4502E) and further east between Ceelaayo (1114N/4853E) and Lasqoray (1109N/4811E) as well as on the escarpment south of Berbera, north of Hargeisa (0931N/4402E) and northwest of Boroma (0956N/4313E).

• **FORECAST**

Breeding may occur along parts of the northern coast between Djibouti and Bossaso and perhaps on the plateau between Boroma and Hargeisa, and Burao and Erigavo where good rains fell in early June. This could cause small hopper groups and bands to form.

Egypt

• **SITUATION**

During the first decade of June, scattered mature solitarious adults persisted at a few places near Lake Nasser at Tushka (2247N/3126E), in the Nile Valley north of north of Aswan (2405N/3256E), and in the Western Desert near Baris (2448N/3035E). Breeding occurred at Sh.Uweinat, giving rise to hopper bands. Ground teams treated 604 ha. During the last week of the month, several mature adult groups were seen in the Western Desert near Darb Al-Arbain (2357N/3018E), Baris and Kharga (2525N/3034E).

• **FORECAST**

No significant developments are likely.

Saudi Arabia

• **SITUATION**

During June, spring breeding declined in the interior where limited late laying occurred by a swarm between Gassim and Hail and by adult groups east of Wadi Dawasir (2028N/4747E). Mainly scattered immature and mature adults, groups and a few small swarms mixed with a few late instar hoppers, groups and bands were present in the north near Al Jawf (2948N/3952E) and Tabuk (2823N/3635E), in the centre between Hail (2731N/4141E) and Riyadh (2439N/4642E), and on the western edge of the Empty Quarter near Wadi Dawasir. In the northeast, immature adult groups were present near farms south of Kuwait in the Qaryat Al Olaya (2733N/4742E) area while mature adult groups appeared in the southwest near Abha (1813N/4230E) in the Asir Mountains. Control operations treated 39 270 ha on 1–26 June of which 2 690 ha were by air.

• **FORECAST**

Spring breeding will end and any infestations that are not detected or cannot be treated in the interior will form groups and a few small swarms that are expected to move to Sudan, Yemen and perhaps the Indo-Pakistan border. Breeding may occur on the southern Red Sea coast between Qunfidah and Jizan in areas of recent rainfall or runoff where a few small groups or swarms may appear from adjacent areas of Yemen.

Yemen

• **SITUATION**

During June, there were numerous reports of mature swarms in the several highland areas near Sana'a (1521N/4412E) and Ibb (1358N/4411E), along the eastern side of the highlands near AlHazm (1609N/4446E) and Bayhan (1452N/4545E) mixed with mature adult groups, on the southern coast near Aden (1250N/4503E), and one swarm on the northern Red Sea coast near Suq Abs (1600N/4312E). Laying and hatching occurred in between Al Hazm and Bayhan, giving rise to hopper groups and bands. Laying also took place near Aden. Surveys and control remain limited throughout the country. Ground teams treated 5 ha near Al Hazm.

• **FORECAST**

Breeding will continue on the edges of Ramlat Sabatyn while hatching is expected on the Aden coast and most likely on the Red Sea coast. In all areas, hopper bands will almost certainly form and will start to fledge by the end of July, giving rise to an increasing number of immature adult groups and possibly small swarms during August.

Oman

• **SITUATION**

During June, small-scale breeding occurred in the northern interior near Nizwa (2255N/5731E) and on the coast south of Sur (2234N/5930E). Immature adults and one group of hoppers and fledglings were also present in the latter area. No locusts were seen elsewhere in the northern interior, on the Batinah coast and in the south near Thumrait (1736N/5401E).

• **FORECAST**

No significant developments are likely.

Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During June, spring breeding declined in the south. In the southeast, a few hopper bands were present on the coast

near Jask (2540N/5746E) during the first half of the month and late instar hopper groups were present in Jaz Murian Basin in the last week. Throughout the month, immature and mature adults formed groups in Sistan-Baluchistan, southern Kerman, Hormozgan, southern Fars and near the Iraq border in Ilam province south of Mousiyan (3231N/4722E). In the southwest, scattered immature adults were present in Bushehr province while small-scale breeding occurred in nearby areas of Khuzestan. Control operations treated 247 270 ha during June of which 19 800 ha were by air. Operations declined rapidly in the last week.

• **FORECAST**

As conditions continue to dry out, locust numbers will decline in all areas. A few small groups and swarms may form from any infestations that were not detected or could not be treated and move east to the Indo-Pakistan summer breeding areas. There is a moderate risk that a few small swarms from the Arabian Peninsula may move rapidly east along the southern coast to Pakistan and India.

Pakistan

• **SITUATION**

In early June, spring breeding came to an end in Baluchistan with the last report of swarm laying on the 1st near Lasbela (2614N/6619E) while hoppers and hopper groups persisted near Lasbela, Turbat (2600N/6303E), Gwadar (2508N/6219E) and in the northern interior near Dalbandin (2856N/6430E), and scattered immature and mature solitarious adults prevailed in a few places near Lasbela and Turbat. In the summer breeding areas, breeding occurred in Nara Desert south of Rohri (2739N/6857E) and in Cholistan near Islamgarh (2751N/7048E). Hopper groups formed in both areas but mainly in Nara where immature and mature adult groups were also present. Control operations treated 8 684 ha of which 800 ha were by air.

• **FORECAST**

Breeding will continue in Nara and Cholistan, causing locust numbers to increase with the possibility of hopper and adult groups forming. A second generation of breeding could commence in August, leading to the formation of bands and eventually small swarms. Breeding may also extend to Tharparkar Desert with the onset of the monsoon rains.

India

• **SITUATION**

During June, hatching occurred from egg laying last month between Phalodi (2706N/7222E) and Sam (2649N/7030E), giving rise to groups of first to fourth instar hoppers. Groups of mature adults continued to lay during the first half of the month west of Phalodi, which was supplemented by additional swarm laying during the last week of June mainly south of Jaisalmer and Sam as well as adult group laying in Barmer district. Scattered mature adults were also seen in Jalor, Jodhpur and Bikaner districts, and in northern Gujarat. Ground teams treated 3 991 ha during June.

• **FORECAST**

Breeding will continue in Jaisalmer district where additional hatching is expected to cause hopper groups and bands to form. Breeding will extend to other areas of Rajasthan and Gujarat with the onset of the monsoon rains, giving rise to hopper groups. This may be supplemented by additional groups and a few small swarms arriving from spring breeding areas and laying eggs in July. In Jaisalmer district, fledging will commence by mid-July, causing immature adults to form groups that could mature for a second generation of breeding by about mid-August.

Afghanistan

• **SITUATION**

No reports were received in June.

• **FORECAST**

No significant developments are likely.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.
Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.
Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.
Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **CRC.** High-level Emergency Consultation meeting on Desert Locust control in the Central Region, Cairo, Egypt (11 July)
- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague
- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline
- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green
- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow
- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange
- *Threat*. Threat to crops; survey and control operations must be undertaken

Red
- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western
- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger,

Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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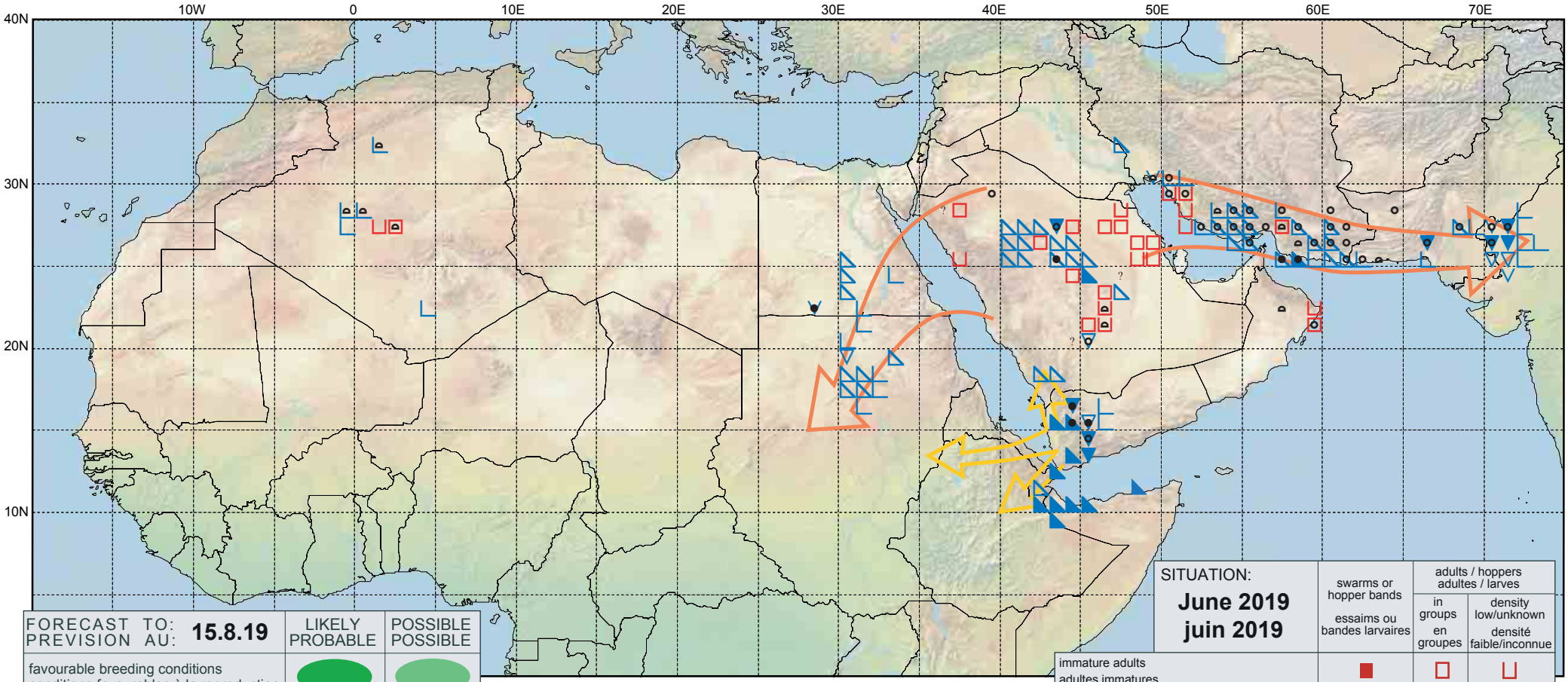

FORECAST TO: / PREVISION AU: **15.8.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **June 2019 / juin 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves	
		in groups en groupes	density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	L
adults, maturity unknown adultes, maturité inconnue	▲	△	Λ
egg laying or eggs pontes ou œufs	▼	▽	V
hoppers larves	●	○	∩
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊓

Food and Agriculture Organization of the United Nations

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Desert Locust Bulletin

General situation during July 2019
Forecast until mid-September 2019

WESTERN REGION: CALM

SITUATION. Small-scale breeding continued in **Algeria** (115 ha treated) and started in northern **Niger**. Hopper and adult groups formed in southwest **Libya**. Scattered adults appeared in southeast **Mauritania**.
FORECAST. Small-scale breeding will occur in **Mauritania**, **Mali**, **Niger** and **Chad**, causing locust numbers to increase slightly.

CENTRAL REGION: THREAT

SITUATION. Control operations (1 300 ha) declined in **Saudi Arabia**. Hopper bands and swarms formed in **Yemen** and 4 600 ha were treated. A few swarms moved to northeast **Somalia** and **Oman**. Breeding occurred in **Ethiopia** and bands formed in northwest Somalia. Adult groups were treated (1 180 ha) in **Sudan**.
FORECAST. More swarms will form in **Yemen** and another generation of breeding will cause a further increase in locust numbers that could affect southwest **Saudi Arabia**. Hopper bands could form in **Ethiopia** while smaller-scale breeding will occur in **Sudan** and western **Eritrea**.

EASTERN REGION: THREAT

SITUATION. Control operations increased in **India** (26 764 ha) and continued in **Pakistan** (7 666 ha) against swarms and hopper bands but was declining in **Iran** (31 307 ha) against spring-bred populations. There were reports of breeding in southern **Afghanistan**.
FORECAST. Locust infestations will increase from widespread hatching and band formation in Rajasthan, **India** and a second generation of breeding in **Pakistan**.

Swarms in India and Yemen with more expected

In Southwest Asia, substantial ground control operations were carried out against numerous spring-bred swarms that appeared in Rajasthan, India during July and laid eggs, which hatched and caused hopper groups and bands to form. Smaller operations were conducted in adjacent areas of Pakistan. Locust numbers will increase further from widespread hatching in India and a second generation of breeding in Pakistan, giving rise to additional hopper bands and adult swarms. In the Central Region, numerous hopper bands were present in Yemen and new swarms began forming after mid-month. Although control operations were undertaken in some places, the situation is expected to deteriorate further because of unusually heavy rainfall and flooding that will allow another generation of breeding and further increases in locust numbers, which could extend to the Red Sea coast in southwest Saudi Arabia. Several swarms migrated from Yemen, reaching southern Oman and northeast Somalia. A few hopper bands formed on the northwest coast of Somalia and small-scale breeding occurred in northeast Ethiopia. Adult groups were treated in the Nile Valley of northern Sudan. During the forecast period, hopper groups and a few bands could form from breeding in Ethiopia and small-scale breeding will occur in Sudan and Eritrea. In the Western Region, the situation remained calm. Local breeding occurred in southwest Libya and in parts of Algeria and northern Niger while low numbers of adults began appearing in southeast Mauritania. Small-scale breeding will occur in the northern Sahel between Mauritania and Chad, causing locust numbers to increase slightly.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.
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Weather & Ecological Conditions in July 2019

Good rains fell in the summer breeding areas of the northern Sahel from West Africa to northern Ethiopia. Heavy rains and flooding occurred in Yemen that will allow breeding to continue.

WESTERN REGION

The Inter-Tropical Convergence Zone (ITCZ) continued to move northwards over the Sahel in West Africa. It was further north than usual during the first decade in all countries and during the second decade in Niger and Chad but remained further south than usual over Mauritania in the third decade. During the month, it reached as far north as Tidjikja in central Mauritania, Aguelhoc in the central Adrar des Iforas of northern Mali, Tin Zaouatene and In Guezzam in southern Algeria, and Fada in northeast Chad. Consequently, light to moderate rains fell at times during the first two decades in northern Mali and Niger, and in northeast Chad. More intense rains fell during the third decade, especially in southern Mauritania, northern Mali and Niger, and southern Algeria between Bordj Badji Mokhtar and Tamanrasset. As a result, breeding conditions improved in many areas. In Northwest Africa, mainly dry conditions prevailed except near irrigated areas in parts of the Algerian Sahara. Small areas of green vegetation persisted in southwest Libya near Ghat from rains that fell from April to June.

CENTRAL REGION

The Inter-Tropical Convergence Zone (ITCZ) continued to move northwards over the interior of Sudan. During the first and third decades, it was further south than usual but was about normal in the second decade, reaching as far north as Abu Uruq in North Kordofan and Shendi in the Nile Valley. Light to moderate rains fell between El Obeid and Abu Uruq, and heavier showers occurred near Kassala and in the western lowlands of Eritrea that will cause breeding conditions to continue to improve. Breeding conditions were favourable in the Amhara region of northern Ethiopia where heavy rains fell, and in Afar and the eastern region, extending to the Somali plateau near Hargeisa where light to moderate rains occurred. Vegetation was drying out on the coast in northwest Somalia. In Yemen, breeding conditions were favourable in the highlands, interior, Wadi Hadhramaut and on the Aden coastal plains. Unusually heavy and widespread rains, causing sandstorms and flooding, will allow conditions to remain favourable for additional breeding. In Oman, vegetation continued to dry out in most areas.

EASTERN REGION

The annual southwest monsoon arrived in Rajasthan, India during the first week of July, which is about normal, and thereafter reached adjacent areas of Cholistan, Nara and Tharparkar deserts in Pakistan by the 20th. Although heavy rains did not start until the last days of the month, vegetation was already green or becoming green throughout Rajasthan and Gujarat in India as well as in adjacent areas of Tharparkar and southern Cholistan in Pakistan from earlier pre-monsoon rains. Consequently, ecological conditions were favourable for breeding in both countries. Vegetation continued to dry out in the spring breeding areas of southern Iran and southwest Pakistan where only local areas of green vegetation remained near Chabahar, Iran and near Khuzdar and Nushki in northern Baluchistan, Pakistan.

Area Treated

More than 73 000 ha were treated during July.

Algeria	115 ha (July)
Egypt	4 ha (July)
India	26 764 ha (1–26 July)
Iran	31 307 ha (July)
Oman	25 ha (July)
Pakistan	7 666 ha (July)
Saudi Arabia	1 300 ha (July)
Sudan	4 935 ha (June)
	1 180 ha (July)
Yemen	4 605 ha (1–29 July)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

During the last decade of July, isolated mature adults were seen in the southeast near Aioun El Atrous (1639N/0936W) and Nema (1636N/0715W).

• **FORECAST**

More scattered adults are likely to appear in the south and southeast where small-scale breeding will occur in areas of recent rainfall, causing locust numbers to increase slightly.

Mali

• **SITUATION**

During July, no surveys were undertaken but locals reported locust infestations in the Adrar des Iforas between Kidal (1827N/0125E) and Aguelhoc (1927N/0052E).

• **FORECAST**

Small-scale breeding will occur in areas of recent rainfall in the Adrar des Iforas, causing locust numbers to increase slightly. Breeding will extend to adjacent areas of the Tilemsi Valley and Tamesna with the onset of the summer rains.

Niger

• **SITUATION**

During July, isolated mature solitarious adults were present in the southeast Air Mountains east of Timia (1809N/0846E) and on the Tamesna Plains between In Abangharit (1754N/0559E) and Tazerzait Plateau (1832N/0449E). Local breeding occurred east of Timia where fourth instar solitarious hoppers were seen at the end of the month.

• **FORECAST**

Small-scale breeding will cause locust numbers to increase slightly on the Tamesna Plains and in the southeast Air Mountains as well as between Tahoua and Tanout where breeding is likely to be already in progress from earlier rains.

Chad

• **SITUATION**

No surveys were carried out and no locusts were reported in July.

• **FORECAST**

Scattered adults are likely to appear in areas of recent rainfall in the centre and northeast and breed on a small scale.

Burkina Faso

• **SITUATION**

No locust activity was reported during July.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during July.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During July, small-scale breeding continued near irrigated areas in the northern Sahara south of El Bayadh (3341N/0102E) and in the central Sahara northeast of Timimoun (2916N/0014E) where low numbers of solitarious hoppers persisted. Scattered immature and mature solitarious adults were also present between Timimoun and In Salah (2712N/0229E) while isolated mature solitarious adults were seen in the southern Sahara west of Tamanrasset (2250N/0528E). Ground teams treated 115 ha.

• **FORECAST**

Low numbers of locusts may persist near agricultural areas in the central Sahara where small-scale breeding could continue. Breeding will occur in the south in those areas that receive rainfall. No significant developments are likely.

Morocco

• **SITUATION**

No locust activity was reported during July.

• **FORECAST**

No significant developments are likely.

Libya

• **SITUATION**

Groups of gregarious fifth instar hoppers and immature adults, resulting from earlier breeding, were seen at several places during a survey in the Ghat (2459N/1011E) area of the southwest on 16–20 July.

• **FORECAST**

Low numbers of adults are likely to persist in those areas that remain green near Ghat but will decline as vegetation dries out and adults move south to summer breeding areas.

Tunisia

• **SITUATION**

No locust activity was reported during July.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During the first week of July, scattered mature solitarious adults were seen on the Red Sea coast between Suakin (1906N/3719E) and the Eritrea border, in the Nile Valley between Khartoum (1533N/3235E) and Atbara (1742N/3400E), and in North Kordofan between El Obeid (1311N/3010E) and Umm Saiyala (1426N/3112E), and in the Baiyuda Desert. Ground teams treated 1 180 ha of maturing adult groups in the northern Nile Valley near Merowe (1830N/3149E) and mature groups near Abu Hamed (1932N/3320E).

• **FORECAST**

Small-scale breeding is expected to be underway in areas of recent rainfall in North Darfur, North Kordofan, White Nile and Khartoum states. This will cause locust numbers to increase in all areas. There is a low to moderate risk of a few adult groups or perhaps a small swarm arriving from adjacent areas of northern Ethiopia.

Eritrea

• **SITUATION**

No surveys were carried out and no locusts were reported in July.

• **FORECAST**

Low numbers of adults, perhaps supplemented by a few groups arriving from northern Ethiopia, are expected to appear in the western lowlands and breed in areas of recent rains. Consequently, locust numbers will increase during the forecast period.

Ethiopia

• **SITUATION**

During July, small-scale breeding occurred on the western edge of the Awash Valley north of Bati (1111N/4001E) in the Afar and Amhara regions where first and second instar solitarious hoppers mixed with mature solitarious adults were seen in the last week. Scattered solitarious adults were also present in the eastern region between Dire Dawa (0935N/4150E) and Ayasha (1045N/4234E).

• **FORECAST**

Breeding will occur in areas of recent rainfall in Amhara, Afar and eastern regions, with additional hatching that could give rise to hopper groups and bands.

Djibouti

• **SITUATION**

No surveys were carried out and no locusts were reported in July.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

On 12–13 July, several mature swarms were seen flying along the northeastern plateau in the Sanaag and Bari regions from south of the northern coastal mountains to Iskushuban (1017N/5014E). In the northwest, second to fourth instar hoppers bands were present during the third week on the coastal plains south of Zeylac (1121N/4328E) near the Djibouti border as a result of egg-laying in mid-June by swarms that arrived from Yemen. Scattered mature solitarious adults were seen further east along the coast to Berbera (1028N/4502E) and low numbers of solitarious hoppers were present at two places on the escarpment and plateau southeast of Berbera.

• **FORECAST**

Fledging will occur on the northwest coast during the first three weeks of August; thereafter, small highly mobile immature groups and perhaps a few small swarms are likely to form and move up the escarpment to the plateau in the northwest and adjacent areas of eastern Ethiopia. In the northeast, breeding by earlier swarms could give rise to hopper groups and bands.

Egypt

• **SITUATION**

During July, small-scale breeding occurred near farms in the Sh. Oweinat (2219N/2845E) area just north of the Sudanese border where solitarious hoppers and a few small hopper groups were present. Ground teams treated 4 ha. No locusts were seen during surveys on the Red Sea coast west of Abu Ramad (2224N/3624E), in the Nile Valley north of Aswan (2405N/3256E), and in the Western Desert near Darb Al-Arbain (2357N/3018E), Farafra (2710N/2818E) and Bahariya (2821N/2851E).

• **FORECAST**

Low numbers of locusts may persist on the edges of some farms in the Western Desert. No significant developments are likely.

Saudi Arabia

• **SITUATION**

During July, immature solitarious adults were present at mid-month near Wadi Dawasir (2028N/4747E), and groups of immature adults were seen in the Asir Mountains near Al Baha (2001N/4129E) and Abha (1813N/4230E) during the last week. Ground teams treated 1 300 ha. No locusts were seen during surveys in the spring breeding areas of the central interior between Riyadh (2439N/4642E) and Hail (2731N/4141E) and in the east near Qaryat Al Olaya (2733N/4742E).

• **FORECAST**

Locusts may persist near Wadi Dawasir and in parts of the Asir Mountains. Locust groups are likely to appear on the southern coast of the Red Sea near Jizan from adjacent areas of Yemen and breed in areas of recent rainfall or runoff.

Yemen

• **SITUATION**

During July, numerous hopper bands continued to form throughout the highlands, along the western edge of Ramlat Sabatyn from Al Hazm (1610N/4446E) to Bayhan (1452N/4545E), on the southern coast from Am Rija (1302N/4434E) to Zinjibar (1306N/4523E), and in the foothills of the Red Sea coast east Al Zuhrah (1541N/4300E). By mid-month, many of the hoppers had fledged and immature adults were forming groups and swarms that were seen flying in many areas, including Sana'a (1521N/4412E). On the 27th, a mature swarm was seen laying south of Marib (1527N/4519E). In the east, mature adult groups were present in Wadi Hadhramaut and on the plateau towards Thamud (1717N/4955E). Ground teams treated 4 605 ha on 1–29 July.

• **FORECAST**

Swarm formation will continue in the highlands, the Ramlat Sabatyn interior and on the southern coast. Most of the swarms are expected to persist, mature and start to lay in areas of recent rainfall during the second half of August,

including the Red Sea coast. This could give rise to another generation of hatching by the end of the forecast period that would cause a substantial increase in locust numbers. Limited breeding may also occur in Wadi Hadhramaut where hopper and adult groups may form.

Oman

• **SITUATION**

During the first week of July, solitarious mature adults including at least one group were seen in the southern province of Dhofar northwest of Thumrait (1736N/5401E), and a mature swarm was seen on the coast north of Salalah (1700N/5405E) on the 5th. These populations probably originated from earlier breeding in the Empty Quarter and in eastern Yemen. In the northern interior, scattered immature and mature solitarious adults were present near Sinaw (2230N/5802E) and on the Musandam Peninsula where small scale breeding occurred and solitarious hopperswere present at one place. Ground teams treated 25 ha of mature groups in the mountains near Sur (2234N/5930E) on the 17–20th, most likely a result of earlier local breeding.

• **FORECAST**

Scattered adults may persist in parts of the north, but no significant developments are likely.

Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During July, groups of immature and mature adults prevailed in the southern provinces of Ilam near the Iraqi border, Bushehr and adjacent areas of Khuzestan and Fars, Hormozgan, southern Kerman and Sistan-Baluchistan. Small-scale breeding occurred near the Afghan border to the west of Zabol (3102N/6130E) where mid-instar solitarious hoppers were present. Control operations ended on 24 July, treating 31 307 ha during the month of which 10 720 ha were by air.

• **FORECAST**

A few residual groups of adults will persist in parts of the south early in the forecast; thereafter, the situation will become calm and no significant developments are likely.

Pakistan

• **SITUATION**

In the spring breeding areas of Baluchistan, ground teams treated hopper and adult groups in the north near Nushki (2933N/6601E) and immature adults further south near Lasbela (2614N/6619E) during the first fortnight of July. Scattered mature solitarious adults were present along the coast east of Ormara (2512N/6438E)and in the interior near Khuzdar (2749N/6639E). In the summer breeding areas, groups of hoppers and immature and mature adults were present east of the Indus Valley to the south of Rohri (2739N/6857E). Groups of adults laid eggs in Cholistan near Islamgarh (2751N/7048E) and Rahimyar Khan (2822N/7020E), and in Tharparkar Desert near Chachro (2506N/7015E) and Virawah (2431N/7046E) where immature soltiarious adults were also present near the Indian border. In Cholistan, a mature swarm was seen flying south of Bahawalpur (2924N/7147E) on the 15th, and hatching commenced during the last week and hoppers were forming groups. Control operations treated 7 666 ha of which 400 ha were by air.

• **FORECAST**

Breeding will continue in Cholistan and Tharparkar deserts with hatching and the formation of hopper groups and bands. This will be supplemented by a second generation of breeding in Nara Desert. New immature adult groups and perhaps a few small swarms are likely to form in September.

India

• **SITUATION**

During July, numerous mature adult groups and swarms appeared from spring breeding areas and laid eggs over a widespread portion of Rajasthan from Barmer (2543N/7125E) to Churu (2818N/7458E). Hatching commenced about mid-month and early instar hopper groups formed in Jaisalmer district and, to a lesser extent, in southwest Jalor and in northern Gujarat while hopper bands formed along the border of Pakistan in Barmer district. Small-scale breeding occurred in parts of Bikaner and Churu districts. Ground teams treated 26 764 ha on 1–26 July.

• **FORECAST**

Fledging of current hopper groups and bands will commence by the beginning of August and groups and perhaps small immature swarms are likely to form. In addition, breeding will continue especially in Bikaner and Jaisalmer districts where substantial hatching is expected during the first half of August, giving rise to hopper groups and bands that will start to fledge in the first half of September and form immature adult groups and possibly small swarms.

Afghanistan

• **SITUATION**

There were reports of locust infestations in the southern provinces of Helmand and Nimroz where mature *transiens* and gregarious adults were seen copulating in July.

• **FORECAST**

Hatching and the formation of hopper groups and perhaps small bands are likely to occur during August in parts of Helmand and Nimroz provinces.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.
Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.
Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.
Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague

- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline

- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green

- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow

- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange

- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

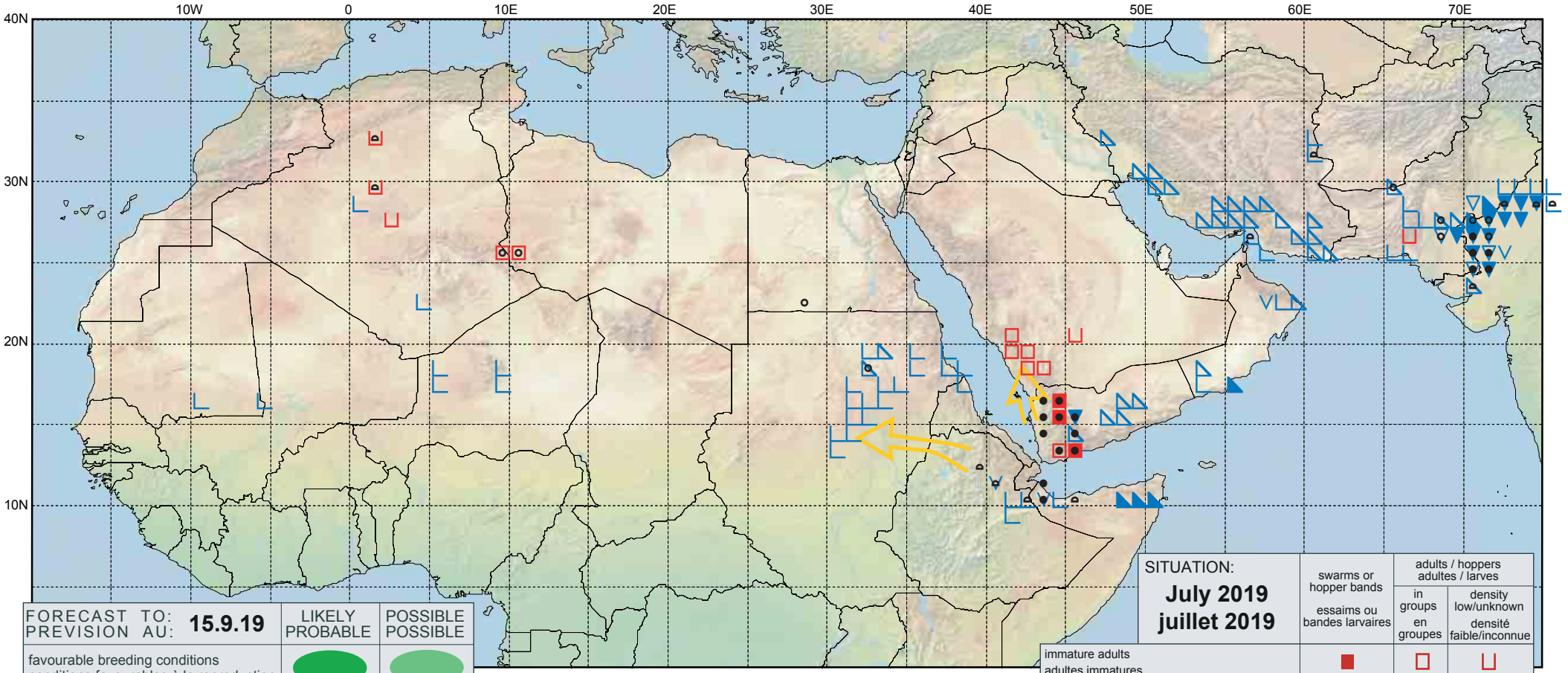
FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

490



FORECAST TO: / PREVISION AU: **15.9.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION:
July 2019
juillet 2019

	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves: in groups en groupes	adults / hoppers adultes / larves: density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	L
adults, maturity unknown adultes, maturité inconnue	▲	△	Λ
egg laying or eggs pontes ou œufs	▼	▽	V
hoppers larves	●	○	∩
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊔

Food and Agriculture Organization of the United Nations

No. 491 3 SEPTEMBER 2019

Desert Locust Bulletin

General situation during August 2019
Forecast until mid-October 2019

WESTERN REGION: CALM

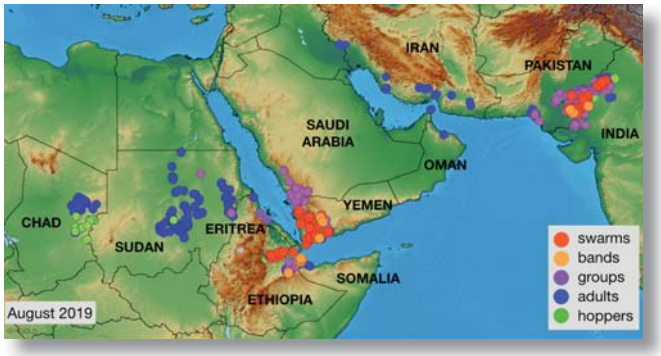
SITUATION. Small-scale breeding occurred in northern **Mali**, **Chad** and probably **Niger**. Hoppers and adults were treated (70 ha) in southwest **Libya**. Isolated adults were present in central and southern **Algeria**.
FORECAST. Small-scale breeding will continue in **Mali**, **Niger** and **Chad** and, to a lesser extent, in **Mauritania**, causing locust numbers to increase slightly. Small-scale breeding may occur in southwest **Libya**.

CENTRAL REGION: THREAT

SITUATION. Swarms spread in **Yemen** to the coast and matured; 110 ha treated. Several swarms moved through **Djibouti** to **Ethiopia** where breeding was underway (11 ha treated). Immature groups formed on the northwest coast of **Somalia**. Immature adult groups were treated (3 900 ha) in southwest **Saudi Arabia** and groups bred on the southern Red Sea coast. Isolated adults prevailed in northern **Oman**. Scattered mature adults increased in **Sudan** and adult groups were treated (200 ha). Adults and a few groups were copulating on the Red Sea coast in **Eritrea**.
FORECAST. More swarms will form in **Yemen** and coastal breeding will cause a substantial increase in locust numbers, supplemented by breeding in **Saudi Arabia**. Hopper groups and bands could form in **Ethiopia** and on the Red Sea coast in **Eritrea**. Smaller-scale breeding will occur in **Sudan** and western Eritrea.

EASTERN REGION: THREAT

SITUATION. Control operations increased in **India** (65 089 ha) and **Pakistan** (16 445 ha) due to laying swarms and widespread hatching, causing numerous hopper groups. Isolated adults persisted in southern **Iran**.
FORECAST. Another generation of breeding is expected in **Pakistan** while breeding will continue in **India**, causing locust numbers to increase further with the possibility of swarm formation from late September onwards.



Worrisome situation in eastern and central regions

The current situation is most serious in Yemen, Pakistan and India, and it could deteriorate in Ethiopia and Eritrea. In Yemen, swarms moved in the highlands and reached the Red Sea and Gulf of Aden coasts while a few swarms migrated through Djibouti and reached Ethiopia. Adult groups formed on the northwest coast of Somalia and moved to eastern Ethiopia. Unusually good rains fell along both sides of the Red Sea in Yemen, Saudi Arabia and Eritrea that will allow breeding from September onwards and hopper bands may form. A substantial increase in locust numbers is expected in Yemen as more swarms form in the interior and breeding starts in coastal areas. In northeast and eastern Ethiopia, breeding is expected to continue, giving rise to small hopper bands. In Southwest Asia, swarm laying and widespread hatching caused numerous hopper groups to form in Rajasthan, India while a second generation of breeding occurred in Pakistan. Although ground control operations increased in both countries, there remains a risk of further breeding and the possible formation of new swarms starting in late September. Smaller-scale breeding will occur in the northern Sahel between Mali and western Eritrea, causing locust numbers to increase slightly. Less breeding is expected in Mauritania due to poor rains so far. Breeding may also occur in southwest Libya.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.
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Facebook/Twitter: faolocust

Weather & Ecological Conditions in August 2019

Good rains fell in the summer breeding areas of the northern Sahel from Mali to Eritrea and along the Indo-Pakistan border. Breeding conditions were favourable in all areas except for Mauritania. Widespread unusual rains fell in the winter breeding areas along both sides of the Red Sea coast.

WESTERN REGION

The Inter-Tropical Convergence Zone (ITCZ) moved further north than usual between Mali and Chad, which led to widespread above-average rainfall particularly in Chad. Consequently, ecological conditions were favourable for breeding in the Tilemsi Valley, Adrar des Iforas and Tamesna of northern Mali, the central pasture areas, Tamesna Plains and the southern Air Mountains in Niger, and throughout the northern Sahel of Chad, reaching as far north as Faya and Fada. In Mauritania, the ITCZ was further south than normal and, as a result, below-average rains fell in the south and southeast. In Northwest Africa, generally dry conditions prevailed; however, heavy rains caused flooding in the Ghat area of southwest Libya at the end of August. Green vegetation persisted in some places from earlier rains that fell from April to June.

CENTRAL REGION

The Inter-Tropical Convergence Zone (ITCZ) moved further north than usual over Sudan, causing widespread above-average rainfall throughout the summer breeding areas, extending to the Baiyuda Desert and the Nile Valley in the north and the Red Sea Hills in the east as well as the western lowlands of Eritrea. Consequently, ecological conditions were favourable for breeding over a widespread area. In the interior of Yemen, although only light showers fell at times, conditions remained favourable for breeding. Light to moderate rains fell at times in eastern Ethiopia and on the plateau in northwest Somalia as far east as Burao. Conditions were favourable for breeding in Ethiopia and were expected may be improving on the Somali plateau. In the winter breeding areas, moderate to heavy rains fell along both sides of the Red Sea on the coastal plains of Eritrea from Mersa Cuba south to Djibouti and on the entire Yemen Tihama coast, extending north to Qunfidah, Saudi Arabia. Good rains also fell on the Gulf of Aden coast. Rainfall was heaviest during the first decade of August. During the second decade, rains also fell in the Red Sea Hills of Sudan and southeast Egypt, some of which may have run off into Wadi Diib and onto the coastal plains between Port Sudan and Tokar Delta. It is unusual for such rains to fall at this time of year, which have given rise to locust outbreaks in the past.

EASTERN REGION

Moderate to heavy rains fell along both sides of the Indo-Pakistan border during the first decade and continued during the second decade in Cholistan, Pakistan and in East Rajasthan, India. Light to moderate rains fell at the end of the month from Tharparkar to Cholistan and adjacent areas of West Rajasthan. This year's monsoon in India has continued to produce above average rainfall in West Rajasthan (18% higher than normal) and East Rajasthan (42%). Consequently, breeding conditions remained favourable in both countries.

Area Treated

Nearly 86 000 ha were treated during August.

Ethiopia	11 ha (August)
India	36 330 ha (July updated)
	65 089 ha (August)
Libya	70 ha (August)
Mali	40 ha (August)
Pakistan	16 455 ha (August)
Saudi Arabia	3 900 ha (August)
Sudan	200 ha (August)
Yemen	110 ha (August)

Desert Locust Situation and Forecast

WESTERN REGION

MAURITANIA

• **SITUATION**

No surveys were carried out and no locusts were reported in August.

• **FORECAST**

Low numbers of adults are almost certainly present but breeding is likely to be limited. Depending on the extent of additional rainfall during the forecast period, small-scale breeding will continue in parts of the two Hodhs, southern Tagant, Assaba, Brakna and Trarza, causing locust numbers to increase slightly.

MALI

• **SITUATION**

A late report indicated that scattered mature solitarious adults were present at one location in the Adrar des Iforas south of Aguelhoc (1927N/0052E) in late July. During August, adults were copulating south of Aguelhoc. Ground teams treated 40 ha of low densities of solitarious adults

mixed with higher densities of African Migratory Locusts west of Tombouctou (1649N/0259W).

• **FORECAST**

Small-scale breeding will occur in areas of recent rainfall in the Adrar des Iforas, Tilemsi Valley and Tamesna where limited hatching will take place, causing locust numbers to increase slightly.

Niger

• **SITUATION**

No reports were received during August.

• **FORECAST**

Small-scale breeding will cause locust numbers to increase slightly on the Tamesna Plains and in the southeast Air Mountains as well as between Tahoua and Tanout where breeding is likely to be already in progress from earlier rains.

Chad

• **SITUATION**

During August, small-scale breeding was underway in the east near the Sudanese border between Goz Beida (1242N/2125E) and Iriba (1507N/2215E) and further west near Arada (1501N/2040E) where isolated solitarious hoppers of all instars were present from egg-laying that started in early July. Isolated solitarious adults were maturing further north between Kalait (1550N/2054E) and Fada (1714N/2132E). No locusts were seen in northern Batha.

• **FORECAST**

Small-scale breeding will continue in the east and northeast where increased fledging will take place. Similar breeding will occur in western and central areas that received good rains, causing locust numbers to increase slightly but remain below threatening levels.

Burkina Faso

• **SITUATION**

No reports were received during August.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during August.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During August, isolated mature solitarious adults were present near a few irrigated areas south of Adrar (2753N/0017W) in the central Sahara and west of Tamanrasset (2250N/0528E) in the southern Sahara.

• **FORECAST**

Low numbers of locusts may persist near agricultural areas in the central Sahara where small-scale breeding could continue. Breeding will occur in the south in those areas that receive rainfall. No significant developments are likely.

Morocco

• **SITUATION**

No locust activity was reported during August.

• **FORECAST**

No significant developments are likely.

Libya

• **SITUATION**

In late August, ground teams treated 70 ha of fifth instar hoppers and immature and mature adults in the southwest near Ghat (2459N/1011E).

• **FORECAST**

Low numbers of adults are likely to persist in those areas that remain green from recent flooding near Ghat and could breed, causing locust numbers to increase and groups to form.

Tunisia

• **SITUATION**

No locust activity was reported during August.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During August, mainly scattered mature adults were present in North Kordofan between Sodiri (1423N/2906E), Abu Uruq (1554N/3027E) and Umm Saiyala (1426N/3112E), in White Nile and Khartoum states, along the Nile between Ed Debba (1803N/3057E) and Dongola (1910N/3027E), and in the east between Kassala (1527N/3623E) and Haiya (1820N/3621E). Ground teams treated 200 ha of mature mature adult groups in the Nile Valley near Abu Hamed (1932N/3320E), and scattered adults and groups were laying eggs near Kassala.

• **FORECAST**

Small-scale breeding will cause locust numbers to increase in Darfur, North Kordofan, White Nile, Khartoum and Kassala states. Hatching is expected in all of these areas and small groups may form near Kassala. Fledging will commence after mid-September.

Eritrea

• **SITUATION**

During the last week of August, scattered mature solitarious and *transiens* adults were copulating on the Red Sea coast between Sheib (1551N/3903E) and Ghelaelo (1507N/4004E). Adult groups were seen at one place on the coast south of Mersa Cuba (1616N/3911E). On the northern coast, immature solitarious adults were present along the foothills between Mehimet (1723N/3833E) and the Sudan border. Scattered solitarious mature adults were seen copulating at one place. The current breeding most likely originated from remnants of the swarms that flew over the southern Red Sea coast from Yemen in July. No information was received about the situation in the summer breeding areas of the western lowlands.

• **FORECAST**

Locust numbers will increase on Red Sea coast between Mersa Cuba and Mersa Fatma as hatching occurs. A few small hopper groups could form in some areas. Smaller-scale breeding will occur on the northern coast where hatching will also take place. Breeding is almost certainly in progress and will continue in the western lowlands, which could give rise to hopper and adult groups.

Ethiopia

• **SITUATION**

During August, hatching continued on the western edge of the Awash Valley north of Bati (1111N/4001E) in the Afar region and along the railway area north of Dire Dawa (0935N/4150E). First to fourth instar hoppers, groups and a few bands were seen in both areas. Scattered immature and mature solitarious adults were present between Dire Dawa and Djibouti and a few immature groups were seen near the border of northwest Somalia on 23–24 August that may have originated from earlier breeding on the northwest coast of Somalia. In the following days, several very small immature swarms were seen moving west in Afar from Djibouti towards Weldiya (1150N/3936E) that may have come from Yemen. By the end of the month, mature swarms were seen copulating north of Bati. Ground teams treated 11 ha in August.

• **FORECAST**

Breeding will continue in Afar and along the railway area where additional hatching will cause an increasing number of hopper groups and small bands to form.

Djibouti

• **SITUATION**

On 24–25 August, groups of immature and mature *transiens* adults were seen during surveys in the northwest interior between Tadjourah (1147N/4253E) and Moudo (1218N/4226E) and in the south near Ali Sabieh (1109N/4242E). These may be remnants of swarms from Yemen.

• **FORECAST**

There remains a risk of additional small groups and swarms from Yemen transiting through the country towards Ethiopia.

Somalia

• **SITUATION**

A late report indicated that adult groups in the northeast had reportedly moved to the Golis Mountains by the end of July and only scattered adults remained in a few places near Iskushuban (1017N/5014E) and on the northeast coast near Bosaso (1118N/4910E). During the first week of August, fifth instar hopper groups and bands were present on the northwest coast near Silil (1058N/4326E). Most of the hoopers had fledged and formed immature adults and groups that left the coastal plains because of dry conditions and moved towards eastern Ethiopia.

• **FORECAST**

Low numbers of locusts may persist in a few places of recent rainfall on the northwest plateau near Hargeisa.

Egypt

• **SITUATION**

No surveys were carried out and no locusts were reported in August.

• **FORECAST**

No significant developments are likely.

Saudi Arabia

• **SITUATION**

During August, groups of immature adults were seen in the Asir Mountains between Al Baha (2001N/4129E) and the Yemen border, near Najran (1729N/4408E) in the southwest interior and Jizan (1656N/4233E) on the southern Red Sea coast. By the end of the month, some of the groups had matures and were copulating near Jizan. Ground teams treated 3 900 ha in August.

• **FORECAST**

Locust numbers will increase on the southern coastal plains of the Red Sea between Qunfidah and Jizan as a result of breeding in areas of recent rainfall. Hatching will occur during September and hopper groups and perhaps small bands are likely to form.

Yemen

• **SITUATION**

During August, numerous immature adult groups and swarms were seen flying throughout the central highlands between Sana'a (1521N/4412E) and Taiz (1335N/4401E), in the interior between Marib (1527N/4519E) and Bayhan (1452N/4545E), in the south near Aden (1250N/4503E) and Al Baydha (1405N/4542E), and on the Red Sea coast near Hodeidah (1450N/4258E) and Suq Abs (1600N/4312E). Mature adult groups and swarms were also present and laying in some of these areas, including the northern Red Sea coast at mid-month. Hopper bands

from earlier breeding persisted near Marib, Bayhan and Lahij (1303N/4453E). On the 25th, an immature and mature swarm appeared on the coast west of Aden near Bab El Mandeb where some swarms may have crossed to Djibouti and Ethiopia. Ground teams treated 110 ha during August.

• **FORECAST**

More swarms are likely to form from current breeding in the interior. A substantial increase in locust numbers is expected to occur as a result of swarm laying and subsequent hatching in areas of recent rainfall on the Red Sea coastal plains and on the southern coast near Aden that will give rise to hopper groups and bands. Breeding may also continue along parts of the western edge of Ramlat Sabatyn between Marib and Ataq.

Oman

• **SITUATION**

During August, low numbers of immature adults were present on the Batinah coast near Jamma (2333N/5733E) while a mixture of immature and mature adults was seen on the Musandam Peninsula. No locusts were seen elsewhere on the Batinah coast or in the northern interior between Nizwa (2255N/5731E) and Buraimi (2415N/5547E) and near Sur (2234N/5930E).

• **FORECAST**

Scattered adults may persist in parts of the north, but no significant developments are likely.

Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During August, isolated mature solitarious adults persisted in a few places in the southern provinces of Ilam near the Iraqi border, Bushehr, southern Fars, Hormozgan and southern Sistan-Baluchistan.

• **FORECAST**

No significant developments are likely.

Pakistan

• **SITUATION**

During August, adults continued to lay eggs primarily in Cholistan and, to a lesser extent, in Nara and Tharparkar deserts where groups of hoppers and immature and mature adults formed near the Indian border. From mid-month onwards, second-generation hatching caused locust numbers to increase further. Adults were also laying eggs and hoppers were forming groups in the Las Bela area west of Karachi (2450N/6702E). Ground teams treated 16 455 ha during August.

• **FORECAST**

Breeding will continue in Cholistan and Tharparkar deserts with another generation of hatching and the formation of hopper groups and bands with new immature adult groups and perhaps a few small swarms forming by late September.

India

• **SITUATION**

During the first half of August, numerous mature groups and swarms laid eggs along the Pakistani border west of Barmer (2543N/7125E), between Jaisalmer (2652N/7055E) and Phalodi (2706N/7222E), and between Bikaner (2801N/7322E) and Suratgarh (2919N/7354E) that caused widespread hatching at mid-month, giving rise to large numbers of hopper groups but only a few small bands due to control operations. Immature and mature solitarious and transiens adults were also scattered within these areas. Ground teams treated 65 089 ha in August.

• **FORECAST**

Breeding will continue in Rajasthan, causing an increasing number of hopper groups to form and fledge during the forecast period. Consequently, immature groups and small swarms are expected to form from late September onwards.

Afghanistan

• **SITUATION**

No reports were received during August.

• **FORECAST**

Limited breeding may be in progress in parts of Helmand and Nimroz provinces where small groups could form.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.
Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.
Bulletins. Affected countries are encouraged to prepare

decadal and monthly bulletins summarizing the situation. **Reporting.** All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague
- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline
- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green
- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow
- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange
- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

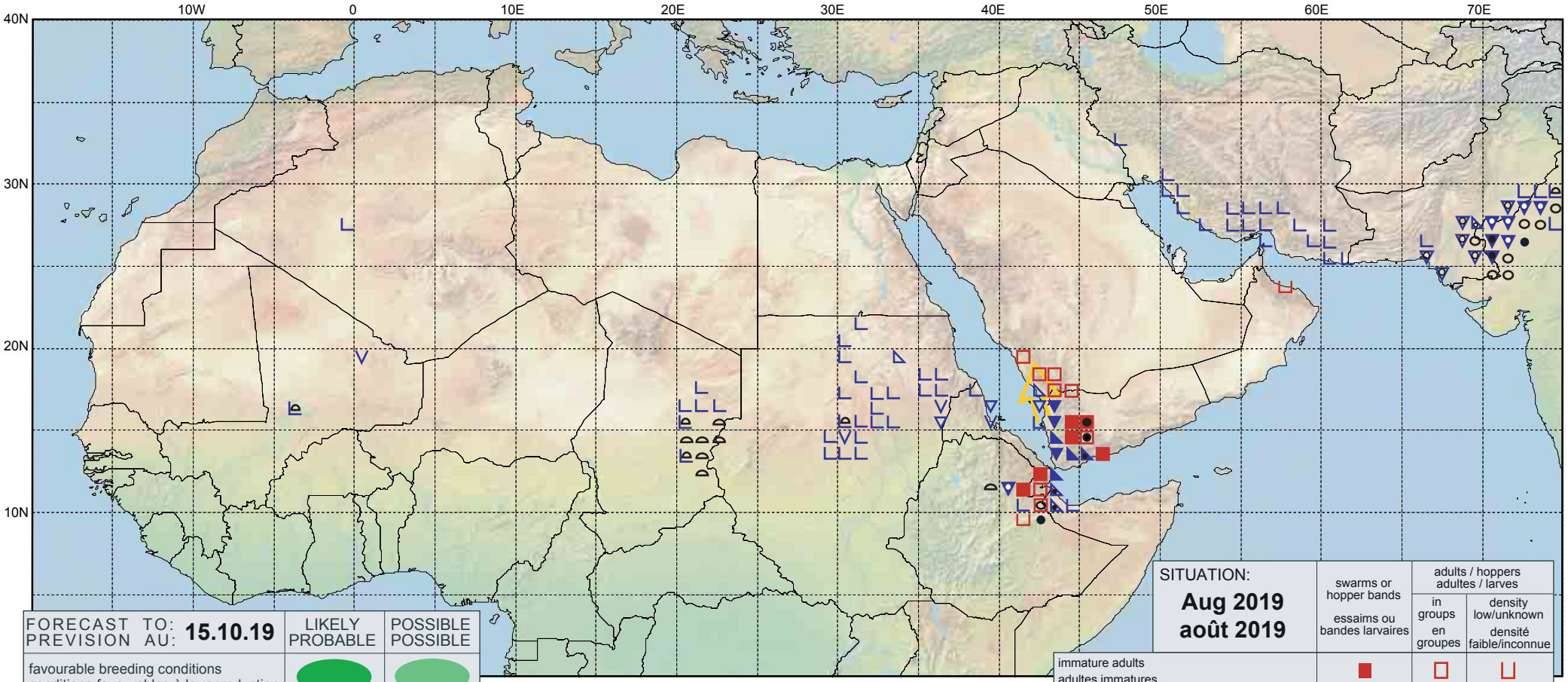
FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

491



FORECAST TO: / PREVISION AU: **15.10.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Aug 2019 août 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves in groups en groupes	 density low/unknown densité faible/inconnue
immature adults adultes immatures			
mature or partly mature adults adultes matures ou partiellement matures			
adults, maturity unknown adultes, maturité inconnue			
egg laying or eggs pontes ou œufs			
hoppers larves			
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)			

Food and Agriculture Organization of the United Nations

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Desert Locust Bulletin

General situation during September 2019 Forecast until mid-November 2019

WESTERN REGION: CALM

SITUATION. A second generation of breeding occurred in **Chad** while small-scale breeding was underway in **Algeria**, **Niger** and probably southern **Mauritania** and northern **Mali**.

FORECAST. Breeding will decline in **Mali**, **Niger** and **Chad** but increase in northwest **Mauritania** where small groups may form, and possibly extend to Western Sahara in **Morocco**. Local breeding may occur in **Algeria**.

CENTRAL REGION: THREAT

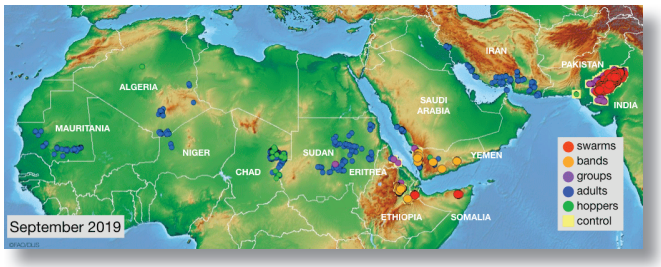
SITUATION. Hopper groups and bands formed in **Ethiopia** (4 636 ha treated) and on the Red Sea coast in **Yemen** (245 ha treated) and **Saudi Arabia** (4 195 ha treated). Early breeding occurred on the **Eritrean** coast (53 ha treated). Hopper bands persisted in the Yemen interior. Swarms were present in northern **Somalia**. Summer breeding was limited in **Sudan**.

FORECAST. Breeding on the coast and interior will cause a substantial increase in locust numbers in **Yemen**, supplemented by breeding in **Saudi Arabia**. Adult groups and swarms may form in **Ethiopia** and migrate to the Ogaden and **Eritrea**. Winter breeding will continue on the Red Sea coast in **Eritrea** and start in **Sudan**.

EASTERN REGION: THREAT

SITUATION. Control operations increased further in **India** (84 639 ha) and **Pakistan** (30 210 ha) against second-generation breeding. Isolated adults persisted in southern **Iran**.

FORECAST. As vegetation dries and breeding ends, adult groups and small swarms are expected to form along both sides of the Indo-Pakistan border and migrate to southwest **Pakistan** and southeast **Iran** where they are likely to remain and slowly mature.



Situation remains threatening in eastern and central regions

The current situation deteriorated in Ethiopia and remains serious in Yemen, Pakistan and India. Swarms laid eggs in northeast Ethiopia that gave rise to hopper bands and aerial control operations were carried out. Once new swarms form, they could migrate south to the Ogaden and north to the Eritrean Red Sea coast where breeding already started. Hopper groups and bands formed on the Red Sea coast of Yemen and, to a lesser extent, in adjacent coastal areas of Saudi Arabia while breeding continued in the interior of Yemen. Control operations were undertaken in both countries. Unusually good rains that fell in Yemen will allow breeding to continue, mostly unchecked, in the interior and on the coast, which will cause a substantial increase in locusts. Breeding may eventually occur in central Oman where heavy rains fell from Cyclone Hikka. Ground control operations increased along both sides of the Indo-Pakistan border against swarms and a second generation of breeding that caused hopper groups and bands to form. As monsoon rains lasted longer than usual, infestations will persist in October. Any locusts that are not detected or controlled will form adult groups and small swarms that are expected to migrate west to southwest Pakistan and southeast Iran where rains are forecasted from October onwards. This would allow infestations to persist until temperatures warm up in the spring for breeding. Locust numbers remained low in West Africa despite two generations of breeding in Chad. Adults are expected to concentrate and breed in northwest Mauritania where unusually good rains fell.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in September 2019

Good rains fell in the summer breeding areas of the northern Sahel in West Africa and continued later than normal along the Indo-Pakistan border. Heavy rains fell in Oman and Yemen from Cyclone Hikka while good rains fell in the Horn of Africa and in some of the winter breeding areas along the Red Sea.

WESTERN REGION

The Inter-Tropical Convergence Zone (ITCZ) remained unusually far north over Mauritania during September. It was some 350 km further north than usual in the northwest during the first decade, reaching Tasiast in the Inchiri region, 200 km further north in the Adrar region during the second decade, and more than 100 km further north than usual near Tidjikja in the last decade. Elsewhere, the ITCZ's position was nearly normal except in northeast Chad during the first decade when it was about 125 km further north than usual. During the third decade, the ITCZ began its seasonal retreat southwards over the Sahel. As a result, moderate to heavy rains fell mainly during the first two decades in western, northwest and northern Mauritania, northern Mali and Niger, and in central Chad. Ecological conditions were favourable for breeding in the northern Sahel of these countries and were improving in northwest and probably northern Mauritania. Some of the rains reached southern areas of Western Sahara in Morocco. In Northwest Africa, light to moderate rains fell in western Algeria and in the southeast where runoff from the Hoggar Mountains is likely to provide suitable ecological conditions for breeding near Tamanrasset, Illizi and Djanet.

CENTRAL REGION

The Inter-Tropical Convergence Zone (ITCZ) was slightly further south than normal over the interior of Sudan during the first decade of September; thereafter, it began its seasonal retreat southwards, reaching Sodiri and Khartoum by the end of the month. Consequently, light to moderate rains fell as far north as Mellit (North Darfur), Abu Uruq (North Kordofan) and Shendi (River Nile) as well as on the western side of the Red Sea Hills between Kassala and Derudeb, extending to the western lowlands in Eritrea. Ecological conditions were favourable for breeding throughout these areas. In the winter breeding areas, good rains fell on the Red Sea coast in Yemen, Eritrea and southwest Saudi Arabia where conditions were already favourable for breeding much earlier than normal. Breeding conditions were improving further north along the coast of Saudi Arabia to Lith and in subcoastal areas of Wadi Oko/Diib in northeast Sudan. On 24 September, Cyclone Hikka brought heavy rains to the central Oman coast, with up to 119 mm in the Duqm area, and in the interior of Al Waste Governorate while light to moderate rains extended to the northern interior between Buraimi and Sharqiyah on the 25–27th. These rains are expected to give rise to favourable breeding conditions that may last several months but low temperatures may delay locust maturation. Heavy rains extended to some areas in the interior of Yemen, causing flooding in parts of Al Jawf, Marib, Shabwah and Lahij where favourable breeding conditions will persist. In the Horn of Africa, light to moderate showers fell in northeast and eastern Ethiopia, extending to the Somali plateau as far east as Burao in northern Somalia. Breeding conditions remained favourable in Ethiopia and were improving in northern Somalia.

EASTERN REGION

The retreat of the southwest monsoon from West Rajasthan, India normally begins in early September; however, it is more than one month delayed this year, the first time in 60 years. Consequently, above-average rains continued to fall, especially during the first two decades of the month and ecological conditions remained favourable for breeding along both sides of the Indo-Pakistan border. Monsoon rains in India were 10% above average this year and the highest in 25 years. In the spring breeding areas, light to moderate rains fell during the last decade of September near Turbat in southwest Pakistan and in the coastal mountains between Zarabad and Jaz Murian in southeast Iran.

Area Treated

Nearly 124 000 ha were treated during September compared to 86 000 ha in August.

Eritrea	53 ha (1–10 September)
Ethiopia	4 636 ha (September)
India	84 639 ha (September)
Pakistan	30 210 ha (September)
Saudi Arabia	4 195 ha (1–28 September)
Yemen	245 ha (September)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• SITUATION

During September, isolated immature and mature solitarious adults were present in the south and southeast from Oualata (1717N/0701W) to west of Tamchekket (1714N/1040W), near Kiffa (1638N/1124W), Tintane (1623N/1009W) and

Moudjeria (1752N/1219W), and in the northwest between Akjoujt (1945N/1421W) and Oujeft (2003N/1301W).

• **FORECAST**

Small-scale breeding will cause locust numbers to increase slightly in the south and southeast during October. Adults are expected to move to the west and northwest where they are likely to concentrate and breed in areas of recent rainfall. This will cause locust numbers to increase with the possibly of a few small groups forming.

Mali

• **SITUATION**

During September, no surveys were carried out in the north due to insecurity and no locusts were reported.

• **FORECAST**

Small-scale breeding is expected to be in progress and will continue in areas of recent rainfall in the Adrar des Iforas, Tilemsi Valley and Tamesna, causing locust numbers to increase slightly.

Niger

• **SITUATION**

A late report indicated that isolated immature and mature adults were present on the northern Tamesna Plains west of Arlit (1843N/0721E) on 31 August. Adults were seen copulating at one place.

During September, isolated mature solitarious adults were present in a few places on the Tamesna Plains near In Abangharit (1754N/0559E).

• **FORECAST**

Small-scale breeding will continue in areas of recent rainfall, causing locust numbers to increase slightly on the Tamesna Plains and probably in the southeast Air Mountains.

Chad

• **SITUATION**

During September, scattered immature and mature solitarious adults were present, mixed with low numbers of solitarious hoppers of all instars, primarily in the northeast near Fada (1714N/2132E) and, to a lesser extent, in the east near Kalait (1550N/2054E) and along the Sudanese border between Goz Beida (1242N/2125E) and Iriba (1507N/2215E). A second generation of breeding commenced as adults laid eggs near Fada and hatching started after mid-month.

• **FORECAST**

Despite a second generation of breeding, locust numbers are likely to remain low. Nevertheless, second-generation hoppers and adults could concentrate and perhaps form a few very small groups in the northeast once vegetation begins to dry out.

Burkina Faso

• **SITUATION**

No reports were received during September.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during September.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During September, local breeding occurred in the central Sahara between Timimoun (2916N/0014E) and El Golea (3034N/0252E). Low numbers of mature solitarious adults were present in the east near Illizi (2630N/0825E), in the southern Sahara west of Tamanrasset (2250N/0528E) where laying was in progress, and along the Niger border near In Guezzam (1937N/0552E). A few immature solitarious adults were seen near Djanet (2434N/0930E).

• **FORECAST**

Low numbers of locusts may persist near agricultural areas in the central Sahara where small-scale breeding could continue. Breeding is expected to occur in areas of runoff from the Hoggar Mountains near Tamanrasset, Illizi and Djanet. No significant developments are likely.

Morocco

• **SITUATION**

No locust activity was reported during September.

• **FORECAST**

Low numbers of adults may appear in the Adrar Souttouf of the extreme south and breed on a small scale in areas of recent rainfall.

Libya

• **SITUATION**

No surveys were carried out and no locusts were reported in September.

• **FORECAST**

Low numbers of adults are likely to persist in those areas that remain green from recent flooding near Ghat where hatching is likely, causing locust numbers to increase and groups to form.

Tunisia

• **SITUATION**

No locust activity was reported during September.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During September, scattered mature solitarious adults continued to be present in the summer breeding areas of the interior in North Kordofan, Khartoum, River Nile, Northern and Kassala states. Similar infestations were also seen early in the month in the subcoastal areas of the northeast along Wadi Oko/Diib north of Tomala (2002N/3551E). Immature solitarious adults were seen in some areas, which suggests that one generation of breeding may have occurred as a result of egg-laying in about mid-July. By the end of September, mature adults had formed a few small groups in North Kordofan.

• **FORECAST**

As vegetation dries out and summer breeding ends, a few small groups may form in the interior. Adults will move to the Red Sea coastal plains where small-scale breeding will commence with the onset of the winter rains.

Eritrea

• **SITUATION**

During the first decade of September, hatching occurred on the Red Sea coastal plains between Massawa (1537N/3928E) and Wekiro (1548N/3918E) and near Ghelaelo (1507N/4004E), giving rise to groups of gregarious hoppers. Scattered immature and mature solitarious adults were present between Wekiro and Sheib (1551N/3903E), and some adults were copulating. Ground teams treated 53 ha on 1–10 September.

• **FORECAST**

Breeding will continue on the Red Sea coastal plains, causing locust numbers to increase between Mersa Fatma and the Sudanese border. Small hopper and adult groups are likely to form in some areas. There is a low to moderate risk of a few groups and swarms appearing on the coast from northeast Ethiopia.

Ethiopia

• **SITUATION**

During September, several more swarms laid eggs during the first half of the month in previously infested areas on the western edge of the Awash Valley north of Bati (1111N/4001E) in the Afar region. Hatching caused numerous hopper groups and bands to form that had reached mid-instar by the end of the month. Hopper bands also formed in a few places west of Dire Dawa (0935N/4150E). In the railway area in the east, a few groups and swarms laid eggs at mid-month south of Ayasha (1045N/4234E). Control operations treated 4 636 ha of which 2 423 ha were by air.

• **FORECAST**

Breeding will continue in Afar and along the railway area where additional hatching will cause an increasing number of hopper groups and small bands to form. Fledging will occur by mid-October, giving rise to an increasing number of immature groups and perhaps small swarms. There is a moderate risk that some of these could move towards the Ogaden, especially if rainfall occurs during the forecast period while others may move north towards the Red Sea coast in Eritrea.

Djibouti

• **SITUATION**

No reports were received during September.

• **FORECAST**

There remains a risk of a few small swarms from Yemen transiting through the country towards Ethiopia.

Somalia

• **SITUATION**

During the last week of August, several maturing swarms were seen on the northwest plateau between Boroma (0956N/4313E) and Sheikh (0956N/4511E) and further east on crops and pastures between Hadaaftimo (1056N/4807E) and Iskushuban (1017N/5014E) in mid-September.

• **FORECAST**

Breeding may occur in areas of recent rainfall on the northwest plateau between Burao and Boroma, causing locust numbers to increase and groups and small bands to form. Breeding is less likely to occur in the northeast unless further rains fall. There remains a risk of a few small swarms from Yemen appearing on the plateau.

Egypt

• **SITUATION**

During September, no locusts were seen on the southern coastal plains and in subcoastal areas of the Red Sea between Halaib (2213N/3638E) and El Sheikh El Shazly (2412N/3438E), and in the Allaqi area east of Lake Nasser.

• **FORECAST**

Low numbers of adults may appear on the Red Sea coastal plains in the southeast where small-scale breeding will occur in areas that receive rainfall.

Saudi Arabia

• **SITUATION**

During September, hatching occurred on the southern Red Sea coastal plains near Jizan (1656N/4233E) where hopper groups and at least one band formed. Mature solitarious, *transiens* and gregarious adults were also present near Jizan while immature and mature solitarious and *transiens* adults were seen further north along the coast near Lith (2008N/4016E). No locusts were seen elsewhere along the coast. Ground teams treated 4 195 ha on 1–28 September.

• **FORECAST**

Locust numbers will continue to increase on the southern coastal plains of the Red Sea mainly near Jizan where hopper and adult groups are likely to form, and a second generation of laying could start in the last week of October

with hatching by mid-November. Breeding will also occur in areas of recent rainfall between Jizan and Lith.

Yemen

• **SITUATION**

During September, only limited survey and control operations could be carried out. Hatching and hopper band formation were in progress on the northern Red Sea coast between Al Zuhrah (1541N/4300E) and Midi (1619N/4248E) from August breeding. By mid-month, most of the hoppers were second and third instar. Scattered mature solitarious adults were also present on the coast between Zabid (1410N/4318E) and Midi. In the interior, late instar hopper bands were present near Marib (1527N/4519E), Nisab (1430N/4629E) and in Wadi Hadhramaut where fledging occurred and adults formed immature groups. Ground teams treated 245 ha.

• **FORECAST**

A substantial increase in locust numbers is expected to occur as a result of unchecked breeding on the Red Sea coast. This will be further exacerbated by an increasing number of groups and perhaps small swarms forming in the interior that are likely to mature and breed along the edge of Ramlat Sabatyn between Marib and Shabwah where good rains and flooding occurred in September.

Oman

• **SITUATION**

During September, scattered immature solitarious adults were present near Khasab (2610N5615E) on the Musandam Peninsula. Elsewhere, no locusts were seen during surveys on the northern coast, in the northern interior between Buraimi (2415N/5547E) and Sur (2234N/5930E), and in interior and coastal areas of the southern governorate of Dhofar.

• **FORECAST**

Small-scale breeding may occur in coastal and interior areas of Al Waste Governorate where good rains fell from Cyclone Hikka.

Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During September, isolated immature and mature solitarious adults persisted in a few places in the southern provinces of Ilam near the Iraqi border, Bushehr, southern Fars, Hormozgan and southern Sistan-Baluchistan.

• **FORECAST**

There is a moderate risk that adult groups and small swarms may arrive in Sistan-Baluchistan and Hormozgan provinces from the Indo-Pakistan summer breeding areas. As rains are unusually predicted during the forecast period in the southeast, the adults are likely to persist, but maturation will be delayed as temperatures decline.

Pakistan

• **SITUATION**

During September, first-generation adult groups continued to mature and lay eggs primarily in Cholistan near the Indian border and Islamgarh (2751N/7048E) and, to a lesser extent, in Nara Desert south and east of Sukkur (2742N/6854E), and Tharparkar Desert north of Khokhropar (2542N/7012E) and near Nagarparkar (2421N/7045E). Second-generation hatching caused additional hopper groups to form and, by the last week of the month, fledging had commenced, giving rise to groups of immature adults. Ground teams treated 30 210 ha.

• **FORECAST**

As second-generation breeding continues, an increasing number of immature adult groups and small swarms will form along the Indo-Pakistan border where they will remain until vegetation dries out. Thereafter, adult groups and swarms will move west to coastal and interior areas of Baluchistan where they are likely to persist if rains occur by the end of the forecast period. These movements are likely in October and November when they are expected to be supplemented by similar populations from adjacent areas of Rajasthan.

India

• **SITUATION**

During September, first-generation adult groups and swarms continued to mature and lay eggs over a widespread area of Rajasthan from Barmer (2543N/7125E) to north of Bikaner (2801N/7322E). Second-generation hatching caused hopper groups to form but no hopper bands due to substantial control operations. By the last week of the month, hoppers began to fledge and form groups of immature adults. Ground teams treated 84 639 ha.

• **FORECAST**

As second-generation breeding continues, an increasing number of immature adult groups and perhaps a few small swarms will form in Rajasthan where they are likely to remain until vegetation dries out. Thereafter, any adult infestations that are not detected or controlled will move towards the west. This movement is expected to increase during November.

Afghanistan

• **SITUATION**

No reports were received during September.

• **FORECAST**

There is a low risk that a few groups or small swarms from the Indo-Pakistan border may appear in southern areas by the end of the forecast period.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.

Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.

Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.

Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **CRC.** ULV sprayer maintenance workshop, Muscat, Oman (11–14 November)
- **SWAC.** Regional Desert Locust Information Officer workshop, Tehran, Iran (26–28 November)
- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession

- Period without widespread and heavy infestations by swarms

Remission

- Period of deep recession marked by the complete absence of gregarious populations

Outbreak

- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge

- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague

- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline

- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green

- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow

- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange

- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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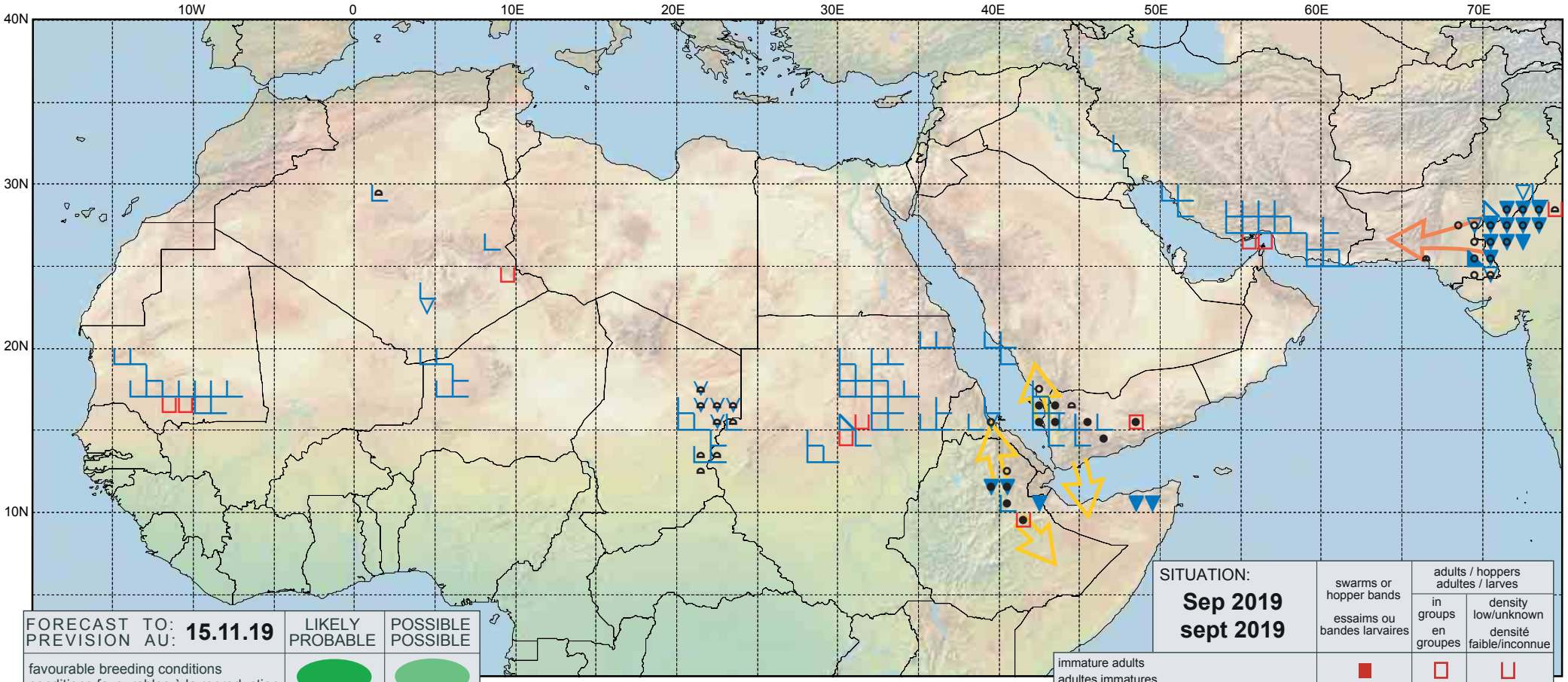

FORECAST TO: / PREVISION AU: **15.11.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Sep 2019** / **sept 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves: in groups en groupes	adults / hoppers adultes / larves: density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	∟
adults, maturity unknown adultes, maturité inconnue	▲	△	∧
egg laying or eggs pontes ou œufs	▼	▽	∨
hoppers larves	●	○	⌓
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊟

Food and Agriculture Organization of the United Nations

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Desert Locust Bulletin

General situation during October 2019
Forecast until mid-December 2019

WESTERN REGION: CALM

SITUATION. Small-scale breeding occurred in **Mauritania** and **Niger** (29 ha), extending to southern **Algeria** (15 ha). Groups formed in Niger. Isolated adults were present in **Morocco** and **Libya**.

FORECAST. A few small groups may form in summer breeding areas of **Mauritania** and **Niger** as vegetation dries out. Small-scale breeding will cause locust numbers to increase in northwest **Mauritania**. Local breeding may occur in **Algeria**.

CENTRAL REGION: THREAT

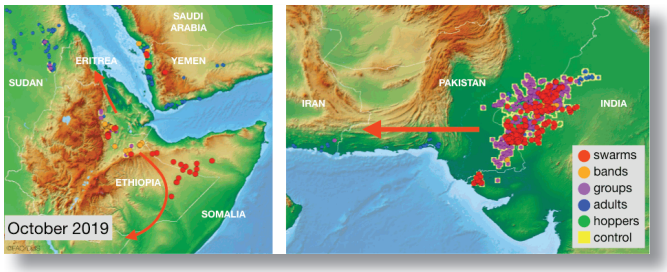
SITUATION. Swarms formed in **Ethiopia** (4 064 ha treated) and moved to east to lay eggs that hatched near northern **Somalia** where mature swarms were seen. A few groups formed from summer breeding in **Sudan** (3 025 ha treated). Breeding continued on the Red Sea coast in **Yemen** (32 ha treated) and **Saudi Arabia** (1 805 ha treated). Isolated adults were present in northern **Oman**.

FORECAST. Breeding will continue on the Red Sea coast of **Yemen**, **Saudi Arabia** and **Eritrea**, and extend to **Sudan**. Small swarms may arrive in Eritrea and northern **Somalia** from Ethiopia and continue to southern Ethiopia and northeast **Kenya**. Breeding will cause hopper bands to form in some areas. A few small swarms could arrive in northeast **Oman** from Indo-Pakistan breeding areas during the first week of November.

EASTERN REGION: THREAT

SITUATION. Control operations continued in **India** (82 944 ha) and **Pakistan** (22 650 ha) against second-generation groups, bands and swarms. Isolated adults persisted in southern **Iran**.

FORECAST. As vegetation dries, adult groups and small swarms will form along both sides of the Indo-Pakistan border and migrate to southwest **Pakistan** and southeast **Iran** where they are likely to remain and slowly mature in areas of recent rainfall.



Serious situation continues in eastern and central regions

The current situation remains serious and threatening along the Indo-Pakistan border and in the Horn of Africa. An increasing number of swarms formed during October in India and Pakistan where intensive control operations continued for a sixth consecutive month. It appears that some swarms have started to move west towards southwest Pakistan and southeast Iran where recent rains should allow them to survive until the spring. A few swarms may also reach northeast Oman on winds associated with Cyclone Kyarr in the first days of November. Ground and aerial operations were in progress in northeast Ethiopia where swarms formed. A few groups moved north towards Eritrea while some swarms moved southeast to northern Somalia and eastern Ethiopia where they laid eggs that began hatching at the end of the month. There remains a moderate risk that a few swarms could reach northeast Kenya. A few hopper bands and small swarms formed in breeding areas on the Red Sea coast in Yemen and adjacent areas in Saudi Arabia, and control was undertaken. Breeding will continue along both sides of the Red Sea, which could be supplemented by the arrival of a few small swarms on the Eritrean coast from Ethiopia, causing a further increase in locust numbers. In the Western Region, small-scale breeding occurred in Mauritania, Niger and southern Algeria, and isolated adults were present in Morocco and Libya. A few groups formed in northern Niger and limited control was carried out there and in Algeria. Locusts are expected to increase slightly in northwest Mauritania due to small-scale breeding.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in October 2019

Rainfall declined in the summer breeding areas of West Africa, Sudan and along the Indo-Pakistan border but vegetation remained green. Good rains fell in parts of the winter breeding areas along the Red Sea coast. Light rains fell in the spring breeding areas of Iran and Pakistan. Good rains fell over the Horn of Africa. Light to moderate showers fell in eastern Oman from Cyclone Kyarr.

WESTERN REGION

The Inter-Tropical Convergence Zone (ITCZ) continued its seasonal movement southwards but was generally about 200–300 km further north than usual during the first two decades of October. By the last decade, the ITCZ had moved south of the summer breeding areas in the Sahel of West Africa. As a result, good rains fell mainly during the first decade in southern Mauritania, southern Tamesna, the Air Mountains and central pasture areas in Niger, and in central and northeast Chad. Thereafter, no significant rain fell in the summer breeding areas of the northern Sahel. Although vegetation remained green, it was starting to dry out in parts of southern Mauritania and northern Niger. During the second decade, light to moderate rains fell in northwest Mauritania where conditions are expected to remain favourable for breeding during the forecast period. In Northwest Africa, very little rain fell except for some possible light showers about mid-month over the Hoggar Mountains in southeast Algeria extending to southwest Libya. Nevertheless, vegetation remained green in central, eastern and southern Algeria, including along the borders of Mali and Niger.

CENTRAL REGION

Similar to the Western Region, the Inter-Tropical Convergence Zone (ITCZ) continued its seasonal movement southwards but was generally about 200–300 km further north than usual during the first two decades of October over the interior of Sudan. By the last decade, the ITCZ had moved south of the summer breeding areas in Sudan. As a result, light to moderate rains fell primarily during the first decade and less so during the second decade in the summer breeding areas of West and North Darfur, North Kordofan, White Nile states, the Baiyuda Desert and near Kassala extending to the western lowlands in Eritrea. Light rain fell in a few places along the western side of the Red Sea Hills, including parts of Wadi Oko/Diib. Light to moderate showers fell at times during the first two decades in eastern Ethiopia, including the Ogaden and adjacent areas of northwest and central Somalia. Rainfall declined in the Afar region and northern Ethiopia. Heavy rains and flash floods occurred in central Somalia. In the winter breeding areas, light rains fell on the Red Sea coast in Eritrea, Yemen and Saudi Arabia as far north as Badr. Rainfall was particularly heavy during the second decade. Good rains fell on the southern coast of Yemen near Aden where breeding conditions were favourable in the wadis. Unusually heavy rains may have fallen on the northwest coast and escarpment of Somalia on the 1st and 8th. In Oman, moderate showers fell in the north during the first half of the month. Cyclone Kyarr developed in the Indian Ocean at the end of the month and moved in a southwesterly direction along the eastern coast of Oman, causing light to moderate rain to fall in some areas between Sur and Duqm. Vegetation was already green near Duqm and in other areas of Al Wusta governorate from rains associated with Cyclone Hikka in September.

EASTERN REGION

The monsoon withdrew from the Indo-Pakistan breeding areas on 11 October, which is nearly one month later than normal. Consequently, good rains continued to fall during the first week of the month and ecological conditions remained favourable for breeding and locust survival along both sides of the Indo-Pakistan border in Cholistan, Nara and Tharparkar deserts in Pakistan and in Rajasthan, India. In the spring breeding areas, light to moderate rains fell at times during the first week along the coast and interior of southern Sistan-Baluchistan, Iran and in adjacent areas of Baluchistan in southwest Pakistan. This may allow natural vegetation to become sufficiently green for Desert Locust survival but low temperatures are likely to delay maturation.

Area Treated

Control operations declined slightly in October (118 000 ha) compared to (125 000 ha).

Algeria	15 ha (October)
Ethiopia	4 064 ha (October)
India	82 944 ha (October)
Niger	29 ha (October)
Pakistan	29 930 ha (October)
Saudi Arabia	720 ha (29–30 September)
	1 805 ha (October)
Sudan	3 025 ha (October)
Yemen	32 ha (October)

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

During October, isolated immature and mature solitarious adults persisted in the summer breeding areas of the south between Oualata (1717N/0701W), Kiffa (1638N/1124W) and Tidjikja (1833N/1126W). Adults were also seen in the southwest near Rkiz (1658N/1514W) and persisted in the west between Nouakchott (1809N/1558W) and Atar (2032N/1308W). Small-scale breeding was detected near Tidjikja, Rkiz and Nouakchott where first to third instar solitarious hoppers were present, and solitarious adults were copulating north of Aguilal Faye (1827N/1444W).

• **FORECAST**

Small-scale breeding will cause locust numbers to increase in the northwest in areas that previously received good rains. This may lead to a few small groups forming. If conditions remain favourable, a second generation of laying could commence by the end of the forecast period.

Mali

• **SITUATION**

No surveys were carried out and no locusts were reported in October.

• **FORECAST**

Small-scale breeding is expected to be in progress and will continue in areas of recent rainfall in the Adrar des Iforas, Tilemsi Valley and Tamesna, causing locust numbers to increase slightly.

Niger

• **SITUATION**

During October, scattered immature and mature solitarious adults were present on the Tamesna Plains between Tassara (1650N/0550E) and the Algerian border, in the northern Air Mountains north of Iferouane (1905N/0824E) in the southeast Air to the northeast and east of Timia (1809N/0846E), and along the southern edge of the Air. Small-scale breeding throughout these areas. From mid-month onwards, *transiens* adults and small groups of hoppers and adults, at densities up to 800 adults/ha, were seen on the Tamesna Plains, including a few groups of laying adults. Ground teams treated 29 ha.

• **FORECAST**

Small-scale breeding may continue in those areas where conditions remain favourable. However, as vegetation dries out, small groups may form in Tamesna and move to the Air Mountains.

Chad

• **SITUATION**

No surveys were carried out and no locusts were reported in October.

• **FORECAST**

As vegetation dries out, a few small groups may form in the northeast and move towards the Air Mountains in Niger. Thereafter, locust numbers will decline, and no significant developments are likely.

Burkina Faso

• **SITUATION**

No reports were received during October.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during October.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During October, isolated mature solitarious adults persisted in the east near Illizi (2630N/0825E) and Djanet (2434N/0930E), in the southern Sahara west of Tamanrasset (2250N/0528E), and along the Niger border near In Guezzam (1937N/0552E). Small-scale breeding occurred near In Guezzam where second and third instar solitarious hoppers were present. Low numbers of immature solitarious adults were seen in the central Sahara between Reggane (2643N/0010E) and In Salah (2712N/0229E) and in the south on the Malian border southeast of Bordj Badji Mokhtar (2119N/0057E). Ground teams treated 15 ha near Reggane.

• **FORECAST**

Low numbers of locusts are likely to persist along the edge of the Hoggar Mountains near Illizi, Djanet and Tamanrasset, and near agricultural areas in the central Sahara. No significant developments are likely.

Morocco

• **SITUATION**

During October, isolated immature solitarious adults were seen in the northern part of the Western Sahara in W. Sakia El Hamra near Haouza (2707N/1112W) and south of the Atlas Mountains in the Draa Valley near Zag (2800N/0920W) and Assa (2836N/0926W).

• **FORECAST**

Low numbers of adults may appear in the Adrar Souttouf of the extreme south and breed on a small scale in areas of recent rainfall.

Libya

• **SITUATION**

During October, scattered gregarious appearing adults were seen at two places during a survey carried out in the southwest near Ghat (2459N/1011E) on the 16–19th.

• **FORECAST**

Low numbers of adults are likely to persist and breed on a small scale in those areas near Ghat that received earlier flooding and remain green.

Tunisia

• **SITUATION**

No reports were received during October.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During October, scattered immature and mature adults declined in North Kordofan and along the Nile Valley between Khartoum (1533N/3235E) and Dongola (1910N/3027E) but increased on the western side of the Red Sea Hills between Derudeb (1731N/3607E) and Haiya (1820N/3621E) where solitarious hoppers of all instars were seen up to mid-month from local breeding. A few groups of immature and mature adults formed in near Umm Saiyala (1426N/3112E) in North Kordofan, Derudeb and near Kassala (1527N/3623E). Ground teams treated 3 025 ha. No surveys were conducted in Wadi Oko/Diib of the northeast.

• **FORECAST**

As vegetation continues to dry out, a few small groups may form in the interior and move to the Red Sea coastal plains and the northeast subcoastal areas where small-scale breeding will commence with the onset of the winter rains. There is a low risk that a few small swarms could appear from the south on the southern coast near the Eritrean border.

Eritrea

• **SITUATION**

No surveys were carried out and no locusts were reported in October.

• **FORECAST**

Breeding is almost certainly in progress and will continue on the Red Sea coastal plains, causing locust numbers to increase between Mersa Fatma and the Sudanese border. Small groups of hoppers and adults are likely to form. There is a moderate risk of a few groups and small swarms from northeast Ethiopia appearing in the highlands on their way to the coast.

Ethiopia

• **SITUATION**

During October, hopper groups and bands continued to form in previously infested areas on the western edge of the Awash Valley north of Bati (1111N/4001E) in the Afar region and in the railway area in the east between Dire Dawa (0935N/4150E) and Ayasha (1045N/4234E). Fledging in Afar caused an increasing number of immature adult groups and swarms to form after mid-month. By the end of the month, some swarms had moved southeast towards Dire Dawa and the Harar Highlands in Oromiya region while a few immature groups moved north towards Mekele (1329N/3928E) in southern Tigray region with one group reaching Ganta Afeshum zone east of Axum (1407N/3843E) near Eritrea. On 14–16th, several mature swarms appeared in the northern Ogaden between Degeh Bur (0813N/4333E) and Warder (0658N/4520E), and some swarms continued south to Kebri Dehar (0644N/4416E). The swarms laid eggs that began hatching at the end of the month. Control operations treated 4 064 ha of which 1 150 ha were by air.

• **FORECAST**

Small swarms will continue to form in Afar in November and move north to Tigray where they are likely to continue to Eritrea. A few swarms will form along the railway area and move to the Ogaden and Oromiya. Hatching and band formation will occur in the Ogaden during November.

Djibouti

• **SITUATION**

No reports were received during October.

• **FORECAST**

No significant developments are likely.

Somalia

• **SITUATION**

There were unconfirmed reports from locals by radio of swarms arriving on the northwest plateau between Gebiley (0942N/4337E) and Las Anod (0828N/4721E) on 8–13 October. These are likely to have originated from earlier infestations in northeast Somalia, perhaps supplemented by a few swarms from Yemen and adjacent areas of eastern Ethiopia.

• **FORECAST**

A few adult groups and small swarms from adjacent infestations in Ethiopia may appear on the northern plateau south of Hargeisa, Burao and Las Anod, and in central areas between Garowe and Galkayo. Small-scale breeding could occur in some areas that might give rise to hopper groups and small bands. Breeding in areas of recent heavy rains on the northwest coast may cause hopper and adult groups to form.

Egypt

• **SITUATION**

During October, isolated mature solitarious adults were seen in the southeast on the Red Sea coastal plains near Abu Ramad (2224N/3624E).

• **FORECAST**

Low numbers of adults may appear on the Red Sea coastal plains in the southeast where small-scale breeding will occur in areas that receive rainfall.

Saudi Arabia

• **SITUATION**

During October, a small immature swarm was seen on the Red Sea coast plains south of Jizan (1656N/4233E) near the Yemen border on the 6th. Breeding continued in the Jizan area where a few late instar hopper groups and bands were present mixed with solitarious hoppers of all instars, and immature and mature solitarious adults. Ground teams treated 1 805 ha. On the central coast, scattered immature and mature solitarious adults were present near Lith (2008N/4016E).

• **FORECAST**

Locust numbers will continue to increase on the southern coastal plains of the Red Sea mainly near Jizan where hopper and adult groups and perhaps a few small bands are likely to form. A second generation of breeding will occur in November. Breeding will also extend to other areas of recent rainfall between Jizan and Badr.

Yemen

• **SITUATION**

During October, breeding continued on the northern Red Sea coast between Al Zuhrah (1541N/4300E) and Suq Abs (1600N/4312E) where late instar hopper groups and bands fledged, giving rise to groups of immature and mature adults. Hatching was seen at mid-month as well as one swarm laying eggs. Scattered immature and mature solitarious adults were present on the central Tihama between Bajil (1458N/4314E) and Zabid (1410N/4318E). Ground teams treated 32 ha. On the southern coast, small-scale breeding occurred near Lahij (1303N/4453E) and solitarious hoppers were present, egg-laying was seen near Ahwar (1333N/4644E) and scattered immature solitarious adults were present between Am Rija (1302N/4434E) and Ahwar. In the interior, low numbers of immature and mature solitarious adults were seen near Bayhan (1452N/4545E) in Shabwah and near Hawra (1542N/4817E) in W. Hadhramaut. An immature swarm was seen flying in the highlands near Sana'a (1521N/4412E) on the 30th. No locusts were seen elsewhere during surveys in the interior.

• **FORECAST**

Late first-generation hatching will occur in early November on the northern Red Sea coastal plains, giving rise to small hopper bands that will fledge by the end of the forecast period. This will be supplemented by a second generation of breeding with hatching from mid-November onwards. A few immature swarms from the interior are likely to move through the highlands and arrive on the Red Sea and Gulf of Aden coasts where they will mature and lay, causing hopper groups and bands to form.

Oman

• **SITUATION**

During October, isolated immature solitarious adults were seen in a few places on the Musandam Peninsula, in the northern interior near Adam (2223N/5731E), and on the eastern coast near Duqm (1939N/5743E). There were unconfirmed reports of small groups on the eastern coast north of Duqm, in the northern interior near Nizwa (2255N/5731E) and Ibri (2314N/5630E). No locusts were seen elsewhere in the north or the southern region of Dhofar.

• **FORECAST**

Small-scale breeding may occur in coastal and interior areas of Al Wusta and Sharqiya governorates where good rains fell from cyclones Hikka and Kyarr.

Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During October, isolated mature solitarious adults persisted in a few places along the southern coast near Bushehr (2854N/5050E), Bandar Abbas (2711N/5619E), Zarabad (2534N/5923E) and Chabahar (2517N/6036E), and in Jaz Murian of the southeast interior. At the end of the month, immature solitarious adults were seen near Zarabad and Chabahar, and a group of mature *transiens* adults was reported northeast of Chabahar near the Pakistan border.

• **FORECAST**

There is a moderate to high risk that adult groups and small swarms will arrive in Sistan-Baluchistan and Hormozgan provinces from the Indo-Pakistan summer breeding areas. The adults are likely to remain in any areas that receive rainfall and slowly mature due to low temperatures.

Pakistan

• **SITUATION**

During October, numerous second-generation hopper groups and some bands continued to develop and fledge in Tharparkar, Nara and Cholistan deserts, giving rise to an increasing number of immature adult groups that were maturing. At least one immature swarm was reported near the Indian border in Cholistan. Local infestations were likely to have been supplemented by adult groups moving

westwards from adjacent breeding areas in Rajasthan. During the last week of the month, scattered mature solitarious adults were seen further westwards near Lasbela (2614N/6619E) west of Karachi. Control operations treated 29 930 ha of which 600 ha were by air.

• **FORECAST**

As conditions dry out, second-generation breeding will decline but an increasing number of immature and mature adult groups and swarms will form in Cholistan, Nara and Tharparkar deserts. Any infestations that are not detected or controlled will move west to coastal and interior areas of Baluchistan where they are likely to persist in areas that receive rainfall. These movements will be supplemented by similar populations moving west from adjacent breeding areas in Rajasthan.

India

• **SITUATION**

During October, widespread second-generation hatching continued in west Rajasthan from Barmer (2543N/7125E) to north of Bikaner (2801N/7322E), giving rise to numerous hopper groups and some bands. Fledging caused an increasing number of immature swarms to form that were maturing. During the last decade, several mature groups and swarms moved towards the coast in the Rann of Kutch northwest of Bhuj (2312N/6954E). Ground teams treated 82 944 ha in October.

• **FORECAST**

As conditions dry out, second-generation breeding will decline but an increasing number of immature and mature adult groups and swarms will form in Rajasthan. Any infestations that are not detected or controlled will move towards the west. This movement is expected to decline after November.

Afghanistan

• **SITUATION**

No reports were received during October.

• **FORECAST**

There is a low risk that a few groups or small swarms from the Indo-Pakistan border may appear in southern areas by the end of the forecast period.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.

Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.

Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.

Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Desert Locust Control Committee (DLCC)

The registration deadline for the 41st session of the DLCC is 10 November 2019. Thereafter, accommodation and participation in the session cannot be guaranteed. Please contact AGP-713-DLCC@fao.org. The session will be a *green* or sustainable meeting that is designed, organized and implemented in a way that minimizes negative environmental impacts and leaves a positive impact for the host country. Digital tools will be used to save paper.

Calendar

The following activities are scheduled:

- **CLCPRO.** Regional biological control workshop, Rabat, Morocco (26–28 November)
- **SWAC.** Regional Desert Locust Information Officer workshop, Tehran, Iran (26–28 November)
- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)
- **CRC.** ULV sprayer maintenance workshop, Muscat, Oman (20–23 January)
- **CLCPRO/CRC/DLIS.** Drone field trial, Mauritania (27–31 January)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague
- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline
- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green
- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow
- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange
- *Threat*. Threat to crops; survey and control operations must be undertaken

Red
- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western
- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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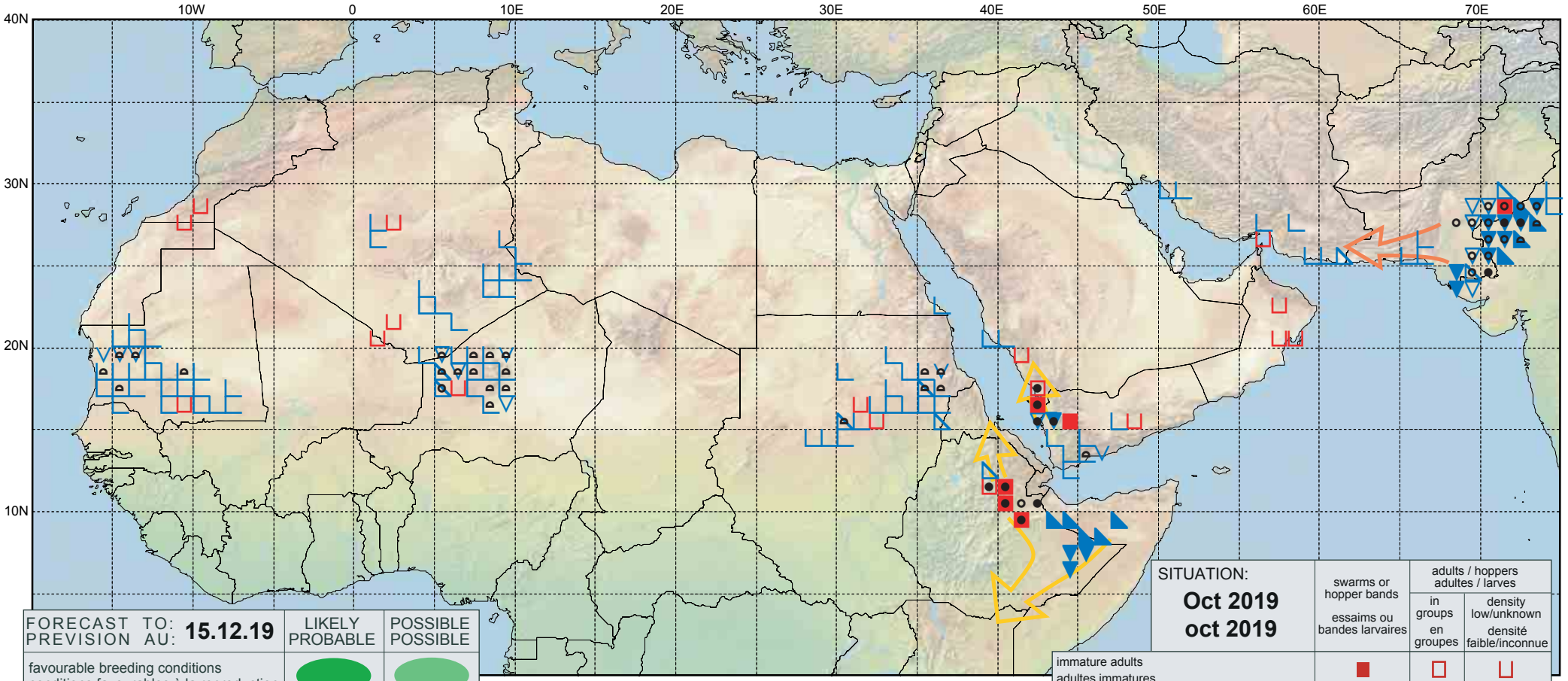

FORECAST TO: / PREVISION AU: **15.12.19**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Oct 2019** **oct 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves	
		in groups en groupes	density low/unknown densité faible/inconnue
immature adults adultes immatures			
mature or partly mature adults adultes matures ou partiellement matures			
adults, maturity unknown adultes, maturité inconnue			
egg laying or eggs pontes ou œufs			
hoppers larves			
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)			

Food and Agriculture Organization of the United Nations

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Desert Locust Bulletin

General situation during November 2019
Forecast until mid-January 2020

WESTERN REGION: CALM

SITUATION. Small-scale breeding continued in **Mauritania**, **Mali**, **Niger**, **Chad** and **Algeria** (272 ha treated). Groups formed in Niger.

FORECAST. A few small groups may form in northwest **Mauritania** and northern **Niger**. Small-scale breeding will cause locust numbers to increase slightly in northwest **Mauritania**.

CENTRAL REGION: THREAT

SITUATION. Swarms formed in **Ethiopia** (10 822 ha treated) and moved north to **Eritrea** (6 060 ha treated) and **Saudi Arabia**, while other swarms came from **Yemen** (5 760 ha treated). Hopper bands formed in the Ogaden of Ethiopia. Bands and swarms formed in northern **Somalia**. Groups, bands and swarms formed in summer areas of **Sudan** (27 165 ha treated) and groups appeared on the coast. A few swarms from Indo-Pakistan arrived in northern **Oman** (116 ha treated) and laid.

FORECAST. Breeding will occur on the Red Sea coast of **Yemen**, **Saudi Arabia**, **Eritrea**, **Sudan** and **Egypt**. Swarms will form in **Ethiopia** and northern **Somalia** that could move to **Djibouti** and northeast **Kenya**. Some swarms may reach Eritrea. Hopper bands are likely to form in the Ogaden of Ethiopia from second-generation breeding and in northern **Oman** where a few swarms may arrive from the Indo-Pakistan area in December.

EASTERN REGION: THREAT

SITUATION. Control operations against groups, bands and swarms declined in **India** (34 070 ha) and increased in **Pakistan** (60 970 ha). Control operations in **Iran** treated 1 511 ha of adult groups from Indo-Pakistan arrived in Iran (1 511 ha treated).

FORECAST. As vegetation dries, numerous swarms are likely to migrate from both sides of the Indo-Pakistan border to areas of recent rains in southwest **Pakistan** and southern **Iran** where they will disperse and slowly mature in areas of recent rainfall.

Situation deteriorates as swarms increase

The current situation is extremely serious in the Eastern and Central regions. Despite intensive control operations, hopper bands and swarms continued to form along both sides of the Indo-Pakistan border where an unprecedented third generation of breeding started. Some swarms began their seasonal migration westwards with a few swarms crossing the Arabian Sea to northern Oman while groups appeared in southeast Iran. Swarm migration is likely to continue during December to southwest Pakistan, southern Iran and northern Oman, and decline thereafter. Countries should remain alert and be prepared. Subsequent breeding could be delayed in some areas by winter temperatures. In the Horn of Africa, swarms formed in Ethiopia and moved northwards, reaching the Red Sea coast of Eritrea where breeding was underway and at least one swarm crossed the Red Sea to Saudi Arabia. Other swarms in Ethiopia moved east towards the Ogaden, supplemented by additional swarms from adjacent areas of northern Somalia where hopper bands formed. More swarms are expected to form and move to Djibouti, the Ogaden, southern Somalia and perhaps northeast Kenya. A few swarms formed on the Red Sea coast in Yemen and moved north to Saudi Arabia. Groups and a swarm formed in the summer breeding areas of Sudan and adult groups appeared on the Sudanese Red Sea coast. Winter breeding along both sides of the Red Sea will cause locust numbers to increase further and hopper bands could form in some places. The situation remained calm in the Western Region where small-scale breeding occurred in parts of the northern Sahel.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in November 2019

Good rains fell in the winter breeding areas along both sides of the Red Sea, in the Horn of Africa and in southern Iran. Vegetation continued to dry out in summer breeding areas.

WESTERN REGION

No significant rain fell in the region during November. Consequently, vegetation was drying out in the summer breeding areas of the northern Sahel in West Africa. Nevertheless, ecological conditions remained favourable for locust survival and breeding in limited areas of northwest Mauritania, and in a few places in northern Mali, northern Niger, and eastern Chad. In Algeria, breeding conditions remained favourable along the edges of the Hoggar Mountains in the east and south, along the Mali and Niger border adjacent to the Adrar des Iforas in Mali and the Tamesna Plains in Niger, and near irrigated areas in the central Sahara. Vegetation was mainly dry in Morocco south of the Atlas Mountains and in the Western Sahara.

CENTRAL REGION

In the summer breeding areas, a few showers lingered during the first decade of November in eastern Sudan near Kassala. Consequently, vegetation was drying out in all areas. In the winter breeding areas, good rains fell along the Red Sea coast in Sudan and southeast Egypt during the first two decades of the month and on the central coastal plains in Eritrea and central and southern coast in Saudi Arabia during the second and third decades. Good rains fell on the northwest coast of Somalia during the last decade. As a result, vegetation was green or becoming green and breeding conditions were favourable in all of these areas. In the Horn of Africa, seasonal rains continued longer than normal and good rains fell during the first and last decades of the month in northern and eastern Ethiopia, including the Ogaden, and on the plateau in northern Somalia. Breeding conditions remained favourable in all of these areas. In Oman, good rains fell on the northern coast and parts of the interior during the first two decades of the month. Vegetation was green or becoming green in these areas as well as on the east coast near Ras Al Hadd and Duqm, and ecological conditions were favourable for breeding.

EASTERN REGION

Vegetation remained greener than usual in the summer breeding areas along both sides of the Indo-Pakistan border as a result of the late withdrawal of the monsoon. This was supplemented by heavy rains during the second decade in Rajasthan, India. In the spring breeding areas, good rains fell on the southern coast of Iran in Hormozgan province during the first decade, followed by heavy showers along the coast from Bushehr to Bandar Abbas during the second decade. Good rains fell in Jaz Murian during the last two decades and on the southeast coast near Chabahar in the last decade. Less rain fell in adjacent areas of southwest Pakistan where light to moderate showers occurred in a few coastal areas near Gwadar and Pasni and in the interior near Turbat and south of Panjgur. Consequently, breeding conditions were improving in most of these areas in both countries, but low temperatures may delay locust maturation.

Area Treated

Control operations increased in November (154 440 ha) compared to October (121 843 ha).

Algeria	272 ha
Eritrea	6 060 ha
Ethiopia	10 822 ha
India	34 074 ha
Iran	1 511 ha
Oman	116 ha
Pakistan	60 970 ha
Saudi Arabia	7 770 ha
Sudan	27 165 ha
Yemen	5 760 ha

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

During November, isolated immature and mature solitarious adults were present in parts of northeast Brakna and east Trarza to the north of Magta Lahjar (1730N/1305W), in Nouadhibou, Inchiri and southwest Adrar. Small-scale breeding occurred from mainly south of Akjoujt (1945N/1421W) to Oujeft (2003N/1301W) as well as in a few places north of Magta Lahjar where low numbers of solitarious hoppers of all instars were present.

• **FORECAST**

Small-scale breeding is likely to continue in the northwest in areas that remain favourable, which could cause a few small groups to form.

Mali

• **SITUATION**

During November, scattered immature and mature solitarious adults at densities up to 500 adults/ha,

mixed with a few *transiens* adults, were present on the western side of the Adrar des Iforas, in Tilemsi Valley and Timetrine between Aguelhoc (1927N/0052E) and Ti-n-kar (1926N/0022W). Small-scale breeding occurred and fifth instar hoppers were seen at one place. No locusts were seen in the west near Kayes (1426N/1128W).

• **FORECAST**

Small-scale breeding may continue in areas that remain favourable in the Adrar des Iforas, Tilemsi Valley and Tamesna, however, low temperatures will delay locust maturation.

Niger

• **SITUATION**

During November, scattered immature and mature solitarious adults at densities up to 300 adults/ha were present on the northern Tamesna Plains from north of Tassara (1650N/0550E) to the Algerian border and in the nothern and eastern Air Mountains. Small-scale breeding was in progress in both areas where second to fifth instar solitarious hoppers were seen as well as a few groups of adults on the Tamesna Plains.

• **FORECAST**

As vegetation continues to dry out, adults may concentrate and form a few small groups that are likely to move towards the Air Mountains where they are expected to persist.

Chad

• **SITUATION**

During November, isolated immature and mature solitarious adults were present in the centre between Salal (1448N/1712E) and Arada (1501N/2040E), in the northeast to Fada (1714N/2132E), and in the east near the Sudan border between Abeche (1349N/2049E), Adre (1328N/2212E) and Goz Beida (1242N/2125E). Small-scale breeding occurred in the east where low numbers of late instar solitarious hoppers were present from September laying.

• **FORECAST**

Locust numbers will decline, and no significant developments are likely.

Burkina Faso

• **SITUATION**

No reports were received during November.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locust activity was reported during November.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During November, low numbers of immature and mature solitarious and *transiens* adults persisted in the central Sahara between Adrar (2753N/0017W) and In Salah (2712N/0229E), in the east between Illizi (2630N/0825E) and Djanet (2434N/0930E), in the southern Sahara west of Tamanrasset (2250N/0528E), and along the Niger border near In Guezzam (1937N/0552E). Small-scale breeding occurred near In Guezzam where isolated second to fifth instar solitarious hoppers were present. Ground teams treated 272 ha. No locusts were seen on the Mali border between Bordj Badji Mokhtar (2119N/0057E) and Tin Zaouatene (1957N/0258E).

• **FORECAST**

Low numbers of locusts are likely to persist along the edge of the Hoggar Mountains near Illizi, Djanet and Tamanrasset, and near agricultural areas in the central Sahara. No significant developments are likely.

Morocco

• **SITUATION**

During November, no locusts were seen during surveys south of the Atlas Mountains and in the Western Sahara except for a mature solitarious adults in the Draa Valley south of Tata (2944N/0758W) near the Algerian border.

• **FORECAST**

Low numbers of adults may appear in the Adrar Souttouf of the extreme south and breed if rainfall occurs.

Libya

• **SITUATION**

No reports were received during November.

• **FORECAST**

Low numbers of adults may be and could persist in the southwest near Ghat.

Tunisia

• **SITUATION**

No locusts were reported during November.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During November, summer-bred hoppers formed groups and bands while adults formed immature and mature groups and at least one mature swarm in the Baiyuda

Desert between Abu Uruq (1554N/3027E) and Berber (1801N/3400E). Scattered mature solitairous adults were present in a few places in the east between Kassala (1527N/3623E) and Derudeb (1731N/3607E). On the Red Sea coast, adult groups were laying on the northern coast between Mohamed Qol (2054N/3709E) and the Egyptian border while solitarious adults were laying in the Tokar Delta. Scattered mature solitarious adults were present along the coast between Tokar and Mohamed Qol, and in subcoastal areas of Wadi Oko/Diib in the northeast. Immature solitarious adults were seen on the southern coast near Karora (1745N/3820E) and the Eritrean border. Control operations treated 27 165 ha of which 19 600 ha were by air.

• **FORECAST**

As vegetation continues to dry out, a few more groups will form in the interior and move to the Red Sea coast during December. Small-scale breeding will cause locust numbers to increase on the coast and in subcoastal areas. Hopper groups are likely to form on the northern coast. There is a possibility that a few small swarms could appear from the south on the southern coast near the Eritrean border and breed.

Eritrea

• **SITUATION**

During November, breeding continued on the Red Sea coastal plains between Foro (1515N/3937E), Wekiro (1548N/3918E) and Sheib (1551N/3903E) where scattered second to fifth instar hoppers, groups, fledglings and laying solitarious adults were present from earlier breeding that started in September. During the last week of November, immature groups and swarms appeared west of Massawa (1537N/3928E) reportedly coming from Ethiopia. One mature swarm was seen south of Foro on the 30th. Ground teams treated 6 060 ha.

• **FORECAST**

A second generation of laying is expected to start about mid-December on the Red Sea coast near Massawa and extend to the Sudan border with hatching from the end of the month onwards. This will be augmented by the maturation and laying of swarms originating from Ethiopia. Consequently, locust numbers could increase significantly with groups, bands and perhaps small swarms forming.

Ethiopia

• **SITUATION**

During November, numerous immature groups and swarms formed from earlier breeding in eastern Amhara region and moved northwards in eastern Tigray. Crop and pasture losses were reported on a localized basis and some farmers were harvesting early to avoid additional losses. New hatching occurred in the Afar region. Hopper bands were present and fledging in the Somali region near Dire Dawa (0935N/4150E), causing immature swarms to form. Numerous immature swarms were also reported between Ayasha (1045N/4234E) and Jijiga (0922N/4250E), some of which were said to come from adjacent areas of northern Somalia. In the Ogaden, hatching continued and second to fifth instar hopper groups and bands were present from about 150 km northeast of Warder (0658N/4520E) and south towards K'efalo (0537N/4408E). Control operations treated 10 822 ha of which 8 295 were by air.

• **FORECAST**

Additional swarms are likely to move north in Tigray and continue to Eritrea. Swarms will continue to form in the Somali region and adjacent areas of Somalia and move to the Ogaden where they will mature and second-generation laying could start by the end of December, giving rise to hopper bands and a substantial increase in locust numbers in January. There remains a high risk of a further movement to southern regions and towards Kenya during the forecast period.

Djibouti

• **SITUATION**

No reports were received during November.

• **FORECAST**

There is a high risk that immature groups and swarms will arrive in the south and east from adjacent areas of eastern Ethiopia and northwest Somalia.

Somalia

• **SITUATION**

During the first week of November, groups of gregarious adults were seen laying on the northwest coast and first and second instar hopper bands were present from earlier undetected laying between Bulhar (1023N/4425E) and Silil (1058N/4326E). On the plateau, mainly second instar hopper groups and at least one immature swarm were seen between Burao (0931N/4533E) and the Ethiopian border. Fledging from earlier breeding commenced after mid-month on the plateau, giving rise to immature adult groups and swarms, some of which may have moved into adjacent areas of Ethiopia. At the end of the month, late instar hopper bands were reported south of Bossaso, on the plateau south of Las Anod (0828N/4721E) near the border of Ethiopia, and further south in Galmudug near Galkayo (0646N/4725E).

• **FORECAST**

More groups and swarms are likely to form on the northwest coast and on the plateau, some of which may migrate to adjacent areas of Djibouti, eastern Ethiopia and southern Somalia while others are likely to remain in favourable areas where a second generation of breeding could occur.

Kenya

• **SITUATION**

No reports were received during November.

• **FORECAST**

There remains a high risk that swarms may arrive in the northeast from adjacent areas of Ethiopia and lay in favourable areas during the forecast period.

Egypt

• **SITUATION**

During November, isolated mature solitarious adults increased in the southeast on the Red Sea coastal plains between Berenice (2359N/3524E) and the Sudanese border. Adults were copulating and laying southwest of Shalatyn (2308N/3535E). No locusts were seen Lake Nasser and Tushka (2247N/3126E).

• **FORECAST**

Small-scale breeding will cause locust numbers to increase on the Red Sea coastal plains in the southeast. There is a low to moderate risk that a few small groups could appear from adjacent areas in northeast Sudan.

Saudi Arabia

• **SITUATION**

During November, breeding started on the central Red Sea coast near Lith (2008N/4016E) giving rise to solitarious hoppers and near Qunfidah (1909N/4107E) where solitarious adults were laying. Breeding continued on the southern coast south of Jizan (1656N/4233E) where hoppers formed groups and a few bands. Immature and mature solitarious adults were scattered along the coast between Jizan and Jeddah (2130N/3910E). On the 23rd, an immature swarm arrived on the coast near Lith, probably coming from Eritrea. This was followed by several more immature swarms and one mature swarm 27-29th near Lith and Qunfidah. South of Jizan, there were several reports of immature swarms on 24-28th, probably arriving from adjacent coastal areas in Yemen. Control teams treated 7 770 ha of which 3 100 ha were by air. No locusts were seen on the northern Red Sea coast between Masturah (2309N/3851E) and Umm Lajj (2501N/3716E), and in the southwest interior between Najran (1729N/4408E) and Wadi Dawasir (2028N/4747E).

• **FORECAST**

Breeding will cause locust numbers to increase on the central and southern Red Sea coastal plains. Hatching is likely occur from mid-December onwards, giving rise to hopper groups and bands. Infestations are likely to extend to the northern Red Sea coast if more rains fall.

Yemen

• **SITUATION**

During November, breeding continued on the northern Red Sea coast between Al Zuhrah (1541N/4300E) and Suq Abs (1600N/4312E) where numerous third to fifth instar hopper bands and groups of immature and mature adults formed. During the last week, two immature swarms were reported. Ground teams treated 5 760 ha. Other areas on the Red Sea coast could not be surveyed or treated. On the Gulf of Aden coast, small-scale breeding continued between Lahij (1303N/4453E) and Ahwar (1333N/4644E) where solitarious hoppers and immature and mature adults were present as well as a hopper band and an immature adult group.

• **FORECAST**

A second generation of breeding will cause a further increase of locust numbers on the Red Sea coast, giving rise to hopper groups and bands. Breeding will also cause an increase in locusts on the Gulf of Aden coast but on a smaller scale. Nevertheless, small groups of hoppers and adults may form.

Oman

• **SITUATION**

During November, hatching occurred on the east coast north of Duqm (1939N/5743E) and early instar hoppers formed several small groups and bands. On the 12th, an immature swarm was seen flying on the northern coast near Rustaq (2323N/5725E) towards the interior and a mature swarm was seen flying near Ras Al Hadd (2232N/5948E). Thereafter, mature adults, groups and swarms were seen laying near Ras Al Hadd, a mature swarm was seen on the northern Batinah coast near the UAE border, immature solitarious adults were seen in the northern interior near Ibri (2314N/5630E) and on the east coast near Duqm. Ground teams treated 116 ha. No locusts were seen elsewhere in the north or the southern region of Dhofar.

• **FORECAST**

Breeding will cause locust numbers to increase on the east and northeast coast. Hatching will commence in December, causing hopper groups and bands to form. Breeding may also occur in areas of recent rains on the Batinah coast. Low numbers of adults may persist elsewhere in the northern interior. There is a risk that a few swarms may arrive in the north from the Indo-Pakistan summer breeding areas during December.

Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During November, at least a dozen groups of mature *transiens* adults appeared in the southeast along the coast near Zarabad (2534N/5923E), along the Pakistan border south of Pishin (2604N/6144E) and in the Jaz Murian Basin of the interior. These groups most likely originated from the Indo-Pakistan summer breeding areas. Ground teams treated 1 511 ha.

• **FORECAST**

There is a high risk that numerous adult groups and swarms from the Indo-Pakistan summer breeding areas will arrive in Sistan-Baluchistan and Hormozgan provinces, and perhaps move towards Bushehr. The groups and swarms are expected to disperse in areas of recent rainfall and adults will slowly mature due to low temperatures, which will limit breeding during the forecast period.

Pakistan

• **SITUATION**

During November, widespread second-generation breeding continued in Cholistan, Nara and Tharparkar deserts where numerous hopper groups and bands formed, many of which had fledged and formed immature and mature groups and swarms. A third generation of breeding occurred mainly in the Nara desert where hatching gave rise to early instar hopper groups. Adult groups and swarms moved from border areas westwards to the edge of the Indus Valley threatening crops, and one immature swarm overflew Karachi (2450N/6702E) on the 11th, flying towards the west. Mature solitarious adults were present west of Karachi in the Lasbela (2614N/6619E) area. No surveys were undertaken further west in Baluchistan. Control operations increased and treated 60 970 ha of which 1 800 ha were by air.

• **FORECAST**

As conditions dry out, an increasing number of immature and mature adult groups and swarms will form in Cholistan, Nara and Tharparkar deserts. Any infestations that are not detected or controlled will move west to coastal and interior areas of Baluchistan where they are likely to persist in areas that receive rainfall. These movements will be supplemented by similar populations moving west from adjacent breeding areas in Rajasthan during December.

India

• **SITUATION**

During November, widespread second-generation fledging caused a dramatic increase in immature adult groups and swarms in West Rajasthan from Barmer (2543N/7125E) to north of Bikaner (2801N/7322E) while hopper groups and a few bands persisted in some areas. Some of the adults had matured and formed a few groups and swarms. There were reports of large bands and swarms of several tens of km in length. Hopper groups also formed in the Rann of Kutch northwest of Bhuj (2312N/6954E) where mature groups and swarms were reported last month. There were signs that a limited third generation of breeding was underway in a few places. Compared to previous months, control operations declined during November, treating 34 074 ha by ground.

• **FORECAST**

As conditions dry out, an increasing number of immature and mature adult groups and swarms will form in Rajasthan. Any infestations that are not detected or controlled will move towards the west on a moderate scale. Consequently, a sharp decline in locust numbers is expected by the end of December.

Afghanistan

• **SITUATION**

No reports were received during November.

• **FORECAST**

There is a low risk that a few groups or small swarms from the Indo-Pakistan border may appear in southern areas if temperatures remain warm during the end of the forecast period.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.
Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.
Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.
Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **DLCC.** 41st Session, Addis Ababa, Ethiopia (10–13 December)
- **CRC.** ULV sprayer maintenance workshop, Muscat, Oman (20–23 January)
- **CLCPRO/CRC/DLIS.** Drone field trial, Mauritania (27–31 January)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)
- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)
- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group
- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small
- swarm: less than 1 km^2
- band: 1–25 m^2

Small
- swarm: 1–10 km^2
- band: 25–2,500 m^2

Medium
- swarm: 10–100 km^2
- band: 2,500 m^2 – 10 ha

Large
- swarm: 100–500 km^2
- band: 10–50 ha

Very large
- swarm: 500+ km^2
- band: 50+ ha

Rainfall

Light
- 1–20 mm

Moderate
- 21–50 mm

Heavy
- more than 50 mm

Summer rains and breeding areas
- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas
- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas
- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding
- The process of reproduction from copulation to fledging

Recession
- Period without widespread and heavy infestations by swarms

Remission
- Period of deep recession marked by the complete absence of gregarious populations

Outbreak
- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge
- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague
- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline
- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green
- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow
- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange
- *Threat*. Threat to crops; survey and control operations must be undertaken

Red
- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western
- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central
- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia,

Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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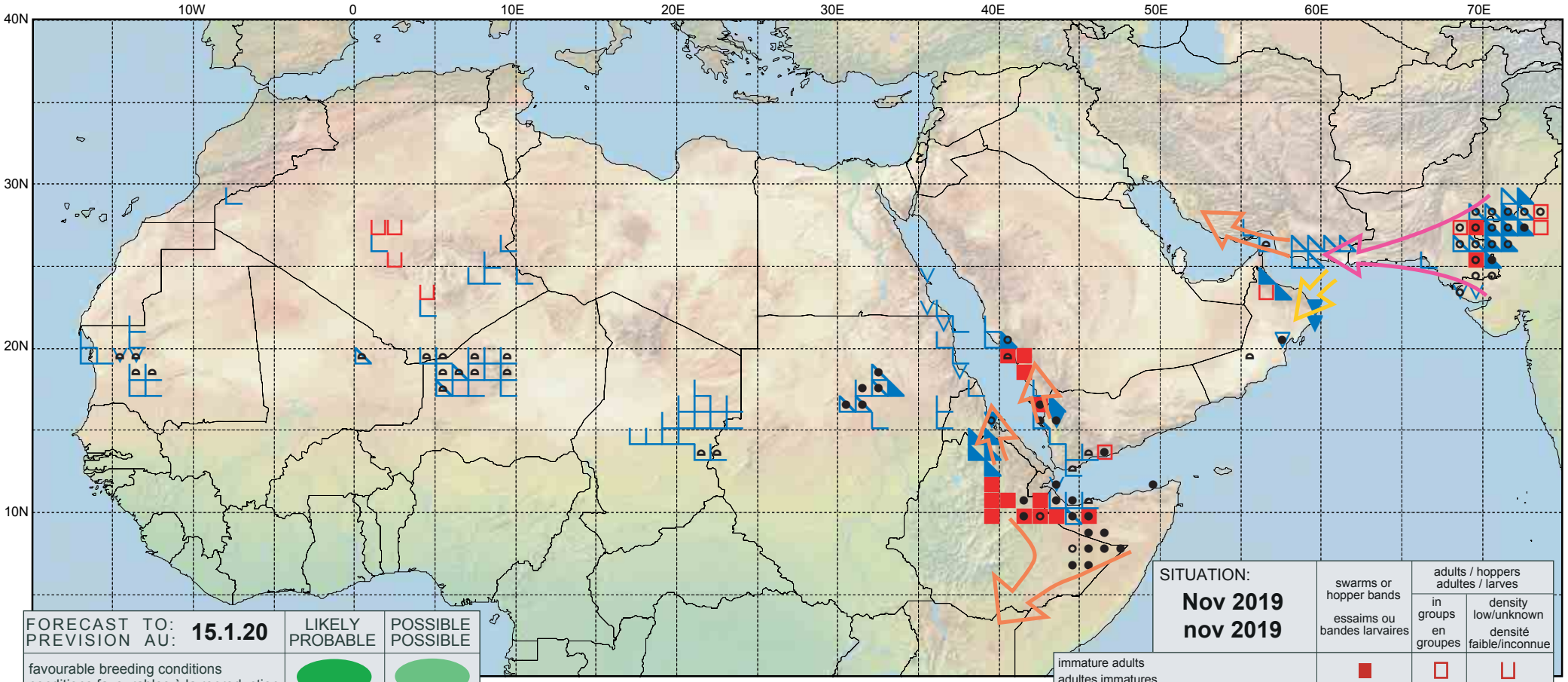


FORECAST TO: / PREVISION AU: **15.1.20**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Nov 2019** / **nov 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves	
		in groups en groupes	density low/unknown densité faible/inconnue
immature adults adultes immatures			
mature or partly mature adults adultes matures ou partiellement matures			
adults, maturity unknown adultes, maturité inconnue			
egg laying or eggs pontes ou œufs			
hoppers larves			
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)			

Food and Agriculture Organization of the United Nations

No. 495 6 JANUARY 2020

Desert Locust Bulletin

General situation during December 2019
Forecast until mid-February 2020

WESTERN REGION: CALM

SITUATION. Limited breeding occurred in **Mauritania** (93 ha treated) and **Algeria** (25 ha treated), and small groups formed in northern **Mali**.

FORECAST. Small-scale breeding may continue in northwest **Mauritania**.

CENTRAL REGION: THREAT

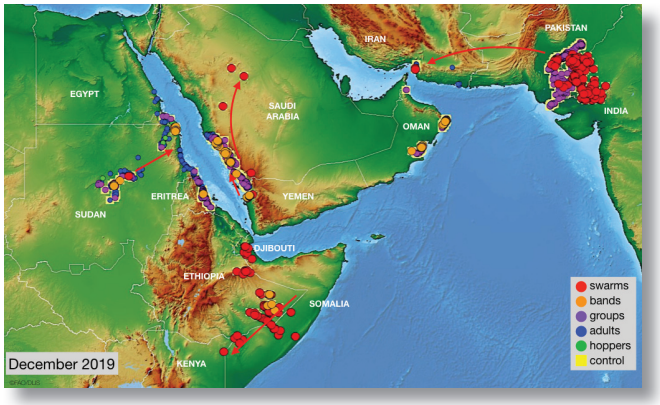
SITUATION. More swarms formed in **Ethiopia** (8 410 ha treated) and moved to Eritrea, **Djibouti** and south in the Ogaden and **Somalia** to **Kenya**. Breeding continued on the coast of **Eritrea** (11 078 ha treated), **Saudi Arabia** (43 798 ha treated) and **Yemen** (80 ha treated). Swarms moved to the interior of Saudi Arabia. Bands and a swarm were present in the interior of **Sudan** (26 846 ha treated) and bands formed on the northeast coast. Adult groups appeared and laid in southeast **Egypt** (30 ha treated). Groups and bands formed in northeast **Oman** (1 710 ha treated).

FORECAST. Swarms will continue to move in southern **Ethiopia**, **Somalia** and northern **Kenya**, and possibly threaten **South Sudan** and **Uganda**. Substantial breeding is likely in Ogaden, Ethiopia and Somalia and numerous bands will form. Breeding will cause bands and swarms to form along both sides of the Red Sea. More breeding is likely in **Oman**.

EASTERN REGION: THREAT

SITUATION. More swarms formed in **India** (22 113 ha treated) and **Pakistan** (71 388 ha treated). Swarms from Indo-Pakistan laid in **Iran** (2 372 ha treated).

FORECAST. The remaining swarms along the Indo-Pakistan border will migrate to southwest **Pakistan** and southern **Iran** and slowly mature and breed.



The worst situation in 25 years

The current situation remains extremely serious in the Horn of Africa where, despite control operations, an increasing number of swarms formed in eastern Ethiopia, including the Ogaden, and perhaps adjacent areas of northwest Somalia. Although some swarms moved to Eritrea and Djibouti, the majority moved south in the Ogaden and Somalia, and several large swarms reached Kenya at the end of the month. There is a risk that some swarms could possibly reach South Sudan and Uganda. The already threatening situation was further exacerbated by limited operational capacities in Somalia and by heavy rains and floods from cyclone Pawan that will allow at least one to two more generations of breeding, causing a substantial increase in locusts over the next six months. In South-West Asia, intensive control operations were in progress along both sides of the Indo-Pakistan border where numerous swarms continued to form. The remainder of these swarms should leave the area in the coming weeks as they migrate to southern Iran where unusually good rains fell and temperatures remained warm, allowing the possibility for early breeding. So far, several swarms moved through Baluchistan, Pakistan and mature swarms laid eggs on the Iranian coast. Hopper bands and swarms formed on the Red Sea coast in Yemen and Saudi Arabia while bands formed in northeast Sudan, groups in Eritrea, and bands in northeast Oman. Further breeding will cause locusts to increase and form bands and swarms along both sides of the Red Sea.

The FAO Desert Locust Bulletin is issued every month by the Desert Locust Information Service (DLIS) at FAO HQ in Rome, Italy. DLIS continuously monitors the global Desert Locust situation, weather and ecology to provide early warning based on survey and control results from affected countries, combined with remote sensing, historical data and models. The bulletin is supplemented by Alerts and Updates during periods of increased Desert Locust activity.

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Weather & Ecological Conditions in December 2019

Cyclone Pawan caused flooding in the Horn of Africa and unusually heavy rains fell in southern Iran. Breeding conditions were favourable along both sides of the Red Sea, in the Horn of Africa and southern Iran.

WESTERN REGION

Although no significant rain fell in the region during December, ecological conditions were favourable for limited breeding in parts of northwest Mauritania (Inchiri and southwest Adrar), in some areas of central, eastern and southern Algeria (Adrar, Illizi, Djanet, Tamanrasset, Malian border), and in southwest Libya (near Ghat). However, low temperatures will delay locust maturation. Elsewhere, annual vegetation was sufficiently green for locust survival in parts of northern Mali (Timetrine and Adrar des Iforas), northern Niger (northern Air Mountains), eastern Chad (Kalait to Fada), and Morocco (Draa Valley) and the southern Western Sahara (Agwanit).

CENTRAL REGION

On 6 December, cyclone Pawan made landfall in northeast Somalia near Eyl to the east of Garowe and about 800 km north of Mogadishu, and then moved inland, bringing widespread, heavy rains of 75 mm or more and flooding to northeast and parts of central Somalia and to the Ogaden in eastern Ethiopia. As a result, breeding conditions are likely to be favourable in these areas for up to six months. In the winter breeding areas along both sides of the Red Sea, moderate rains fell on the Sudan coast and light rains fell on the coast of Yemen and parts of Eritrea. Ecological conditions were favourable for breeding mainly along the coast of Sudan, in Wadi Oko/Diib of northeast Sudan and adjacent areas of southeast Egypt, and along the eastern side of the Red Sea from Lith, Saudi Arabia to Hodeidah, Yemen. Ecological conditions were dry along the southern coast of Yemen. In Oman, moderate rains fell in northern interior and coastal areas during the first decade of the month, and conditions were favourable for breeding.

EASTERN REGION

Although no significant rain fell along both sides of the Indo-Pakistan border during December, annual vegetation was still green in many areas but dried out as the month progressed. Temperatures declined, causing reduced mobility of locust swarms and delayed maturity. In the spring breeding areas, unusually moderate to heavy rains fell in southern Iran extending from the Iraqi to the Pakistani borders during the first decade. These rains continued in the second decade in the southwest from Bander-e Lengheh to Iraq. Temperatures remained warmer than normal in many areas.

Area Treated

Control operations increased in December (187 943 ha) compared to November (154 520 ha).

Algeria	25 ha
Egypt	30 ha
Eritrea	11 078 ha
Ethiopia	8 410 ha
India	22 113 ha
Iran	2 372 ha
Mauritania	93 ha
Oman	1 710 ha
Pakistan	71 388 ha
Saudi Arabia	43 798 ha
Sudan	26 846 ha
Yemen	80 ha

Desert Locust Situation and Forecast

WESTERN REGION

Mauritania

• **SITUATION**

During December, hatching occurred in the first half of the month in the northwest between Bennichab (1928N/1525W) and Oujeft (2003N/1301W) where small-scale breeding started in mid-October. Consequently, scattered solitarious hoppers of all instars, fledglings, and immature and mature solitarious adults were present. Some hoppers and adults formed small groups at densities of up to 2 700 adults/ha in a few places. Ground teams treated 93 ha with biopesticides.

• **FORECAST**

Small-scale breeding is likely to continue in the northwest in areas that remain favourable, which could cause a few small groups to form; however, low temperatures will delay hatching and locust maturation.

Mali

• **SITUATION**

In early December, solitarious adults at densities of 200–400 adults/ha were maturing and forming immature groups in the north on the western side of the Adrar des Iforas west of Tessalit (2011N/0102E), in the Tilemsi Valley, and near Ti-n-kar (1926N/0022W). No locusts were seen in the west between Nara (1510N/0717W) and Kayes (1426N/1128W).

• **FORECAST**

Small-scale breeding may continue in areas that remain favourable in the Adrar des Iforas, Tilemsi Valley and Tamesna, however, low temperatures will delay hatching and locust maturation.

Niger

• **SITUATION**

No reports were received during December.

• **FORECAST**

Low numbers of locusts are likely to persist in parts of northern and central Tamesna and the Air Mountains.

Chad

• **SITUATION**

No locusts were reported during December.

• **FORECAST**

No significant developments are likely.

Burkina Faso

• **SITUATION**

No reports were received during December.

• **FORECAST**

No significant developments are likely.

Senegal

• **SITUATION**

No locusts were reported during December.

• **FORECAST**

No significant developments are likely.

Benin, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone and Togo

• **FORECAST**

No significant developments are likely.

Algeria

• **SITUATION**

During December, small-scale breeding continued west of Tamanrasset where a concentration of second to sixth instar solitarious hoppers were present mixed with immature solitarious adults. Immature solitarious adults were also present further south near the Niger border west of In Guezzam (1937N/0552E) from earlier breeding. No locusts were seen in the Adrar (2753N/0017W) valley and on the Mali border between Bordj Badji Mokhtar (2119N/0057E) and Tin Zaouatene (1957N/0258E). Ground teams treated 25 ha.

• **FORECAST**

Low numbers of locusts are likely to persist along the edge of the Hoggar Mountains near Illizi, Djanet and Tamanrasset, and near agricultural areas in the central Sahara. No significant developments are likely.

Morocco

• **SITUATION**

During the first week of December, no locusts were seen in the northern and southern Western Sahara except for mature solitarious adults on the southern coast north of Bir Gandouz (2136N/1628W) and the Mauritanian border.

• **FORECAST**

Low numbers of adults may appear in the Adrar Souttouf of the extreme south and breed if rainfall occurs.

Libya

• **SITUATION**

A late report indicated that mature solitarious adults were seen laying in the southwest during surveys carried out to the northwest and southeast of Ghat (2459N/1011E) in November. No surveys were carried out in December.

• **FORECAST**

Low numbers of hoppers and adults are likely to persist in the southwest near Ghat but low temperatures will delay maturation.

Tunisia

• **SITUATION**

No reports were received during December.

• **FORECAST**

No significant developments are likely.

CENTRAL REGION

Sudan

• **SITUATION**

During December, summer-bred late instar hopper groups and bands, and immature and mature adults formed groups and at least one immature swarm in the Baiyuda Desert between Abu Uruq (1554N/3027E) and Berber (1801N/3400E) early in the month. In the Red Sea winter breeding areas, laying and hatching were underway along Wadi Oko/Diib where immature and mature solitarious adults and at least one group were present. On the northern Red Sea coast, first to third instar hopper bands formed south of the Egyptian border between Fodukwan (2145N/3644E) and Mohamed Qol (2054N/3709E) where laying occurred last month. Scattered immature and mature solitarious adults were present along the coast further south from Port Sudan (1938N/3713E) to the Eritrean border, including one group of maturing adults. Control operations treated 26 846 ha of which 22 450 ha were by air.

• **FORECAST**

Hopper groups and bands are likely to form in subcoastal and coastal areas of the northeast with fledging from mid-January onwards that could give rise to adult groups and a few small swarms. A second generation of breeding could start at the end of the forecast period. Egg-laying and hatching will occur along the central and southern Red Sea coastal plains, and hoppers could form groups in some places.

Eritrea

• **SITUATION**

During December, groups of hoppers, immature and mature adults continued to form on the Red Sea coastal plains, which was supplemented by groups and swarms moving

northwards from adjacent areas of northeast Ethiopia. A second generation of breeding occurred on the coast from south of Foro (1515N/3937E) to as far north as Mehimet (1723N/3833E) where adult groups laid from the second week onwards, giving rise to substantial hatching and first instar hopper groups by the end of the month. Ground teams treated 11 078 ha.

• **FORECAST**

First-generation fledging will occur on the Red Sea coastal plains in January, causing an increase in immature adult groups that will mature and lay. Second-generation hatching will continue, giving rise to an increasing number of hopper groups and bands.

Ethiopia

• **SITUATION**

During December, late instar hopper bands fledged and formed an increasing number of immature groups and swarms in the railway area between Dire Dawa (0935N/4150E) and Ayasha (1045N/4234E), near Jijiga (0922N/4250E), and in the Ogaden between Degeh Bur (0813N/4333E), Warder (0658N/4520E) and Kebri Dehar (0644N/4416E). Some of the swarms moved further south in the Ogaden to south of Gode (0557N/4333E) and K'efalo (0537N/4408E), and to the Somali border. At least one swarm matured. Cross-border movements were reported in the railway, Somali and Ogaden areas. Control operations treated 8 410 ha of which 7 050 ha were by air.

• **FORECAST**

Adult groups and swarms are expected to mature and lay eggs in the Ogaden that will hatch and give rise to numerous hopper bands during the forecast period. Swarms are likely to move further south in the Ogaden and mature with cross-border movements in Somalia and northern Kenya. Some swarms may reach southern Oromiya and SNNP.

Djibouti

• **SITUATION**

On 1-2 December, several immature and mature swarms, most likely from adjacent areas of northwest Somalia and eastern Ethiopia, were seen flying in the southeast near the Ethiopian border and Ali Sabieh (1109N/4242E) and on the coast near Tadjourah (1147N/4253E) and Djibouti city.

• **FORECAST**

There is a low risk that a few groups and swarms may arrive in the south and east from adjacent areas of eastern Ethiopia and northwest Somalia.

Somalia

• **SITUATION**

During December, large numbers of hoppers and immature adults were reported on the plateau in the northwest near Boroma (0956N/4313E). During the second half of the month, immature swarms move south over central areas of Galgaduud and reached southern areas of Hirshabele and Jubaland. A large immature swarm was seen flying from north to south over Adado (0608N/4637E) on the 18th, over Beledweyne (0444N/4512E) on the 22nd, north of Garbahare (0320N/4213E) on the 25th, and north of Mogadishu (0202N/4520E) on the 26th.

• **FORECAST**

More groups and swarms are likely to appear in central and southern areas from the north and adjacent areas of eastern Ethiopia and mature. Egg-laying is likely to occur in areas that received previous rains, which will give rise to hopper bands. In the northwest, breeding will occur on the northwest coast if rains fall.

Kenya

• **SITUATION**

On 28 December, several large immature swarms first appeared in the northeast near the Somalia border at Mandera (0356N/4151E) and El Wak (0248N/4056E). There were reports that some swarms continued south to reach Wajir (0145N/4003E).

• **FORECAST**

There remains a high risk additional swarms will arrive in the northeast from adjacent areas of Ethiopia and Somalia. The swarms are likely to move west towards Moyale and perhaps further west as well as south towards Garissa where they may mature and lay during January.

South Sudan

• **FORECAST**

There is a low risk that a few small swarms may appear in the southeast from adjacent areas of southern Ethiopia and northern Kenya during periods of easterly winds.

Uganda

• **FORECAST**

There is a low risk that a few small swarms may appear in the northeast from adjacent areas of Kenya during periods of easterly winds.

Egypt

• **SITUATION**

During December, at least one mature adult group appeared in the southeast on the Red Sea coast south of Shalatyn (2308N/3535E) where it was laying. Scattered mature solitarious adults appeared between Shalatyn and the Sudanese border where small-scale breeding was in progress and first to fourth instar solitarious, *transiens*, and gregarious hoppers, and a few hopper groups were present. Scattered adults were also seen further north between Berenice (2359N/3524E) and Marsa Alam (2504N/3454E). No locusts were present near Lake Nasser and Tushka (2247N/3126E). Control teams treated 30 ha.

• **FORECAST**

Locust numbers will increase further on the Red Sea coastal plains in the southeast as breeding continues, giving rise to hopper and adult groups. A second generation of laying could start in February if conditions remain favourable that would lead to a further increase in locusts.

Saudi Arabia

• **SITUATION**

During December, first-generation late instar hoppers and fledglings gave rise to groups of immature and mature adults along the Red Sea coastal plains from Jizan (1656N/4233E) to north of Lith (2008N/4016E). An immature swarm was seen near Qunfidah (1909N/4107E) on the 4th and another one was seen the next day in the southern Asir Mountains between Abha (1813N/4230E) and Najran (1729N/4408E). Some of the groups and swarms may have arrived from adjacent coastal areas in Yemen. Widespread second-generation laying by adult groups occurred throughout the month and, from mid-month onwards, substantial hatching and the formation of numerous early instar hopper groups and bands took place. During the last week, a few immature swarms moved from the Red Sea coast and were maturing in the interior west of Gassim (2621N/4358E) and south of Hail (2731N/4141E). Control teams treated 43 798 ha of which 11 200 ha were by air. No locusts were seen on the northern Red Sea coast between Jeddah and Umm Lajj (2501N/3716E).

• **FORECAST**

A substantial increase in second-generation hopper groups and bands is likely on the Red Sea coast south of Jeddah that will start to fledge by the end of January, giving rise to numerous immature adult groups and swarms. Infestations may extend to the northern coast and perhaps to parts of the interior where low temperatures are likely to delay maturation.

Yemen

• **SITUATION**

During December, breeding continued on the northern Red Sea coast between Al Zuhrah (1541N/4300E) and Suq Abs (1600N/4312E) where at least one swarm was laying and new hatching occurred, causing numerous first to third instar hopper bands to form. Mature solitarious adults were also present. A maturing swarm was seen northeast of Suq Abs on the 13th. Ground teams treated 80 ha. At the end of the month, mature gregarious adults were seen laying on the central Tihama near Al Qutai (1454N/4312E). On the southern coast, no locusts were seen from west of Bir Ali (1401N/4820E) to Al Ghaydah (1612N/5210E).

• **FORECAST**

Breeding will continue on the Red Sea coast and cause a further increase in locust numbers that will give rise to hopper groups, bands, adult groups and swarms.

Oman

• **SITUATION**

During December, breeding continued on the eastern coast in two areas – south of Ras Al Hadd (2232N/5948E) and to the north and west of Duqm (1939N/5743E). Hopper groups and bands formed in both areas while immature adult groups formed near Duqm where breeding had commenced earlier than further north. Scattered immature and mature solitarious adults were present in both areas. First instar hoppers were present at one place on the northern Batinah coast where a swarm had previously been reported. Ground teams treated 1 710 ha. No locusts were seen elsewhere in the north.

• **FORECAST**

Another generation of breeding could commence along the eastern coast by the end of the forecast period if temperatures remain warm and ecological conditions are favourable. There is a low risk that a few summer-bred Indo-Pakistan swarms could appear in the north.

Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestine, Qatar, Syria, Tanzania, Turkey, and UAE

• **FORECAST**

No significant developments are likely.

EASTERN REGION

Iran

• **SITUATION**

During December, scattered immature and mature solitarious adults were present near the coast south of Minab (2708N/5705E) in Hormozgan province and scattered mature solitarious adults were seen on the southeast coast near Chabahar (2517N/6036E) and in the interior on the edge of the Jaz Murian Basin south of Bampur (2711N/6028E). During the last week, several mature swarms were seen laying south of Minab. No locusts were seen elsewhere along the southern coast and in the interior of Hormozgan and Sistan-Baluchistan. Ground teams treated 2 372 ha.

• **FORECAST**

Hatching and band formation is likely to occur near Minab. There remains a high risk that numerous adult groups and swarms from the Indo-Pakistan summer breeding areas will arrive in areas of recent rainfall in Sistan-Baluchistan and Hormozgan provinces and continue to southern and southwest coastal areas where breeding may occur, but low temperatures could limit movement and delay maturation.

Pakistan

• **SITUATION**

During December, late instar hopper groups and substantial third-generation fledging gave rise to numerous immature adult groups and swarms in Tharparkar, Nara and Cholistan deserts. Some of the immature groups had matured by the

end of the month. The infestations were supplemented by cross-border movements during the first and last weeks of the month. Control operations treated 71 388 ha of which 10 300 ha were by air. In Baluchistan, immature swarms from the summer breeding areas arrived in Quetta (3015N/6700E) and nearby areas to the south on 4-6 December.

• **FORECAST**

The remaining summer-bred adult groups and swarms will move from Tharparkar, Nara and Cholistan deserts west towards areas of recent rainfall in Baluchistan. Low temperatures will reduce locust mobility and delay maturation. The migration will be supplemented by similar populations from adjacent areas of India that will transit the summer breeding areas and continue to Baluchistan.

India

• **SITUATION**

During December, numerous immature swarms continued to form in West Rajasthan between Phalodi (2706N/7222E) and Barmer (2543N/7125E), and in Gujarat west of Palanpur (2410N/7226E). A few late instar hopper groups persisted in Rajasthan between Barmer and the Pakistani border while a third generation of breeding occurred in the Rann of Kutch northwest of Bhuj (2312N/6954E) in Gujarat where hatchlings and first to third instar hopper groups were present. Residual populations of immature and mature solitarious adults and groups were present in some areas. Ground teams treated 22 113 ha.

• **FORECAST**

The remaining summer-bred adult groups and swarms will move from Rajasthan and Gujarat west towards Baluchistan, Pakistan. Low temperatures are likely to reduce their mobility and delay maturation. Consequently, a sharp decline in locust numbers is expected in January.

Afghanistan

• **SITUATION**

No reports were received during December.

• **FORECAST**

There is a low risk that a few groups or small swarms from the Indo-Pakistan border may appear in southern areas if temperatures remain warm.

Announcements

Locust warning levels

A colour-coded scheme indicates the seriousness of the current Desert Locust situation: **green** for *calm*, **yellow** for *caution*, **orange** for *threat* and **red** for *danger*. The scheme is applied to the Locust Watch web page and to the monthly bulletins. The levels indicate the perceived risk or threat of current Desert Locust infestations to crops and appropriate actions are suggested for each level.

Locust reporting

Calm (green). Countries should report at least once/month and send RAMSES data with a brief interpretation.

Caution (yellow), threat (orange) and danger (red). During locust outbreaks, upsurges and plagues, RAMSES output files with a brief interpretation should be sent at least twice/week within 48 hours of the latest survey.

Bulletins. Affected countries are encouraged to prepare decadal and monthly bulletins summarizing the situation.

Reporting. All information should be sent by e-mail to the FAO/ECLO Desert Locust Information Service (eclo@fao.org and faodlislocust@gmail.com). Reports received by the first two days of the new month will be included in the FAO Desert Locust Bulletin; otherwise, they will not appear until the following month. Reports should be sent even if no locusts were found or if no surveys were conducted.

Calendar

The following activities are scheduled:

- **CRC.** ULV sprayer maintenance workshop, Muscat, Oman (20–23 January)
- **CLCPRO/CRC/DLIS.** Drone field trial, Mauritania (27–31 January)
- **CLCPRO/DLIS.** Western Region Desert Locust Information Officer workshop, Dakar, Senegal (6–10 April)
- **CRC/SWAC/DLIS.** Central Region and SWAC Desert Locust Information Officer workshop, Cairo, Egypt (7–11 June)

Glossary of terms

The following special terms are used in the Desert Locust Bulletin when reporting locusts:

Non-gregarious adults and hoppers

Isolated (few)

- very few present and no mutual reaction occurring
- 0–1 adult/400 m foot transect (or less than 25/ha)

Scattered (some, low numbers)

- enough present for mutual reaction to be possible but no ground or basking groups seen
- 1–20 adults/400 m foot transect (or 25–500/ha)

Group

- forming ground or basking groups
- 20+ adults/400 m foot transect (or 500+/ha)

Adult swarm and hopper band sizes

Very small

- swarm: less than 1 km^2 • band: 1–25 m^2

Small

- swarm: 1–10 km^2 • band: 25–2,500 m^2

Medium

- swarm: 10–100 km^2 • band: 2,500 m^2 – 10 ha

Large

- swarm: 100–500 km^2 • band: 10–50 ha

Very large

- swarm: 500+ km^2 • band: 50+ ha

Rainfall

Light

- 1–20 mm

Moderate

- 21–50 mm

Heavy

- more than 50 mm

Summer rains and breeding areas

- July–September/October
- Sahel of West Africa, Sudan, western Eritrea; Indo-Pakistan border

Winter rains and breeding areas

- October–January/February
- Red Sea and Gulf of Aden coasts; northwest Mauritania, Western Sahara

Spring rains and breeding areas

- February–June/July
- Northwest Africa, Arabian Peninsula interior, Somali plateau, Iran/Pakistan border

Other reporting terms

Breeding

- The process of reproduction from copulation to fledging

Recession

- Period without widespread and heavy infestations by swarms

Remission

- Period of deep recession marked by the complete absence of gregarious populations

Outbreak

- A marked increase in locust numbers due to concentration, multiplication and gregarisation which, unless checked, can lead to the formation of hopper bands and swarms

Upsurge

- A period following a recession marked initially by a very large increase in locust numbers and contemporaneous outbreaks followed by the production of two or more successive seasons of transient-to- gregarious breeding in complimentary seasonal breeding areas in the same or neighbouring Desert Locust regions

Plague

- A period of one or more years of widespread and heavy infestations, the majority of which occur as bands or swarms. A major plague exists when two or more regions are affected simultaneously

Decline

- A period characterised by breeding failure and/or successful control leading to the dissociation of swarming populations and the onset of recessions; can be regional or major

Warning levels

Green

- *Calm*. No threat to crops; maintain regular surveys and monitoring

Yellow

- *Caution*. Potential threat to crops; increased vigilance is required; control operations may be needed

Orange

- *Threat*. Threat to crops; survey and control operations must be undertaken

Red

- *Danger*. Significant threat to crops; intensive survey and control operations must be undertaken

Regions

Western

- Locust-affected countries in West and North-West Africa: Algeria, Chad, Libya, Mali, Mauritania, Morocco, Niger, Senegal, Tunisia; during plagues only: Benin, Burkina Faso, Cameroon, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierre Leone and Togo

Central

- Locust-affected countries along the Red Sea: Djibouti, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Somalia, Sudan, Yemen; during plagues only: Bahrain, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Palestine, Qatar, South Sudan, Syria, Tanzania, Turkey, UAE and Uganda

Eastern

- Locust-affected countries in South-West Asia: Afghanistan, India, Iran and Pakistan.

Useful tools and resources

FAO Locust Watch. Information, maps, activities, publications, archives, FAQs, links
http://www.fao.org/ag/locusts

FAO Desert Locust regional commissions. Western Region (CLCPRO), Central Region (CRC), South-West Asia (SWAC)
http://www.fao.org/ag/locusts

IRI RFE. Rainfall estimates every day, decade and month
http://iridl.ldeo.columbia.edu/maproom/.Food_Security/.Locusts/index.html

IRI Greenness maps. Dynamic maps of green vegetation evolution every decade
http://iridl.ldeo.columbia.edu/maproom/Food_Security/Locusts/Regional/greenness.html

NASA WORLDVIEW. Satellite imagery in real time
https://worldview.earthdata.nasa.gov

Windy. Real time rainfall, winds and temperatures for locust migration
http://www.windy.com

eLocust3 training videos. A set of 15 introductory training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHEdv1jAPaF02TCfpcnYoFQT

RAMSESv4 training videos. A set of basic training videos are available on YouTube
https://www.youtube.com/playlist?list=PLf7Fc-oGpFHGyzXqE22j8-mPDhhGNq5So

RAMSESv4 and eLocust3. Installer, updates, videos, inventory and support
https://sites.google.com/site/rv4elocust3updates/home

FAOLocust Twitter. The very latest updates posted as tweets
http://www.twitter.com/faolocust

FAOLocust Facebook. Information exchange using social media
http://www.facebook.com/faolocust

FAOLocust Slideshare. Locust presentations and photos
http://www.slideshare.net/faolocust

eLERT. Online database of resources and technical specifications for locust emergencies
http://sites.google.com/site/elertsite

Desert Locust Summary
Criquet pèlerin - Situation résumée

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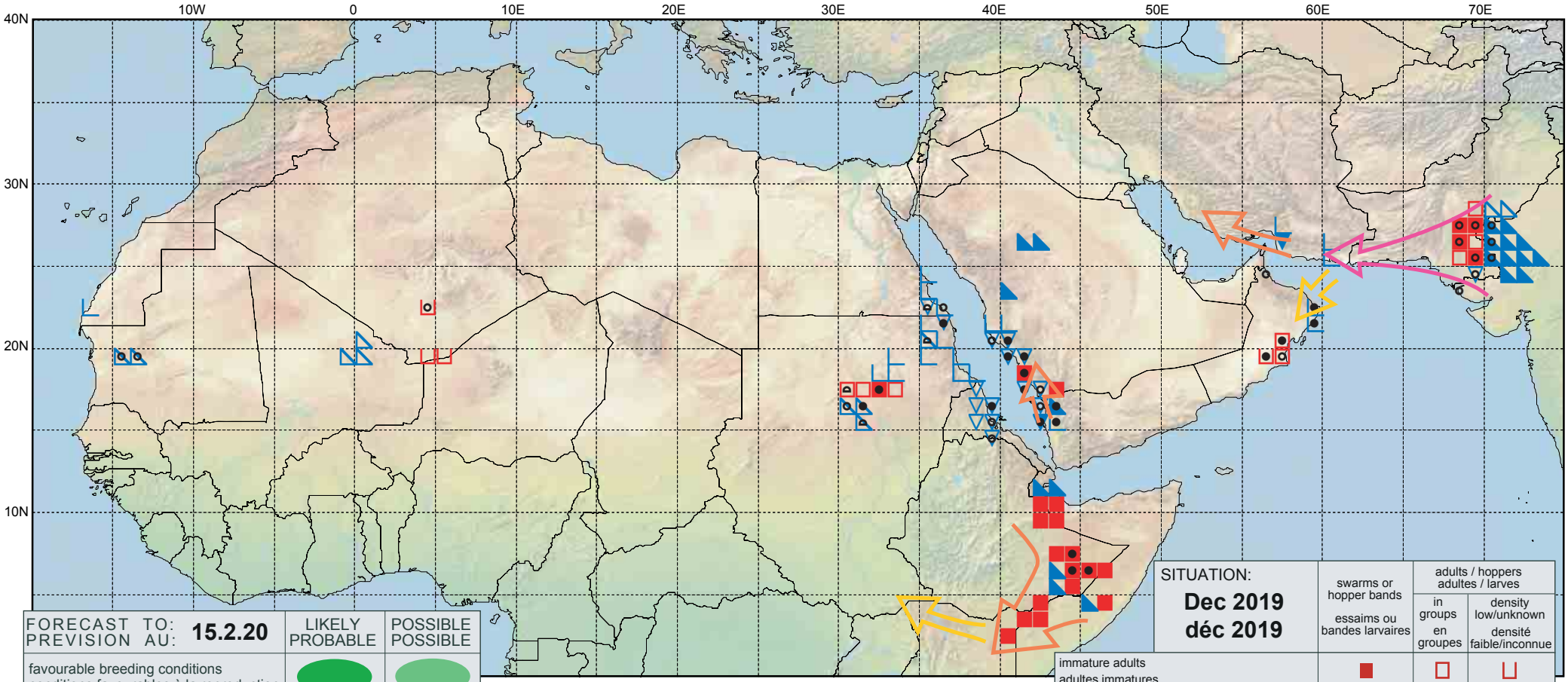

FORECAST TO: / PREVISION AU: **15.2.20**	LIKELY / PROBABLE	POSSIBLE / POSSIBLE
favourable breeding conditions conditions favourables à la reproduction		
major swarm(s) essaim(s) important(s)		
minor swarm(s) essaim(s) limité(s)		
non swarming adults adultes non essaimant		

SITUATION: **Dec 2019** / **déc 2019**	swarms or hopper bands essaims ou bandes larvaires	adults / hoppers adultes / larves: in groups en groupes	adults / hoppers adultes / larves: density low/unknown densité faible/inconnue
immature adults adultes immatures	■	□	⊔
mature or partly mature adults adultes matures ou partiellement matures	◣	◺	∟
adults, maturity unknown adultes, maturité inconnue	▲	△	∧
egg laying or eggs pontes ou œufs	▼	▽	∨
hoppers larves	●	○	◡
hoppers & adults (combined symbol example) larves et adultes (exemple symboles combinés)	◘	◙	⊟