Food and Agriculture Organization of the United Nations

Programme to improve national and regional locust management in Caucasus and Central Asia (CCA)

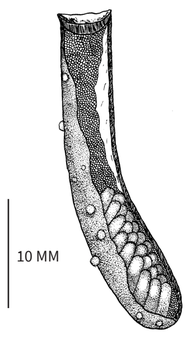
Adult morphology

Mid-size and slender insects.
Tegmina extend beyond the apex of the hind femora. Wings transparent. Body coloration yellowish-grayish, with dark spots.
Hind tibia usually red, less frequently yellow, pink of whitish. Stripes of the X-shaped cross on the pronotum narrow and almost not enlarged in the rear.
Mass of males about 0.6 g, mass of females 1.2 g.

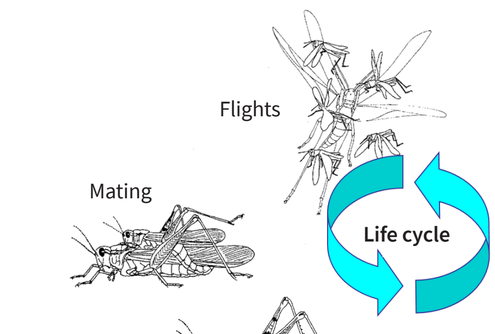
Sex / character	Body length, mm	Tegmen length, mm	Hind femur length, mm
Males	16,5–28,5	17,5–27,0	13,2–17,4
Females	20,5–38,0	23,0–36,0	15,5–21,6

Differences between adult solitary and gregarious phase

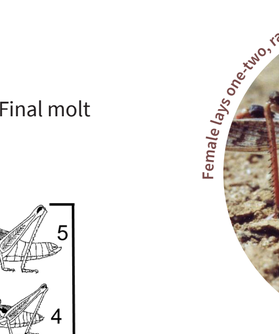
Phase/character	Solitary	Gregarious
Body length, male, mm	16,5–22,5	22,0–28,5
Body length, female, mm	20,5–28,5	25,0–38,0
Index E/F	1,30–1,57	1,58–1,83
General coloration	Bright, contrasting	Faded, “straw-colored”
Three black markings on the top of hind femora	Present	Absent



Differences in the structure of the end of the abdomen In males and females



Rear light stripes of the X-shaped cross markings on the pronotum of *D. kraussi* are wider than in *D. maroccanus*



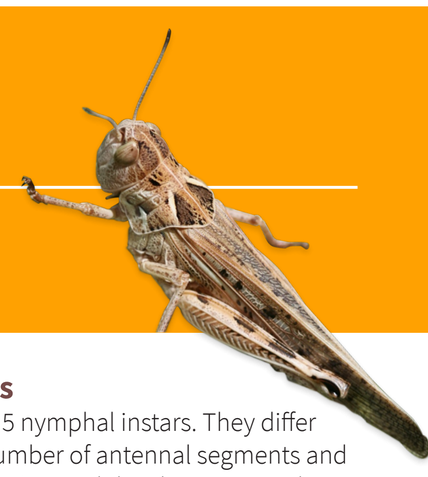
Measurements of tegmen (E) and hind femur (F)

Related species

Moroccan Locust often lives together with a closely related species – *Dociostaurus kraussi*. *Dociostaurus kraussi* is more stocky, its hind femora are thicker, wings shorter (do not reach the tip of the abdomen) and the rear light strips of the X-shaped cross markings on the pronotum are wider than in the Moroccan Locust. Eggs of *D. kraussi* hatch a week earlier than *D. maroccanus* and therefore its hatchlings are a good indicator of the coming hatching of the Moroccan Locust.

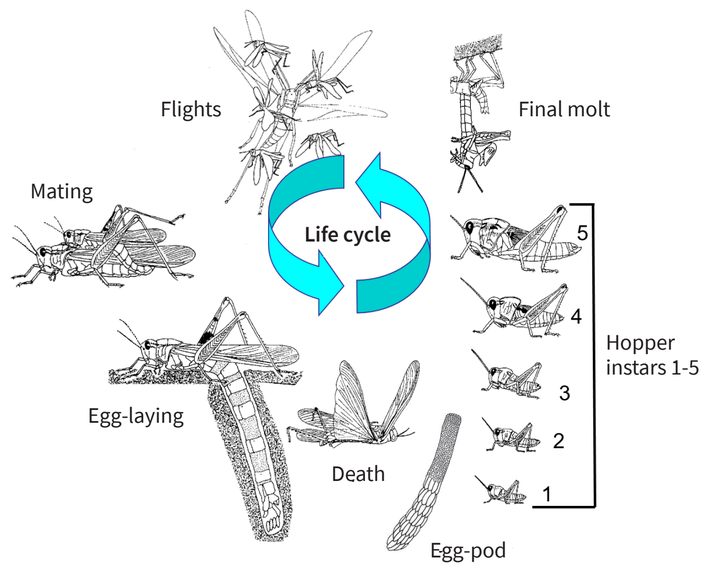
MOROCCAN LOCUST

Dociostaurus maroccanus (Thunberg, 1815) in Afghanistan: biology, ecology, monitoring



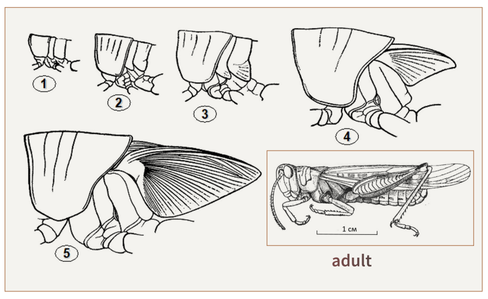
Egg-pod

Slightly curved or straight, a little widened in the lower part. Length 16 – 35 mm. Walls are clayish and solid. Opening on the top is covered with a lid.Eggs 18 – 42 (avg. 30-36), there is a column of whitish foam above them.



Nymphs

There are 5 nymphal instars. They differ by size, number of antennal segments and degree of wing-pad development. In the first, second and third instars, the wing-pads are situated on the sides of the pronotum and they are down-oriented. Nymphs of the 4th and 5th instars have wing-pads on the top of the pronotum, oriented upwards and resembling small wings.

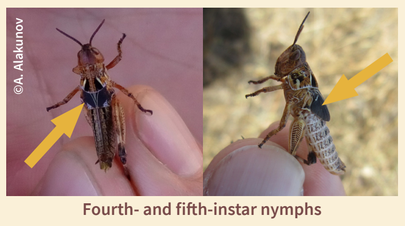


Differences in wing-pad structure between nymphal instars

First-instar hatchlings

Second-instar nymphs

Third-instar nymphs



Fourth- and fifth-instar nymphs

Phenology

Early-spring species. Hatching usually in late February – Early March, concerted and fast, accomplished in 3 to 5 days in one site.
Duration of each nymphal instar is 5 to 7 days.
Adult start flying, mating and egg-laying 10 to 15 days after fledging (usually in May). End of annual cycle is in June.

Food preferences

Highly polyphagous pest.
Damages cereals, legumes, vegetables, cotton, cucurbits, orchards, vineyards and even coniferous trees. Nymphs destroy the natural pasture vegetation in their hatching habitats in the foothills, then move down to valleys and attack crops.

Hopper band and swarm migrations

Hopper bands start mass migrations from the 2nd instar and may travel 3 to 5 km during their entire nymphal period.
Adult swarms fly 25 – 30 km (rarely more) during the entire period of adult life.
Flights are often transboundary, which hampers monitoring and control.

Main Moroccan Locust foci in Afghanistan

Preferred habitats

Semi-deserts in foothills, with a mosaic of bare soil patches and ephemeral vegetation.
The predominant plant is *Poa bulbosa*.
Soils clay loam, slightly salinized. For oviposition, only very compact, undisturbed soil is used.
Altitude 800 – 1200 m a.s.l. but in the 21st century, because of climate warming, Moroccan Locust can inhabit altitudes up to 1500 m and even higher.
Suitable conditions can be created by overgrazing.
Outbreaks are triggered by drought when less than 100 mm of rain falls in February – April.

Natural enemies

Flocks of Rose starlings may significantly decrease the density of nymphs in bands. Blister beetles (family Meloidae) and bee-flies (family Bombyliidae) are efficient egg predators. Tachinid flies (family Tachinidae) parasitize nymphs and adults. Natural enemies are particularly active during the declining phase of the Moroccan Locust multiannual population dynamics.

Moroccan Locust infestations are concentrated in northern and north-eastern provinces: Samangan, Kunduz, Baghlan, Balkh and Takhar, as well as Sar-i-Pul, Faryab, Jawzjan, Ghor, Herat and Badghiz. Exchange of swarms with Tajikistan, Uzbekistan and Turkmenistan is common during particularly severe ourbreaks.

Monitoring (surveys) of the Moroccan Locust

Four annual surveys are recommended. They should be conducted in the morning (6-10 a.m.) or after 5 p.m.

1. Survey of adults during mass egg-laying.
Objective: to find and register egg-laying sites.
Based on the results of this survey, a preliminary forecast of the next year’s infestations is developed.
When: approximately one or two weeks after mass fledging.
How to survey: follow the transect itinerary and take samples along it. Distance between parallel transects is 100 m, distance between samples is 100 m. If the surveyed site is very large, the distances between transects and samples should be increased to 200 m.
How to take sample: approach a visually-delimited one square meter plot in front of you and count the number of insects which jumped out of it. Also, collect at least 20 adult locusts to identify phase (E/F index) and egg development.

2. Summer/Autumn egg-pod survey.
Objective: identification of infested areas. Based on the results of this survey, the forecast of the next year’s infestations is finalized.
When: in the summer/autumn, after the end of the locust annual cycle.
How to survey: itineraries/transect are done similarly to the previous survey. Soil samples (approximately one per hectare) are taken.
How to take soil sample: upper layer of the soil (5-8 cm deep) is taken out from a 50 X 50 cm area. The soil is carefully sifted and the egg-pods are collected and placed in a container. Mean number of eggs per egg-pods is identified, as well as the percentage of egg-pods damaged or destroyed by predators and diseases. To calculate the density of egg-pods per square meter, the number of egg-pods found in a 50 X 50 cm sample is multiplied by four.

3. Spring partial egg-pod survey.
Objective: to assess the overwintering of eggs. Based on the results of this survey, the forecast of infestations is adjusted.
When: before hatching, usually in February or early March.
How to survey: similar to the Summer/Autumn egg-pod survey but selectively, on 10% of the infested area, approximately 1 sample per 10 ha. Percentage of egg-pods damaged by predators or infections is calculated.

4. Nymphal survey during hatching.
Objective: verification of the areas infested by nymphs, which is subsequently subject to control. This survey is the basis for anti-locust treatments.
When: during mass hatching of hoppers, in March – April.
How to survey: similar to adult survey, transects each 100 m and samples each 100 m too. Nymphal density (number of hoppers jumped out of 1 square meter plot) and developmental stage (by collecting hoppers with net and identifying instars by examining their wing pads) are assessed.

http://www.fao.org/locusts-cca/ru/

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