

APPENDIX I

REPORT OF THE FIRST SESSION OF THE EXECUTIVE COMMITTEE
OF THE COMMISSION FOR CONTROLLING
THE DESERT LOCUST IN THE NEAR EAST

Held in
Beirut, Lebanon
22 to 24 April 1971

INTRODUCTION

The first session of the F.A.O. Commission for controlling the Desert Locust in the Near East which was held in Baghdad, Iraq from 1 - 4 February 1969 elected the members of the Executive Committee in accordance with Article VIII of the Agreement and recommended that its next session should be convened by the Director General of F.A.O. at a place and date to be determined by him. The Director General, at the kind invitation of the Government of Lebanon convened the 2nd session of the FAO Commission for controlling the Desert Locust in the Near East in Beirut, Lebanon from 26 - 29 April 1971 and the 1st session of the Executive Committee of the Commission from 22 - 24 April. He invited the member Governments of the Executive Committee namely: Jordan, Lebanon, Qatar, Sudan and U.A.R. to be represented by delegates.

The session was opened by the Chairman, Delegate of U.A.R., Mr. Mostafa El Nahas who welcomed all the participants to this 1st session of the Executive Committee and emphasized the importance of the different subjects to be discussed. He also conveyed his thanks to the Government of Lebanon for all the facilities provided.

Officers of the Session

The delegates of Jordan, Lebanon, Qatar, Sudan and U.A.R. and the FAO consultant along with the FAO Secretariat formed the Drafting Committee. Mr. R. Skaf and Dr. Sardar Singh of the FAO Secretariat acted as Technical Secretaries.

Acknowledgements

Before the close of the session the members of the Executive Committee expressed the great appreciation of the hospitality and facilities made available for the session by the Government of Lebanon and of the efficient manner in which the session had been conducted by the chairman. The delegates also expressed their thanks to the FAO Secretariat.

PARTICIPATION IN THE SESSION

The following delegates from member Nations of the Food and Agriculture Organization of the United Nations and members of the FAO staff participated in the session and contributed to the discussions summarized in this report.

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A G E N D A

1. Opening of the Session
2. Adoption of the Agenda
3. Election of the Drafting Committee
4. Coordination of the Desert Locust Research in the Region
5. Desert Locust Control and Survey
6. Training
7. Any other Business
8. Date and place of Next Session
9. Adoption of the Report

SUMMARY OF DISCUSSIONS

Coordination of Desert Locust Research in the Region

1. In considering the report on the research undertaken in 1970 and programme of work for 1971 in the Democratic Republic of Sudan, (Annex 1) it was noted that due to paucity of research staff and the very low density of locust populations in all areas, research activities were mainly concentrated on surveys along the Red Sea Coast which allowed the study of topographical features and of the vegetation.

2. It was found that cost of controlling grasshopper populations could be reduced to one third by spraying pesticides using ULV technique compared to poisoned bait.

3. A local grasshopper *Zenocerus variegatus* L, was noted to be feeding on water hyacinth in the Sobar River on considerable scale for the first time. However, as it was known to be a pest of several other economic crops in Equatorial Africa, it could not be exploited as a biological agent for the control of the aquatic weed.

4. Taking various factors into consideration, the programme of work for 1971 was laid down on the following lines:

- i. Intensification of field surveys covering the whole of the Red Sea Coastal area.
- ii. Research on the biology and life history of other acridids of economic importance in their natural environment. Emphasis should be given to the "Gregarizing effect" of mixed populations of these acridids, especially *Locusta migratoria* on solitary Desert Locusts.
- iii. Comparative studies on field control methods of Desert Locust or other acridid populations.

5. The Committee considered with great interest the report of Dokki Locust Research Station for 1970 (Annex 2) on the research activities undertaken on Toxicology, Phasiology, Physiology, Ecology and Taxonomy. Findings on seasonal variations in susceptibilities to the Desert Locust to insecticides might be correlated with similar variations depending on the temperatures of the day reported from India.

It was suggested that newer insecticides and formulations might be tested on locust populations in field cages or in field plots.

6. Information was given on 1970 large scale aerial trial of ultra low volume spraying undertaken over 100 sq.kms. having very low density populations (1-2 per sq.km.) within the Hamata - Abu Ramad area (South-Eastern desert) in order to study the residual effect on natural vegetation and its effect on the development of the locust populations. The area was kept under continuous observation.

7. The Committee was interested in the experiment on the effect of food taken by the parents during their life on the development, fecundity, percentage of body water content and survival capacity of the progeny.

8. The Committee was informed that five field research sub-stations had been established at Abraq, Hamata, Qusseir in the Eastern desert, Marsa Matrouh and Khargah in Western desert of U.A.R. where ecological surveys and field research studies were undertaken.
9. The importance of field research in Saudi Arabia was fully recognized. The Committee was informed of the recent arrangements made between the Saudi Arabia and U.K. Governments in order to procure technicians from the Anti-Locust Research Centre, London (ALRC) for assisting in research and surveys. It was hoped that the Saudi Arabian observer at the Commission would be able to supply information regarding the overall plan of research work that had been adopted.
10. The Committee observed that close contact should be maintained amongst the research personnel working in the stations of the region. Full advantage would be taken of provisions made for research in the budget of the Commission for arranging exchange visits of research workers.
11. The Committee appreciated that FAO was providing facilities for the dissemination of information on research by such publications as the Technical Series, the Locust Newsletter and the annual progress Reports of desert Locust field research stations.

As the use of unified terminology was considered important, the Committee hoped that the Glossary of terms used in locust research and control would be soon issued and distributed.

Desert Locust Survey and Control

12. The Committee emphasized the necessity of keeping all areas under permanent seasonal surveys. The new procedure circulated by FAO for assessing low density populations should be tried in different parts of the Region with a view to standardizing procedures.
13. The Committee reiterated the principles of the long-term strategy for the control of locust consisting in combating any concentrations of locust in the areas surveyed in order to avoid further multiplications where breeding conditions prevail.

Training

14. The Committee felt the need for high-level training in the Near East Region and considered the candidature of the following nominees of member governments against the provision of U.S. \$15,000 approved by the Commission in February 1969:

i. Iraq

Mr. Saadi Abdul Muhsin AL Allawi (nomination forms not received yet)

ii. People's Democratic Republic of Yemen

Mr. Saeed Abdallah Saeed Ba'ankoud

B.Sc. Agriculture

(Entomology, Pathology)

Khartoum University 1970

iii. Sudan

Mr. Farouk Ahmad Abdul Ghaffar Karrar
B.Sc. Agriculture
(Economic Entomology)
Cairo University 1963
M.Sc. Plant Protection - Newcastle University 1968

iv. U.A.R.

Mr. Samir Ismail Hammam
B.Sc. Agriculture
Cairo 1961
M.Sc. Locust Toxicology
Cairo, 1970.

15. It was agreed that in selecting candidates for high-level studies priority should be given to countries where there is shortage in qualified control or research staff. The candidature of Mr. Saeed A.S. Ba'ankoud (People's Democratic Republic of Yemen) and Mr. F.A. Abdul Ghaffar Karrar of Democratic Republic of Sudan was approved. In case of non-availability of one of the above two candidates, Mr. Samir I. Hammam of U.A.R. will be a substitute.

Other Business

16. The Committee recommended the preparation and circulation of the Agreement of the Near East Desert Locust Control Commission in Arabic at an earlier date.

Place and Date of Next Session

17. The second session of the Executive Committee may be held just before the 3rd session of the Near East Desert Locust Control Commission and at the same place.

ANNEX I

A Summary of Research in 1970 and Future Plans

SUDAN

Research Undertaken in 1970

The unsuccessful breeding of the Desert Locust culture which was started in 1968 and the continuing recession and the very low locust population everywhere has affected the type of work that can be done in the field.

Keeping in view this fact and the existing facilities and the shortage in research staff, the following studies were carried out in 1970.

1. A survey was carried out along the Red Sea Coast from mid February to mid April. During this Survey no locust activities were reported. However, the ecological characters of the terrain were studied.
2. A study was made on the economics of grasshopper control by U.L.V. as compared to the old method of baiting. It was found that U.L.V. spraying economizes the expenses by 65% as compared to baiting.
3. The grasshopper Zenocerus variegatus L., was recorded for the first time feeding on the Water hyacinth Eichornia crossipes Solms in Sobat River. A paper discussing the economical importance of this grasshopper as a means of biological control of water hyacinth was presented.

Proposed Research Program for 1971

1. Ecological surveys of the Red Sea Coastal areas and the summer breeding areas in Darfur and Kurdofan. Whenever possible observations on the behaviour and bio-cycle of the wild solitary populations will be taken.
2. Studies on the co-habitation of some local acridids with the Desert Locust and the effects of such a co-existence on phase transformations and change from the solitary behaviour.
3. The Ghadared area of East Central Sudan will be surveyed thoroughly for acridids of economic importance.
4. Observations on the behaviour of the African Migratory Locust in some of its natural habitats in Eastern Sudan.
5. Starting a laboratory and outdoor caged cultures for experiments in the future.

ANNEX II

UNITED ARAB REPUBLIC

Dokki Locust Research Station.

Annual Progress Report for 1970 & Plans for 1971

A. Toxicology

I. Seasonal Variations in Susceptibilities of the Desert Locust to Insecticides.

Treatments were carried on adult *Schistocerca gregaria* which had passed their juvenile life and ten days of their adult life through one of the four climatic seasons of the year. Insects for control treatments were reared under thermostatic conditions in the constant temperature room. Dosing applications were either through contact (topical application) or by ingestion (sandwich technique). Insecticides used were pure Lindane and dieldrin and the solvent used was acetone.

The following table summarizes result:

	Lindane			
	Contact		Ingestion	
	LD 50	LD 90	LD 50	LD 90
Winter	10.00	21.46	6.35	12.40
Spring	10.26	27.47	6.71	12.50
Summer	11.77	42.15	10.38	27.70
Autumn	10.70	28.23	9.86	15.95
C T Conditions	11.26	34.37	11.06	21.03

	Dieldrin			
	Contact		Ingestion	
	LD 50	LD 90	LD 50	LD 90
Winter	4.55	14.33	2.22	5.52
Spring	3.51	12.98	3.89	6.99
Summer	2.61	6.69	4.17	13.02
Autumn	4.06	9.90	3.66	6.52
C T Conditions	1.86	4.22	3.75	7.95

It was shown that:

1. Lindane is more toxic as a stomach insecticide than as a contact one, especially in winter and spring when temperatures are low. It is more toxic to winter and spring generations of adult *S.gregaria* than to those of summer and autumn as a stomach insecticide. These results coincide with the results of topical application which indicated that lindane was more toxic at cool weather conditions than at high temperatures.

Difference between LD 50 values for winter and spring and those for the control treatment proved significant, whereas differences between median lethal dose values for summer and autumn generations and the control were insignificant (controls bred under c.t. of 32 ± 1 degree centigrade).

2. As a contact insecticide, dieldrin is more toxic to summer bred Desert Locust than to locusts of the winter generation. Dosage values for the latter (based on LD 50 and LD 90) were almost double those for the first. Results were the opposite when dieldrin was administered orally, for it was more toxic as a stomach poison to locusts of the winter generation than to those of the summer generation. Values for autumn and spring fell between the extremes of summer and winter.

Differences between median lethal dose values of dieldrin for winter locusts and control locusts were significant, whereas differences between values for the other seasons and the control were non significant.

3. It was shown that dieldrin is more toxic to the desert locust during all seasons, as a contact or stomach insecticide than lindane.

This research had been finalized and presented to the Faculty of Agriculture, Cairo University and was accepted and the candidate got his M.Sc.

II. Development of resistance to insecticides in the Desert Locust, Schistocerca gregaria Forsk.

This research is being started and would include attempts towards producing, after a number of toxicated generations, a resistant strain of the desert locust that would tolerate a ceiling of dosing calculated in the form of LD 50 and LD 90.

The research would also include studies on the metabolism of the tested insecticides. For this purpose, it is planned to send a candidate on a fellowship to get the necessary training on insecticide metabolism abroad.

III. Persistence of some insecticides used in Desert Locust Control. Foliage of Sesabania grown in pots would be contaminated with calculated volumes of insecticide droplets representing field spraying deposits. Demarcated contaminated foliage would be offered for ingestion to weighed locusts (sandwich technique) after varying periods of contamination. Assessment of persistence of any insecticide would be in the form of a gradient of toxicity showing regression by time as estimated by median lethal doses and residues biologically tested. (Planned for 1971).

IV. Cumulative effect of sub-lethal doses of some insecticides used against the Desert Locust.

The same technique as above would be followed but instead of dosing in a single dose, fractionised doses would be given at varying periods. Attempts towards estimation of rate of detoxication or cumulation of toxiferous ingredients would be made. Trials will be carried out by chlorinated hydro-carbons and organo-phosphorus compounds (planned for 1971).

V. Relation between body fat content and insecticide tolerance in the desert locust.

Phasiometrically differentiated races of the desert locust are being reared under identical conditions, especially of density and nutrition, until group homogeneity is reached. Correlation between somatometry and body fat content would be estimated as well as insecticide tolerance in relation to unit body fat, saturated or unsaturated.

VI. Toxicological Studies on Anacridium aegyptium, L

B. Biology/Phasiology:

I. Phasiometry in the Desert Locust in relation to population density. This research has been going on over almost eight years in order to obtain some range of stability in organ measurements and in somatometric indices as correlated to the factor of density. The study has been carried out under a variety of conditions and on numerous specimens from the laboratory and from natural populations from the field.

The research is finished and results are being statistically analyzed in preparation for publication. The degree of adaptability and variation in some body parts in relation to density and some other factors have been deduced and degrees of confidence for some measurements and indices used in desert locust morphometry are being drawn.

II. Studies on polymorphism in the Desert Locust.

This research is being carried out in preparation for an M.Sc. thesis in acridology. Ecologic factors affecting phase transformation are under study.

III. Colour patterns in Anacridium Hoppers.

The effects of density, environmental conditions (meteorologic and nutritional) and mimicry on coloration are under investigation.

C. Biology/Physiology

I. The effect of some biological compounds as activators or inhibitors on the biocycle and fecundity of the Desert Locust.

Physiological control is a new trend that is giving promising results in insect control in general and which have many approaches either in compounds or application. The study aims in its initial phases at finding out the effects of some endocrinal factors on growth and maturation in order to evaluate thereafter such compounds as would induce hormonal action. So, the study is divided into two parts:-

1. Fundamental experiments to study the role of the endocrine system.
2. The effect of certain synthetic compounds similar to phytohormones or insect hormones by injection (or ingestion) to 4th and 5th instar Schistocerca hoppers within 24 hours from moulting. Data and observations would fall in the following creteria:

Rate of Metamorphic changes, morphometry, rate of sexual maturation, reproduction potential and sexual ratio:

So far, part of the fundamental studies have been carried out:

1. Implantation of extra corpora allata in 5th instar hoppers (within 24 hours from moulting).

3. Highest rate of increase in nymphal weight and generally heavier hoppers resulted after feeding on clover while the lowest were for those fed on Panicum.
4. Periods for sexual maturation: quickest for both sexes on clover, quick for males and slow for females on maize and castor and slowest for both sexes on Panicum and Casuarina.
5. Total number of eggs laid by a single female was greatest by feeding on clover, maize and castor plant, while egg productivity was low when feeding on casuarina or Panicum.

However, there was no notable variation in the average number of eggs per pod except in the case of clover where it was higher.

6. Generally, there was no difference in the incubation period of the produced eggs, though a slight decrease was noted in the case of maize and a slight increase in the case of Casuarina.
7. Fresh weights of hatched progeny: largest on castor plant followed by maize, casuarina, Panicum and clover successively. Dry weights of hatched progeny: Largest on castor plant and smallest on Panicum.
8. There was correlation between the life span of the mothers and the weight of the hatched progeny: the longer the life span, the smaller the weight.
9. Food reserves in the progeny immediately after hatching were highest in cases of feeding on field crop plants and lowest on Panicum.
10. Hatchings of parents fed on clover contained the lowest percentage of body water content while those of parents fed on Panicum contained the highest. This may have its role in survival in desert arid areas.
11. The survival capacity of the starved hatchlings appeared to depend on water and food and water reserves. SC 50 (median survival capacity) was 52.5, 46.6, 56.5, 37.4 and 39 hours for progenies of parents fed on maize, castor plant, clover, casuarina and panicum successively.
12. There was some correlation between the kind of food and the colour of the hatched progeny. The highest number of green coloured individuals was among the progeny of parents fed on clover while there were no green individuals in the case of the castor plant. Another correlation was between the colour of the hatched progeny and their fresh weight. The greens were the lightest in weight, indicating that solitaries are lighter in weight at hatching than gregarious hoppers.
13. Weight fluctuations in adult Schistocerca as related to feeding on some plant foods - throughout adult life is summarized as follows:-

2. Allatectomy in 5th instar hoppers. Although there had been a large percentage of post-operative mortality in the preliminary trials, reaching between 72-90%, yet there were enough survivals for observations.

Hormonal injection with one of the compounds (geberellin) has been applied for this purpose. 5th instar hoppers were injected with 10 microlitres per capitum in varying doses of 1000, 500 or 100 micrograms per hopper of the compound. Rate of development was notably accelerated as the average period of 5th stadium (till adult emergence) was as follows:-

1000	microgrammes	4	days
500	"	6.5	days
100	"	7	days
control		11	days

Some of the insects treated with 1000 microgrammes emerged into precocious deformed adults with short wings not reaching behind the 4th abdominal segments and their size was generally small.

Treatments will be continued with the same compound on other stadia as well as with other compounds such as indol-acetic, indol-buteric and Farnesol.

II. Preliminary studies on the Parthenogenesis in Schistocerca gregaria. (Planned for 1971).

D. Biology/Ecology:

I. The original parental insects were taken from stocks made as homogeneous as possible by being bred under identical conditions of density (crowded) and fed on the same diet (green Sesabania, dry wheat bran fortified with 5% per weight of yeast). Experiments were carried out under thermostatic conditions ($32 \pm 1^{\circ}\text{C}$), relative humidity (60 - 70%) and suitable illumination in a specially conditioned room.

Food plants used were maize (Graminae) and clover (Trifolium alexandrinum, Leguminosae) as crops plants, Panicum turgidum as a graminous desert plant common in many desert locust habitats, the castor plant as a representative for shrubs and Casuarina equisetifolia for trees. Feeding started after hatching and continued throughout the life of the insects.

Following are some of the results obtained:

1. The shortest life cycle was for those hoppers fed on clover and maize (36.9 and 38.6 days); it extended upto an average of 55.8 days by feeding on Panicum and was longest when feeding on the castor plant and casuarina (63.6 and 74.1 days).
2. Highest natural nymphal mortality was among hoppers fed on casuarina (95% followed by castor (86.7%), Panicum (78%), maize (66.7%) and the lowest was when feeding on clover (40.7). The largest rate of mortality was during the first nymphal instar in all cases.

Maturation Time in days		Females				
		means weight increase in mgs.				
		means emergence weight	after 5 days	at Oviposi- tion	after 1st Oviposi- tion	post- mortem
Maize	12.3	1570.3	185.9	1387.1	778.4	600.2
Castor	22.6	1404	600.7	1587.2	1092.2	723.0
Alfa lfa	9.8	2148	639.2	1800.5	977.3	1061.1

		Males			
		means emergence weight	after 5 days	at copulation	Post-mortem
Maize	12.8	1105.9	102.5	345.4	323.2
Castor	22.6	987.3	000	267.1	480.4
Alfa lfa	9.8	1472	130.3	621.7	398.2

II. Predatory Behaviour of the Preying Mantis Sphodramantis bioculatis to the Desert Locust.

Experiments were carried out in the big breeding cage at Dokki under natural conditions mainly during autumn.

The following table summarizes data so far collected:

Stadia of mantis	duration of instar in days	mean no. of Locust eaten/mantis/day					
		I	II	III	IV	V	adult
I	12	-	-	-	-	-	-
II	19	-	-	-	-	-	-
III	27	1/2	3/8	-	-	-	-
IV	32	1-1/5	3/4	5/12	4/17	-	-
V	37	3-1/9	11/8	3/4	4/7	3/7	1/7
VI	50	4-2/3	12/3	1-1/6	5/9	1/3	3/7
adult	70	5	3-1/6	2-3/5	1-5/9	1-1/3	4/9

1. 1st and 2nd instar mantis do not prey on the desert locust but on smaller arthropods such as mites, aphids and jassids.
2. The third instar mantis preys only on 1st and 2nd instar of the desert locust and can eat 14 or 10 individuals respectively during that stage.

3. 4th instar mantis ate only the first four hopper stages and could feed on 38, 24, 13 or 7 individuals respectively on 1st to 4th hopper instars.
4. 5th and 6th instar mantis as well as the adult female can eat any stage of the desert locust.
5. 5th instar mantis could eat 112, 40, 27, 21, 16 or 5 desert locust in its successive instars repectively during that stage.
6. Numbers eaten by the 6th instar mantis are 233, 62, 23, 20, 12, or 16 and by an adult female mantis are 350, 222, 182, 109, 93, or 40.

III. Seasonal natural mortality in the desert locust.

IV. Biological and Ecological studies on the Egyptian tree locust, Anacridium Aegyptium L.

E. Taxonomy

Acridoidae in the Entomological museums of U.A.R.

Collections of the Agricultural Museum, Plant Protection Dept. Faculty of Science (Cairo University) and the Entomological Society of Egypt were studied.

JEDDAH LOCUST RESEARCH STATION

1. Work during early 1971, and plans for the remainder of the year.

Work at the Jeddah Locust Research Station is being currently conducted with the participation of a team from the Anti-Locust Research Centre, London as a result of an Agreement on Cooperation in Locust Research and Control, between the Ministry of Agriculture and Water of the Kingdom of Saudi Arabia and the ALRC.

The Team Leader, the Information and Forecasting Officer and the Biological Research Officer have already taken up their posts at the Locust Research Station in Jeddah and the Insecticide Research Officer and two field Locust Research Officers will be following shortly.

Work in all aspects of locust research and control is being conducted with the full participation of the Saudi members of the Jeddah Research Station. In addition the FAO International Locust Control Centre in Jeddah continues to render valuable assistance, particularly in helping to conduct locust surveys.

Surveys

Great emphasis is laid on both extensive and intensive locust surveys. Different parts of the Kingdom are surveyed, sometimes repeatedly at appropriate times, to study the distribution, numbers, breeding and movements of locust in time and space, and to detect any tendency towards aggregation at an early stage.

The surveys are actively assisted by the FAO Locust Centre and conducted with the participation of officers of the Centres of the Ministry of Agriculture and Water in whose areas surveys are being carried out. In this manner those officers, who are normally responsible for locust reconnaissance in their respective areas, receive in-service training in locust survey, recording and reporting techniques, while the visitors have the benefit of the local officers' knowledge and experience of the area.

Reporting and Forecasting

Close liaison is maintained with the locust information and reporting service at the Jeddah station, which receives and processes the incoming light of this information and the weather reports received from the Saudi Meteorological Services.

Special Studies

In addition to general surveys, Jeddah Locust Research Station also participates in a project mounted by the ALRC on the study of the movements of locusts and other migrant insects on the coastal plain at Jeddah in relation to meso-scale air movements and convergence. Observations are conducted at a series of light-traps extending across the coastal plain to the foothills while simultaneous weather observations especially on temperature and winds are conducted at the same sites. The studies began in November, 1970 and are to be continued until May, 1971.

Intensive Surveys

Intensive ecological studies are undertaken whenever suitable locust populations are found in the field. The aim of these is to increase our knowledge of the ecology, and the fluctuation of free living locust populations and especially to study and establish the threshold densities at which aggregation, conditioning and gregarisation occurs in hoppers and adults under diverse natural conditions.

During January and February, 1971 surveys were conducted of the coastal plain and the foothills of the Tihama south of Jeddah to the Yemen border. Locust populations were encountered at several points but they were everywhere too low for worthwhile intensive studies.

Other Acridoidea

Side-by-side with the studies on the Desert Locust, field studies are also conducted on the biology, distribution, ecology and the economic importance of other Acridoidea. This is a long term study, begun in spring 1969 and by now a reference collection containing about 75% of all the species known for Saudi Arabia has been gathered, and much has been learnt about their distribution seasonal occurrence and abundance. Some species, among them the two Tree Locusts and the Migratory Locust might be regarded as sporadic pests of greater or lesser economic importance.

In addition to studies in the field, observations on some species of grasshoppers are also conducted in cages. In this manner it is hoped to learn more about the different life-forms, their appearance and duration of development.

Other Pests

The enlarged scope of work at the Jeddah Locust Research Station should provide opportunities for useful observations to be made on other insect pests, particularly those which like the Desert Locust show a tendency to seasonal migration in relation to the weather and to some extent share its seasonal habitats.

Many plant pests have been encountered, and some for instance like the Tomato Caterpillar (Heliothis sp. possibly armigera) and the 12 - spotted Melon Beetle (Epilachna Chrysomelina) are of considerable economic importance. It is hoped to conduct specific studies on these and a number of other pests in the future.

2. Laboratory Studies.

A new laboratory has just been established at Kilo ten, Jeddah - Mecca Road, at a site allotted by the Ministry of Agriculture and Water. The necessary buildings are already in existence and their conversion, fitting and equipment is in hand.

Meanwhile locust breeding is continuing in outdoor cages, some placed in the open and others under shelter. Additional rearing is also conducted at Jeddah headquarters, where the incubators are kept; the hatchlings being transferred to Kilo Ten Laboratory on emergency.

The rearing provides adequate stocks for various experiments.

1. Experiments on the effect of various food plants on development.

This experiment was started on 3rd March, and six plants:

Pennisetum millet (dukhn)
Sorghum (durra)
Tribulus alatus (gatale)
Dipterygium glaucum(arfaj)
Panicum turgidum (thaman)
Boerhavia repens

all of which are common food plants of the Desert Locust under natural conditions, are being tested individually for their effect on the development of Schistocerca.

The experiment is started when the hoppers are 24 hours old. This eliminates the initial post-emergence mortality, which as a rule is particularly heavy. One hundred hoppers are placed in 50 cm. cube cages, kept in anti-proofed tables outdoors, and a carefully weighted quantity of fresh food (about 15 - 30 grams) collected from a partly or fully grown but not senescent or seedling plant is placed in water-filled test tubes in the cages. The experiment is conducted in duplicate and a similar quantity of food is placed in an empty cage as control. No extra water or food are provided. The plants from the hopper cages and the control are re-weighed after 24 hours and replaced by a similar quantity of fresh food.

The numbers of hoppers in each instar are counted if possible daily and the numbers feeding on the plant 5 minutes after its introduction into the cage recorded.

The experiment is at too early a stage to permit any conclusions but there seems little doubt that there is considerable variation between the effect of the six different food plants. It is planned to continue the experiment to the end of the life-cycle of the subject insects and thus establish the effect of plants not only on the duration and the survival of the hopper instars, but also on the duration of maturation and fecundity.

It is also planned to test other well-known food plants such as Heliotropium bacciferum (akrir) and Schouwia purpurea (jerjir), not currently available in sufficient quantities. Also it is planned to conduct experiments on food preference, by placing a number of plant species in the cage simultaneously and noting their appetibility to hoppers by counting the numbers feeding on each plant, and measuring the quantities of each plant consumed. This will also provide an interesting comparison between the effect of mixed and pure diets on development.

2. Experiments on Crowding Schistocerca Gregaria with other Acridoidea.

The purpose of these experiments is to observe to what extent gregarisation in Schistocerca gregaria may be promoted by crowding with other species of Acridoidea. Unfortunately due to unfavourable environmental conditions, the wild locust and grasshopper populations were so low that adequate samples could not be procured to start the experiment. At present attempts are being made to establish stocks of such grasshopper species as Cyrtacanthacris tatarica and Truxalis procera and it is hoped to start the experiment in the near future.

3. Control Research

Work in this direction has been suspended awaiting the arrival of the insecticide Research Officer and the necessary equipment. In due course it is hoped to conduct studies on the toxicity of various insecticides to the Desert Locust and on their persistence under natural conditions.

Work will also be conducted on testing various methods of application of insecticides under different field conditions.

It is hoped to extend these studies to some other pests with a view to establishing the most rational methods of their control under given conditions.

APPENDIX II

Trust Fund No. 409 - Near East Desert Locust Control
Statement of account (Provisional) as at 31 December 1970
(expressed in US dollar equivalents)

Receipts

Balance as at 1 January 1970 44,389.82

Add:

Sums received in 1970 83,943.00
Accrued interest 1970 2,818.18

131,151.00

Deduct:

Cash expenditure 1970

Personnel services 13,644.29
Supplies -
Equipment -
Travel -
Contractual services -
Grants and subsidies -

13,644.29

Project servicing costs
5% on Codes II-III,
14% on Codes I-IV-V-VI 1,910.20

15,554.49

Balance as at 31 December 1970

115,596.51

APPENDIX III

TRUST FUND 409

Statement of Contributions from Participating Government as at
28 February 1971

<u>Country</u>	<u>1969/70</u>	<u>1970/71</u>
Bahrain	4,784.00	4,784.00
Iraq	16,464.00	16,464.00
Jordan	11,486.00	11,486.00
Kuwait	12,796.00	12,796.00
Lebanon	8,970.00	3,264.00
Qatar	5,506.00	5,506.00
Saudi Arabia	-	-
Southern Yemen	360.00*	-
Sudan	14,934.00	-
Syrian Arab Republic	5,616.00**	-
United Arab Republic	26,032.00	-
Yemen Arab Republic	-	-
	<u>106,948.00</u>	<u>54,300.00</u>
<u>Other contributions</u>		
League of Arab States	<u>4,600.00</u>	<u>-</u>
	111,548.00	54,300.00

* People's Democratic Republic of Yemen: reduced contribution agreed to by 1st Session of the Commission.

** Syrian Arab Republic: pending acceptance by Government agreed scale of contributions.

APPENDIX IV

FAO TRUST FUND 409

COMMISSION FOR CONTROLLING THE DESERT LOCUST IN THE NEAR EAST

ANNUAL BUDGET FOR 1971 and 1972

<u>Expenditure headings</u>	<u>FAO "Object of Expenditure" codes</u>						<u>Total</u>
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	
Survey, reconnaissance and control	3,000	-	5,000	20,000	5,000	-	33,000
Reserves of insecticides and equipment	-	32,000	-	-	2,000	-	34,000
Research, Visits, training	1,000	-	3,000	4,000	4,000	11,000	23,000
International Locust Centre, Jeddah	13,000	-	-	7,000	5,000	-	25,000
Regional coordination	-	-	-	7,000	3,000	-	10,000
	<u>17,000</u>	<u>32,000</u>	<u>8,000</u>	<u>38,000</u>	<u>19,000</u>	<u>11,000</u>	<u>125,000</u>
Project Servicing Costs	5% on \$ 40,000 = 2,000						13,900
	14% on \$ 85,000 = 11,900						<u>138,900</u>
Unallocated							<u>160</u>
							<u>139,060</u>

The above budget assumes that all the above countries will have joined the Commission by 1 January 1972 and will have pledged contributions to the Trust Fund 409. To the extent that any countries have not done so, it will be necessary to scale down expenditure allocations proportionately.

Subject to the total commitments at any given time not exceeding the total contribution pledged and received at that time, the Director-General shall have discretionary powers to vary the allocations between one expenditure heading and another as may be necessary to meet the changing locust situation. All such variations shall be reported and justified when submitting annual accounts to the Commission.

Note: FAO "Object of Expenditure" codes

- | | | | |
|-----|-------------------|----|------------------------------------|
| I | Personal Services | IV | Travel |
| II | Supplies | V | Contractual services |
| III | Equipment | VI | Grants and subsidies (fellowships) |

RESOURCES AVAILABLE WITH VARIOUS NATIONAL ORGANIZATIONS IN 1971 FOR DESERT LOCUST CONTROL.

	PERSONNEL		EQUIPMENT					VEHICLES			INSECTICIDES			AIRCRAFT		ANNUAL BUDGET
	Techni- cal staff	General staff	Power dusters	Power dusters sprayers	Hand dust & sprayers	Exhaust sprayers	Light	Medium	Heavy	Oil C. x 00 liters	Dust M.T.	Bait M.T.	No.		Curr x 000	
Bahrain*	3	19	8	9	35	2	4	-	2	-	1	-	-	-	BD	(9
Iraq*	105	-	-	150	-	10	40	50	5	150	65	100	16(1)	-	IP	50**
Jordan*	82	35	5	351	35	3	15	-	6	54	60	200	2(2)	JD	47	
Kuwait*	33	10	25	29	20	13	13	-	14	129	80	-	-	KD	not lmt	
Lebanon*	15	37	5	16	50	-	..	-	..	-	20	-	-	..	..	..
Qatar	1	3	-	-	-	-	-	-	3	18	8	25	-	..	..	..
Saudi Arabia	16	97	56	234	125	45	343	-	146	2700	800	2000	-	..	..	1
P.D.R. of Yemen	(18)	(16)	3	-	104	16	6	-	2	182	70	200	-	SR	3000	
Sudan *(a)	174	763	-	250***	-	25	15	10	10	720	-	1000	8(4)	US\$	9.7	
(b)	-	-	-	-	-	17	17	-	-	370	5	-	-	-	-	-
Syrian A.R.*	120	40	150	70	-	6	90	-	20	600	400	300	6(3)	..	..	..
U.A.R.	70	259	13	8	97	13	32	-	65	514	57	42	-	..	..	150
Yemen	(32)	-	2	4	-	12	9	-	6	50	48	40	-	..	..	54
Total	669	1279	267	1121	466	162	594	60	279	5487	1614	3907	32			

32
18
16
6

* Resources for plant protection and locust control
 ** For locust control only excluding personnel and allowances.

*** For both dusting and spraying
 (a) National unit
 (b) DLCO-EA unit

(1) 4 Pipers, 4 Pawnees, 2 Helicopters, 6 Czechosl.
 (2) 1 Piper Cub, 1 Helicopter
 (3) 4 Pipers Super Cub, 2 Pawnees
 (4) 2 Cessna 180, 1 Cessna 206A, 2 Pawnees,
 3 Piper Super Cub

APPENDIX VI

LIST OF WORKING PAPERS

AGP:DL/NE/X/71/2	Training
AGP:DL/NE/71/1	The Desert Locust Situation in the Near East and neighboring countries
AGP:DL/NE/71/2	A view of the Desert Locust Survey and Control activities carried out by the Member Countries during 1970/71
AGP:DL/NE/71/4	Programme of Work and Budget for 1971 and 1972
AGP:DL/NE/71/5	Assistance to the People's Democratic Republic of Yemen.

