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9. ABSTRACT

In recent months, the increased demand for emergency assistance in the Sahel states has suggested certain conclusions which bear on the medium and long-term recovery and development of the Sudano-Sahelian zone. The present capability of the Sahel states to manage common, annual crop pests is extremely limited. This condition, where it exists, will tend to neutralize attempts at increasing crop production. The Sahel Governments are aware of the crop pest problem, and many are ready to seek a long-range solution to it. The members of the donor community are also aware of the problem.

The objectives of the Conference were:

(1) To establish a technical understanding of the problem. While any one concerned organization possessed valuable information, there had not been a comprehensive compilation and exchange of such information.
(2) To develop a technical consensus from the standpoint of professional pest control management on the most appropriate approaches to the solution to the problem.
(3) To help create a forum or network for continued exchange of information bearing on the problem.
(4) To gain some indication of the kind of assistance donors might provide.

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# Report of the

# Sahel Crop Pest Management Conference

## Held at the invitation of the

## Agency for International Development

## United States Department of State

## Washington, D.C., U.S.A.

## December 11-12, 1974

Ray F. Smith and David E. Schlegel,

Rapporteurs

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## Acronyms Used in This Report

AFR/CWR Bureau for Africa, Office of Central and West African Regional Affairs, USAID

AID see USAID

APHIS Animal and Plant Health Inspection Service, United States Department of Agriculture, Washington, D.C.

CIDA Canadian International Development Agency, Ottawa, Canada

COPR Centre for Overseas Pest Research of the Overseas Development Ministry, Wrights Lane, London W8 5SJ, United Kingdom

FAO Food and Agricultural Organization of the United Nations, Rome, Italy

IBRD International Bank for Reconstruction and Development, 1818 H Street N.W., Washington, D.C.

IRAT Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières, Paris, France

OCLALAV Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviare, Dakar, Senegal

OICMA Organisation Internacional sur Le Criquet Migrateur Africain, Bamako, Mali

ORSTOM Office de la Recherche Scientifique et Technique Outre-Mer, Paris, France

OSRO Office Sahelian Relief Operations of FAO

TA/AGR Bureau for Technical Assistance, Office of Agriculture, USAID

UNDP United Nations Development Programme, New York, New York

USAID Agency for International Development, United States Department of State, Washington, D.C., USA

WARDA West Africa Rice Development Association, Monrovia, Liberia

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## I. INTRODUCTION

In recent months, the increased demand for emergency assistance in the Sahel states has suggested certain conclusions which bear on the medium and long-term recovery and development of the Sudano-Sahelian zone.* The present capability of the Sahel states to manage common, annual crop pests is extremely limited. This condition, where it exists, will tend to neutralize attempts at increasing crop production. The Sahel Governments are aware of the crop pest problem, and many are ready to seek a long-range solution to it. The members of the donor community are also aware of the problem. They have already contributed to resolving local outbreaks and would probably support a longer term solution. Up to now there have been no overall proposals advanced for the technical solution of the problem, which of necessity must provide for active efforts in each country as well as a coordinated regional approach. Consequently, it seemed appropriate, therefore, to take the initiative to obtain a consensus among the interested donor agencies and African technicians as to a technically feasible approach to the solution of the problem. The United States decided to exercise this initiative. Invitations were subsequently submitted to technicians and technician/administrators to attend this Conference.

The objectives of the Conference were:

(1) To establish a technical understanding of the problem. While any one concerned organization possessed valuable information, there had not been a comprehensive compilation and exchange of such information.

(2) To develop a technical consensus from the standpoint of professional pest control management on the most appropriate approaches to the solution to the problem.

(3) To help create a forum or network for continued exchange of information bearing on the problem.

(4) To gain some indication of the kind of assistance donors might provide.

* The Sudano-Sahelian zone for these purposes includes ths sub-Saharan ecological zone stretching from Senegal to Ethiopia.

The Steering Committee for the Conference consisted of Irving Rosenthal, Chairman; Lloyd Clyburn, Vice Chairman; Donald Shallow, Executive Secretary; Channing Fredrickson; and Joseph Gentry. Donald Shallow was Chairman of the Conference. Ray F. Smith and David E. Schlegel, of the University of California/USAID Pest Management and Related Environmental Protection Project served as Rapporteurs. A list of particpants in the Conference is provided in Appendix A.

Dr. Samuel C. Adams, Jr., Assistant Administrator, USAID, welcomed the participants and indicated that it was the wish of the United States to assist in having a productive conference - one which would contribute to understanding of the problem and would be of use to the Sahel states in increasing their capacity to manage their own affairs. He observed that while the severe and prolonged drought brought the fact of the food deficit in the Sahel states to the attention of the world, we have also become critically aware that insects and other crop pests create and maintain serious unacceptable food shortages. He observed further that in so much as the drought did bring world attention to the Sahel food problem, influencing no doubt the presence of the participants at this Conference, the drought itself might be considered to have had certain positive, beneficial effects in the long run.

## II. THE PROBLEM

Most of the first day of the Conference was devoted to a review of the nature of the pest problems, their causes, and the special features of the handling of pest problems in the Sudano-Sahelian zone. Many participants contributed to this discussion, and this is a brief summary. Major background papers were presented by Gurdas Singh (see Appendix B) and G. Popov (see Appendix C). These two papers emphasized the grasshopper problem, but as many discussants brought out, other pest problems are involved in the total pest problem facing the Sudano-Sahelian states.

### A. THE PESTS

1. Grasshoppers - The 1974 monsoon season produced a massive outbreak of grasshoppers. Widespread damage was caused to a wide range of crops by many species (about 40 involved and 15 of major significance) of grasshoppers with diverse life cycles and ecological

requirements. Almost all crops were attacked. In some instances there was some manifestation of gregariousness and migration. Grasshoppers are a chronic problem in the Sudano-Sahelian zone, but the scale of the 1974 outbreak was exceptional. Apparently several ecological factors favor increase of grasshopper populations to high levels in relatively small areas. A major problem of control is to locate and define these pockets of grasshoppers. Although grasshoppers are systematically and evolutionarily related to locusts, they are different ecologically and biologically and therefore require different approaches for their control.

2. Graminivorous birds - A number of species of birds but especially the weaver bird, Quelea quelea, are of increasing importance in the region. In many areas, bird depredation represents the most serious plant protection problem. Of particular seriousness is the loss to millet, sorghum and rice.

3. Stem boring caterpillars - A number of lepidopterous larvae bore in the stems of millet and sorghum in the Sahelian zone. Young plants may be thoroughly riddled and collapse; although older plants are not always killed, yields are reduced significantly. These would appear to have increased in importance in recent years, especially Acigona ingefusalis, although precise information does not appear to be available.

4. Head caterpillars or "earworms" - At least three species of caterpillars attack the panicles of sorghum and millet. In the past, these losses have been estimated to be 20 to 30 percent of the crop in Niger and other parts of the Sudano-Sahelian zone. In 1974, these losses were reported to have intensified, but the details of the infestations and the exact species involved are not known.

5. Locusts - The potential of invasions of the migratory locust and the desert locust remain, but during the past year the level of this plague was at a low ebb.

6. Other pests - A number of other insect pests take their annual toll from the Sudano-Sahelian farmers. These include midges and shoot flies as major problems on sorghum and millet. Frequently, one-third or more of the sorghum/millet crops are lost to plant diseases (principally smuts and downy mildew) in the Sudano-Sahelian states. The grassy weeds and witchweed, Striga hermontheca, are severe problems. Finally the impact of rodents in this area has not been evaluated. It seems likely that these other pests pose a more serious threat to crop production in the Sahel than is generally recognized at this time. If the pests causing the dramatic losses can be controlled, the full impact of diseases, weeds and other insects will be more apparent.

B. EXPLANATIONS OF RECENT OUTBREAKS

Except for locusts, the causes and mechanisms of outbreaks of these pest species or even their seasonal life-cycles in the Sudano-Sahelian zone are at present practically unknown. One conjectural explanation is that the concentration of the population by the drought followed by good rains in some areas last year, released the naturally high reproductive potential of certain species. The intensification of agriculture in certain areas (i.e., introduction of irrigation) and poor cultural practices (e.g., lack of rotation) undoubtedly have exacerbated the pest problems.

C. FORECAST FOR THE 1975 SEASON

In view of the limited knowledge on the factors influencing pest outbreaks in the Sudano-Sahelian zone, any forecast must be given with considerable reservation. It is highly likely that the various pest species are now, at the end of the 1974 season, present in larger numbers than they were at the same time a year ago. Therefore, should the same or more favorable conditions prevail in 1975 as did in 1974, an even larger outbreak will most probably result.

D. SPECIAL PARAMETERS OF CROP PROTECTION IN THE SUDANO-SAHELIAN ZONE

1. While most of the Sudano-Sahelian states have a rudimentary plant protection service, they do not have the institutional capabilities to maintain surveillance of the pest problems, to

develop appropriate attacks on the pests, or to react quickly and effectively when a pest outbreak occurs.

2. With the exception of locusts, Quelea, and to a limited extent certain grasshoppers, the pest problems are typically national (i.e., intra-country) problems rather than regional (i.e., inter-country) or international problems.

3. The regional plant protection organizations (OICMA and OCLALAV) have a primary mandate to prevent or eliminate outbreaks of the plague locusts and Quelea.

4. The nature of terrain and the transport system in the Sahelian zone makes surveillance extremely difficult. Furthermore, supplies of equipment and pesticides must be in place in the potential outbreak districts (not the capitals and ports) prior to the start of the monsoon (i.e., before June 1).

5. The 1974 outbreaks have left the region seriously depleted of available supplies of equipment and pesticides.

6. Training and retraining of technical and non-professional levels of crop protection workers is seriously needed. This training should stress field operations and ecological aspects of plant protection.

7. It is difficult to attract young people to the crop protection profession.

## III. BRIEF SUMMARY OF CURRENT CROP PROTECTION ACTIVITIES IN SUDANO-SAHELIAN ZONE

### A. Programs

1. Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviare (OCLALAV). This regional organization has the primary responsibility for control of the Desert Locust, Schistocerca gregaria, and the weaver birds, Quelea spp. It has many operational bases throughout the Sahel with headquarters at Dakar, Senegal. Although it is not officially responsible for grasshoppers, it has demonstrated its ability and willingness to conduct campaigns against grasshoppers, although it suffers from a chronic shortage of funds. OCLALAV has been involved in offering courses in plant

protection for the Sahel states (e.g., a training course given in French at Dakar will be offered in February, 1975), and this resource could be reinforced. It has a radio network to facilitate communication in the region. With external emergency assistance, OCLALAV treated 20,000 ha for grasshopper control. For additional detail on OCLALAV see Appendices D and E. Plans for projects and proposed budgets are given in Appendices F and G.

2. Organisation Internacional sur le Criquet Migrateur Africain (OICMA).

This regional organization has the responsibility to monitor and to mount campaigns against the African Migratory locust, Locusta migratoria migratorioides, in 20 countries. In the Sudano-Sahelian zone it coordinates its activities with that of OCLALAV. The two organizations can use their equipment, pesticide supplies and personnel in emergency grasshopper control if they are not engaged against the locusts, however since OCLALAV is also short supplied, obviously their combined resources fall short of the needs. The administrative headquarters for OICMA is Bamako, Mali. The principal research and control base is located at Kara, Mali approximately 400 kilometers northeast of Bamako. A satellite base is being established at Maiduguir, Nigeria with a secondary base at Garoua, Cameroon. For additional details see Appendix H.

3. The Food and Agricultural Organization (FAO) is the implementing agency for the UNDP/FAO Quelea bird project headquartered in Dakar, Senegal and the UNDP/FAO project on training in crop protection. These training activities are conducted in the Sudano-Sahelian zone in cooperation with OCLALAV and OICMA. Training activities also include courses on stored product pests.

4. The West Africa Rice Development Association (WARDA), with headquarters in Monrovia, Liberia, has included crop protection research in its program to increase rice production in 13 West African countries.

5. Canada. CIDA is assisting in establishing plant quarantine and plant protection programs in Niger and Upper Volta, and anticipates including a plant protection element in a cereal grain project in

Mali.

6. France. ORSTOM has conducted research on plant protection in several francophone Sahel states. ORSTOM and IRAT have maintained laboratories in Senegal, Niger, Mali and elsewhere in the Sudano-Sahelian region.

7. United Kingdom. COPR of ODM has been working closely with the regional locust organizations and has other projects on birds, grasshoppers and termites in northern Nigeria.

8. United States. In recent years, assistance has been limited to the grasshopper outbreaks, largely through OSRO.

9. The national programs of the Sudano-Sahel states are very limited in response capability to handle pest problems. They lack trained people, equipment, transport and supplies. Many have plans to restructure their plant protection services but need assistance.

B. Pattern

After discussion by the Conference of the existing survey and control strategies practiced by national and regional plant protection organizations, the following pattern emerged:

1. Initial action against pests in the Sudano-Sahelian zone is taken by the national plant protection services. They are also responsible for making surveys of the crop areas, identifying pests and reporting on their occurrence.

The Conference recommended that the countries of the zone be requested to centralize their information particularly on the migrant pests and to send copies of reports to the regional organizations.

2. The regional plant protection organizations implement surveillance in their normal areas of operation and particularly in areas not normally covered by national services. They maintain operational bases and stocks of insecticides, fuel and control equipment. They undertake control of any infestations discovered directly by them and of any others where their help is requested by two national services. Regional organizations insure centralization and processing of information and provision of forecasts. The regional organizations insure popularization

of information on acridial infestations, recognition of different species and assessment of infestations both in their own area of operation and by cooperation with national teams. Some in-service training is provided.

The Conference welcomed these activities and recommended the appointment of one and two specialists (nine man months) familiar with the ecology of the Sudano-Sahelian zone and its pest problems to coordinate the efforts of the national and regional organizations. This will help a balanced overall assessment of the situation and the concentration of effort where it is most needed. OSRO is recommended as the focal point for the implementation of the aid program.

## IV. APPROACHES TO DEVELOPING CROP PEST MANAGEMENT CAPABILITIES IN THE SUDANO-SAHELIAN STATES

### A. Regional Development and Assistance

1. FAO. William Furtick, Chief, Plant Protection Service, presented an overall analysis of the problems stressing long-term needs. There was general agreement that national programs should be strengthened; without national capability, the national program is weakened. At the regional level there is a need for manpower training, emergency control operations, exchange of information, adaptive research, and the development of coordinated policy and planning. The research needs include basic studies on the relationship of the entire pest complex, control strategies and the very neglected area of implementation stretagies. In the area of development of policy and planning, there is a great need for integration of pest control into the total picture of agriculture and development. The plant breeding programs at a national scale have often left out pest control, and as a result, new problems in pest control have not been anticipated. Land use and irrigation development policy should include the impact on pest control and pest problems. There is also a need for regional coordination in the legislative area because it is impractical to have each country set up its own legislative program.

At the regional level there are needs for planned, sustained and coordinated efforts in the pest control area. There is presently a general lack of coordination between donor groups. One problem that seemingly could be eliminated or ameliorated by modified coordinated policy is the blocking of young qualified professionals entrance to regional or national plant protection service simply by high requirements for years of service. Also in this planning there is a lack of interdisciplinary coordination, and all of this culminates in the lack of information for good policy and planning. There are a number of problems in establishing this coordination which include the specific interest of the donors, limitations within the FAO system, and the research orientation for the Consultative Group. The future looks much better because of certain developments in the pest control area at the World Food Conference and also the plan that originated in Bellagio last spring which has since been modified considerably within the FAO system. A new international program is being proposed by FAO to coordinate and strengthen the national programs, to strengthen regional structures and to develop information exchange. The program elements in this overall plan, which have not been finalized, include small or regional secretariats with advisory committees and coordinated projects, a governing body which would include both the donors and technical authorities, and the FAO coordinating secretariat which would operate under the advice of the coordinating board. Furtick also indicated that 24-28 February 1975 FAO will have an Ad Hoc Government Consultation on Pesticides in Agriculture and Public Health as a follow-up to certain recommendations which were made at the World Food Conference. A copy of the draft invitation to this ad hoc consultation was distributed to the participants and is attached as Appendix I.

2. United Kingdom. Clifford Ashall, Assistant Director, COPR, indicated that they have long had good associations with

OICMA and OCLALAV and are planning additional short-term and long-term activities in the multilateral sector. Research and training needs emphasis, and these activities need to be integrated with control operations. The UK feels that emphasis should be placed on bringing together existing knowledge on the pests of the region, in addition to grasshoppers, and incorporating this information into effective programs.

3. France. Professor Leberre indicated that the French intend to send a team of four experts to study the problems in the Senegal and then later to Mali and Cameroon. This team will work with OCLALAV.

B. National Development and Assistance

1. Canada. CIDA indicated that its first priority was in support of the national programs, particularly in Niger, Upper Volta and Mali. They would be anxious to coordinate their program with that of the other bilateral programs.

2. UNDP. Davidson indicated that UNDP works with the national governments in programming their national plans and helps them construct their total program. He indicated that the approach described by Furtick would be helpful in all of these coordinating activities.

3. United States. Joe Gentry of APHIS presented a proposal for a regional pest management project in Central West Africa which would be implemented by the United States Department of Agriculture through a participating agency agreement with USAID. Gentry proposed a regional activity to accommodate coordinated planning and centralized training and bilateral projects with participating country governments. The project would provide technical assistance, training, equipment, materials and limited other costs. This proposal is attached as Appendix J.

## V. ANALYSIS AND CONCLUSIONS

The Conference was divided into two committees to consider short- and long-term approaches to the pest problems of the Sahel.

The committees met separately and prepared their reports. The reports were reviewed by the entire Conference and after minor modification, were accepted. The members of the Committee for Short Range Planning were Yehouessi, Abdallahi, Cavin, Lauzon, Pouliot, Singh, Roy and Popov, Chairman. The members of the Committee for Long Range Planning were Schlegel, Smith, Gadbois, Gentry, LeBerre, Diagne, Roy and Ashall, Chairman. The reports of the committees are as follows:

A. Near Term Problem

1. Forecast and anticipated problem

The Conference accepted the Forecast for 1975 given in the FAO paper, (Appendix B, p. 7), as realistic. It considered that: a) the scale of the infestation is likely to be in the order of 500,000 ha; b) at least half will be in small scattered pockets requiring ground operations; the remainder as large infestations treatable by air; and, c) provisions should be made by 1 June 1975 and be available until end of the year.

2. Requirements

a. National Programs

The Conference recommended that the requests for assistance presented by the Sahelian countries by given serious consideration. Four countries, Mauritania, Mali, Cameroon and Senegal have submitted their requests which follow:

| COUNTRY | ITEM | QUANTITY | ESTIMATED COST (thousands FrsCFA)* |
|---|---|---|---|
| Mauritania | HCH 25% dust | 300 tons | 37.500 |
| | Fenitrothion 50% | 25.000 litres | 25.000 |
| | Knapsack sprayers (Holder type) | 50 units | 2.500 |
| | Exhaust nozzle sprayer | 20 units | 2.500 |
| | | | 67.500 |
| Mali | HCH 25% dust | 320 tons | 40.000 |
| | Hand dusters (type Procall Rex) | 320 tons | 3.750 |
| | | | 43.750 |
| Cameroon | HCH 25% dust | 150 tons | 18.750 |
| | Fenitrothion 50% | 10.000 litres | 10.000 |
| | Knapsack sprayer (Holder type) | 50 units | 2.500 |
| | Hand dusters (type Procall Rex) | 100 units | 1.250 |
| | | | 32.500 |

* 230 FrsCFA = approximately $1 U.S.

| COUNTRY | ITEM | QUANTITY | ESTIMATED COST (thousands FrsCFA) |
|---|---|---|---|
| Senegal | HCH 25% dust | 300 tons | 37.500 |
| | Fenitrothion 50% | 10.000 litres | 10.000 |
| | Malathion | 10.000 litres | 12.000 |
| | Timul 35 (Endosulfan) | 20.000 litres | 15.200 |
| | Bran | 200 tons | 2.600 |
| | Post Radio CSF-BLU-CBL52 | 7 units | 5.250 |
| | Dust sacks | 10.000 units | 1.500 |
| | Exhaust nozzle sprayer | 10 units | 1.250 |
| | Knapsack sprayers (Holder type) | 125 units | 6.250 |
| | Hand dusters (Procall Rex type) | 250 units | 3.125 |
| | Truck UNIMOG 416 | 10 units | 35.000 |
| | | | 129.675 |

RECAPITULATION

| ITEM | QUANTITY | ESTIMATED COST (thousands FrsCFA) |
|---|---|---|
| HCH 25% dust | 1.070 tons | 133.750 |
| Fenitrothion 50% | 45.000 litres | 45.000 |
| Malathion | 10.000 litres | 12.000 |
| Timul 35 (Endosulfan) | 10.000 litres | 15.200 |
| Bran | 200 tons | 2.600 |
| Post Radio CSF-BLU-CBL52 | 7 units | 5.250 |
| Dust sacks | 10.000 units | 1.500 |
| Exhaust nozzle sprayer | 30 units | 3.750 |
| Knapsack sprayer (Holder type) | 225 units | 11.250 |
| Hand sprayer (Procall Rex type) | 650 units | 8.125 |
| Truck UNIMOG 416 | 10 units | 35.000 |
| | | 273.425 |

The remainder: Dahomey, Gambia, Niger, Chad, Upper Volta and Togo are formulating their requests, while Nigeria and Ghana may also possibly do so. It is recommended that provisions be made on a scale comparable to the requests already received made for these potential demands.

Aid should also be available for the control of agricultural pests other than grasshoppers.

b. OCLALAV

The request for assistance by OCLALAV was discussed and recommended with certain amendments. These provisions covered only ground operations. The estimates for aerial operations are presented in "d"

below and are to be divided between OCLALAV and OICMA.

| | ESTIMATED COST (thousands FrsCFA) |
|---|---|
| Insecticides - | |
| Replacement of quantities utilized in 1974 is about 80,000 litres with choice according to availability and price between Fenthion ULV and Folithion ULV. | 120.000 |
| Vehicles - | |
| Replacement of the vehicles used and augmentation of control potential. | |
| Vehicles for treatment and intermediate carrier. | |
| 15 UNIMOGS Diesel 416 | 60.000 |
| and vehicles for surveillance. | |
| 15 Land Rover Pick-up Diesel | 22.000 |
| | 82.000 |
| Radio Equipment - | |
| For communication with Direction General, group and control team. | |
| 2 transmitter/receivers BLU 200 W | |
| 15 transmitter/receivers BLU 50 W for vehicle Estimate = | 18.000 |
| | 220.000 |
| Operational Costs | |
| Vehicles - | |
| For surveillance, ground treatments and logistic support of plane. | |
| Costs for fuel, oil, spare parts, tires | 10.000 |
| Personnel - | |
| Seasonal personnel, field expenses. | 15.000 |
| | 510.000 FrsCFA |

c. OICMA

The request for assistance presented by OICMA was similarly discussed and supported with the amendment that due to inevitable delay in delivery, the aircraft should be hired, not purchased. This item is covered under "d" as follows:

The materials and products below should be put at the disposal of the Organization no later than the end of May 1975 in order to permit effective intervention against the acridian infestation at the beginning

of the rainy season.

Aircraft

2 agricultural planes - Cessna 185 AGWAGON or Piper Pawnee

300 flight hours helicopter for the period July-December 1975

Ground transportation

2 all-terrain trucks, 10 tons

6 Mercedes pick-ups, UNIMOG 416

Insecticides

50,000 litres of fenitrothion or Dursban, formulation ULV

Radio Equipment

2 transmitter/receivers 400 watts

30 transmitter/receivers (portable) 3 W

d. Aerial Treatment by OCLALAV and OICMA

Aircraft

4 Helicopters (Evergreen) for survey only

2 OICMA, 2 OCLALAV

Cost $300/flying hour

50 hours/month x $300 per hour = $15,000

$15,000 x 5 months = $75,000 for aircraft

$75,000 x 4 helicopters - - - - - - - - = $300,000

Transportation to and from site for 6 people and 4 helicopters x $25,000 = 100,000

6 people @ $30.00 per day x 150 days = 27,000

$427,000

Fixed wing aircraft and insecticides to treat 225,000 ha.

5 Aircraft (3 OCLALAV, 2 OICMA)

Operational cost $50/flying hour excluding pilot costs -

5 mo. x 150 flying hours per aircraft = 750 flying hours.

Total 750 x 50 x 5 = $187,000

Insecticides

Insecticides (Malathion or equivalent)

28 oz/ha. ULV = 6.2 ha./gal. (U.S.)

225,000 ha. ÷ 6.2 = 36,290 gal. (U.S.)

36,290 x $7/gal. = $254,032

Transportation estimated (surface) - $50,000

| Total Costs | |
|---|---|
| Helicopters and support personnel and transportation | $427,000 |
| Aircraft (fixed wing) Operations expenses (less pilots) | 187,500 |
| Insecticides | 254,032 |
| Transportation of insecticides | 50,000 |
| | $918,532 |

Plus personnel, other equipment, etc.

In view of their cost of operation it was recommended that the helicopters be primarily used in flood areas.

B. LONG TERM REQUIREMENTS FOR PLANT PROTECTION

1. Institutional Capability

It was agreed that it is absolutely essential for each country to develop its own institutional capability to maintain surveillance and control its crop pests.

2. Coordinating Mechanism

The Conference recommended that a special coordinating committee be established with reference to plant protection in the Sahelian zone. This committee would review progress and maintain coordination of the program. It was agreed that FAO be invited to accept responsibility for arranging annual meetings of this committee and keeping its records. It was further recommended that the committee would include representatives from the donors and the regional plant protection organizations. The exact composition would be determined following consultations with recipient governments and other appropriate organizations.

3. Resource Allocations

It was agreed that both regional and national organizations should receive support but that the levels of support should be related to specific needs and capacities of the recipients to utilize the aid. Resources should be allocated to meet operational requirements, training and research.

a. Operational needs

It was recommended that support for OCLALAV and OICMA should be provided on a long term basis in order

to maintain their viability in their present role. The aim however is to enable these organizations to become self-supporting in the not too distant future. Consideration should be given to those organizations accepting responsibility for some aspects of training and research. A mechanism should also be sought whereby the facilities of the organizations could be used in control operations against pests other than locusts when not occupied by locust outbreaks.

The need was recognized for the development of sound infrastructures in national plant protection programs which would require varying support in relation to the needs of particular countries. It was agreed that urgent attention be given to the establishment of a pest surveillance and information network for the region.

b. Training needs

It was recognized that a continuous program of training would be required at several levels but that there should be greater emphasis on practical field training than on academic training.

c. Research needs

It was emphasized that maximum use should be made of existing information and that future research should emphasize adaptive* research (as contrasted to applied* and basic* research) and be oriented towards the solution of the immediate survey and control problems.

* For these purposes and recognizing the interdependence among the three, basic research is the pursuit of new knowledge without reference to an applied goal, applied research is the application of basic knowledge in new ways to solve a defined applied goal, and adaptive research is the modification of existing technology and the utilization of knowledge to meet the requirements of local conditions.

It was appreciated that other national and international research organizations formed part of the research network within the region and consideration should be given to an annual Sahelian plant protection research conference (perhaps to be held in conjunction with the meeting of the proposed coordinating committee).

4. Duration and phasing of program

It was recommended that support be provided for the above activities for a projected period of at least 5 years, but because of the nature of the region and likely development of plant protection problems, the program should be re-evaluated annually.

It was agreed that the detailed objectives and requirements of the program would need to be worked out in the near future (perhaps by a special working party to be organized by FAO at the Ad Hoc Consultation on Pesticides in Agriculture and Public Health to be held in Rome in February 1975). The USAID should be invited to prepare, in consultation with other donors, a working paper for study by representatives at this meeting.

## Appendix A.

Participants in the Sahel Crop Pest Management Conference Agency for International Development, United States Department of State, Washington, D.C. December 11-12, 1974

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Appendix B.

## The 1974 Outbreak of Grasshoppers in Western Africa

By Gurdas Singh

### 1. INTRODUCTION

1. During the last three years world attention has been focused on the severe drought and the resultant famine which affected the Sahelian zone of Western Africa from the Sudan to the Atlantic Ocean. The 1974 monsoon was good and high hopes were held of bumper harvests but in many parts the harvests fell far short of expectations due to exceptionally heavy attack by grasshoppers in the Sahel and the adjacent areas of Sudan. Before examining the history of this outbreak, a word may be said about the nature of the grasshopper problem in general.

The Grasshopper problem in West Africa

2. Even in normal years grasshoppers are regarded as important pests of agriculture in most of the west African countries. The problem is a chronic one; it involves many areas, types of environment and crops and a score of species of grasshoppers with a wide range of biological and ecological characteristics. Probably the most important are the species associated with the better watered heavier soils, where a variety of staple and cash crops are raised. It appears that no crop is entirely immune from grasshopper attack though the cereal crops are perhaps on the whole more vulnerable. Some grasshopper species are preferentially graminivorous, others horbivorous yet others feed readily on either and could be called omnivorous. Table 1 lists the principal grasshopper species and crops. The observed preferences for each crop are indicated and are tabulated acoording to the type of soil with which they are predominantly associated.

The timing and nature of grasshopper damage

3. Grasshopper damage tends to be most severe early and late in the growing season. At the beginning of the monsoon, the species surviving the dry season as adults, e.g. most of the true locusts (Schistocerca, Locusta, Nomadacris, Anacridium) and such generally mobile grasshoppers as Aiolopus simulatrix and Catantops axillaris arrive at the site of the rain, or emerge from their refuges in the cracks of the soil, tufts of vegetation, etc., and due to the general scarcity of green vegetation are readily attracted to the early crops. Their ranks are soon swollen by the many species which hibernate as eggs among them Cataloipus, Hieroglyphus, Kraussaria, Oedaleus, Cyrtacanthacris, Amphiprosopia, Orthochtha and Eyprepocnemis. Early damage tends to be severe as the young plants are very vulnerable and sometimes repeated replantings are repeatedly destroyed. Later, as the plants grow larger they are better able to withstand the attack of grasshoppers and in any case, with the development of the natural habitats, the grasshoppers tend to leave the crops temporarily relieving the pressure. The attacks later in the growing season may be partly due to population pressure and partly to desiccation of the natural habitat. The grasshoppers

Table 1

| Grasshopper species | Clay — Sand Rice | Sorghum | Maize | Millet | Clay — Sand Cotton | Beans | Cassawa |
|---|---|---|---|---|---|---|---|
| Oedaleus senegalensis | x | x | xx | xxx | | | |
| Pyrgomorpha cognata | | x | x | xx | xx | xxx | ? |
| Catantops axillaris | | x | xx | xx | x | x | xx |
| C. haemorhoidalis | | x | xx | xx | x | | |
| Kraussaria angulifera | | xx | xx | xxx | xxx | xx | x |
| Zonocerus variecatus | ? | | | | | xx | xxx |
| Cyrtacanthacris aeruginosa | x | xx | xx | | xxx | ? | ? |
| Eyprepocnemis sp. | x | x | xx | | ? | ? | ? |
| Cataloipus sp. | x | xx | xxx | | | | |
| Amphiprosopia gwynni | x | xx | xxx | | | | |
| Orthochtha venosa | xx | x | x | | | | |
| Hieroglyphus daganensis | xx | xx | xxx | | | | |
| Aiolopus simulatrix | ? | xxx | xx | | | | |
| **Locust species** | | | | | | | |
| Schistocerca gregaria (Desert Locust) | ? | xx | xxx | xxx | xxx | xx | ? |
| Anacridium melanorhodon (Tree locust) | | x | x | x | xx | xx | ? |
| Locusta migratorioides migratoria (African migratory locust) | xx | xxx | xxx | xxx | | | |
| Nomadacris septemfasciata (Red Locust) | xx | xxx | xxx | xxx | x | | |

Sand / Clay

Sand / Clay

begin to forage and invade the crops, the damage spreading from the periphery to the centre of the fields. Later attacks tend to coincide with fledging, i.e. increased mobility of grasshoppers and ripenning of the cereal crops. The insects feed preferentially on the milky grains causing severe damage.

The pattern of infestation

4. In western Africa there are few large agricultural schemes comparable to the Gezira of the Sudan or the mechanized crop production scheme in the Gedharef area south of it. The usual agricultural pattern is of mixed cropping in small holdings owned by individual farmers and small communities. This practice creates a partly heterogeneous environment where fields bearing a variety of crops and often mixtures of them alternate with fallows and areas of "bush" (usually secondary woodland and scrub) and grassland. Such fallows and areas of natural vegetation serve as habitats of grasshoppers and sources for invasions.

5. Such patchiness greatly complicates control, for the targets are generally small and scattered albeit over very large areas. As a rule control measures are purely defensive once the crops are invaded. The common method is by hand or knapsack dusters and sprayers and are directed against the heaviest and most accessible infestations. Many remain untreated, but to local farmers such chronic grasshoppers damage is just another reason for his poor yields.

The outbreaks and their causes

6. Grasshopper infestations vary in severity from year to year. Occasionally there are mass outbreaks of grasshoppers, when large areas may become infested, especially by species of grasshoppers prone to gregarisation and migration. Since there are no proper surveys to monitor the situation, outbreaks tend to occur without warning leaving little time to organise control and prevent crop damage. The 1974 outbreak is among the worst on record; its scale completely outstripped not only the resources of the local plant protection services, but also those of the Desert and the Migratory Locust Control Organizations (OCLALAV and OICMA), that were called to the rescue. The causes of outbreaks have not been studied in any detail. While there is some suggestion that in northern Nigeria outbreaks may be brought about by widespread above-average rainfall; this coincidence is not always there and it would seem that other factors may be involved. Thus, we have the paradox of the 1974 outbreak which followed upon a three-year drought especially severe in the Sahelian zone, where much of the grasshopper activity was recorded. It would seem that the vagaries of the dynamics of the Intertropical Convergence Zone, which were responsible for the drought, may have also caused the concentration of the more mobile species of grasshoppers close to the northern limit of its seasonal advance during the monsoon coinciding with the south Sahelian and the Sudan zones. Furthermore while in general deficiency of rainfall is adverse to animal life, it could be less so to the many of grasshopper species than to some of their natural enemies, so that when at last good rains fell as they did in 1974, the grasshoppers realised their naturally high reproduction potential to the maximum and rapidly multiplied to massive numbers especially in the areas where they were previously concentrated

by convergent winds associated with the ITCZ. While this explanation appears to be plausible it is no more than guesswork. What is evident, is that the causes and mechanism of grasshopper outbreaks are very complex problems and much painstaking research is needed before they are properly understood.

The Extent of the Infestation

7. While locusts are an international problem, grasshoppers are a national one and it is not incumbent upon various countries to report their occurrence to any central monitoring body. As a result the information on grasshopper activity in general and, in 1974 in particular, is very incomplete. Such reports as are available originate from the Locust Control Organizations OCLALAV and OICMA, who were called upon to assist with the control, from a few UNDP experts present in the area at the time, and from the national press of the countries concerned. The biggest single source of information by far was OCLALAV, which played a large part in the control of the outbreak. The data from OCLALAV reports are summarized in Table 2. While the figures may be regarded as a general index of the scale of the infestation, they do not fully reflect the situation during the earlier months, when the gravity of the situation was not properly appreciated and the national plant protection services were attempting to control the situation by themselves. The reports are also marked on the map. Due to the small scale of the map not all the reports could be shown individually, sometimes a single symbol is used to indicate several reports from the same or several adjacent localities. Similarly a single symbol was sometimes used to represent the main species from several reported. The earlier reports were of attacks of Aiolopus simulatrix in the Mora area of northern Cameroons in June. There was little control and heavy damage was inflicted on early rain millet and sorghum. This species, which is regarded as the most important grasshopper pest in the Sudan, has been growing in importance in western Africa in recent years. In addition to the northern Cameroons, it was at the same time reported to be active in the Senegal river valley, though the extent of damage, if any, was not mentioned. After these early infestations of hibernating parents and the first generation nymphs, the second generation nymphs and young adults were recorded, later in October, attacking and locally destroying dry season sorghum, known as 'firki' or 'masakowa' then in the early and vulnerable stage of growth in the black clay belt south west of Lake Chad in the N.E. State of Nigeria. The infestation was observed over one square kilometer but later reports indicated that it had spread considerably.

8. During August and September, there were widespread and locally severe attacks by a complex of species associated with the heavier clay soils at several points in the Lake Chad basin. The specific composition, the order of importance and the numbers of the species varied from place to place, but the principal species were : Cataloipus sp. and the superficially similar Amphiprosopia gwynni; Catantops axillaris, Orthochtha venosa, Hieroglyphus daganensis, Kraussaria angulifera, Acorypha sp. and Eyprepocnemis sp. The African Migratory Locust (Locusta migratoria migratorioides) and the Red Locust (Nomadacris septemfasciata)

were also frequently associated with this complex of species. At times the densities were very high and in some instances there was some manifestation of gregarisation : this was most pronounced in the Red and the Migratory Locusts, which in several localities along the shores of Lake Chad formed small aggregations of nymphs and subsequently dense concentration of adults. The denser concentration of nymphs of Cataloipus also exhibit some cohesion and gregarious coloration, and so did those of Eyrpepocnemis sp. In general they resembled the coloration of the gregarious nymphs of Locusta and were occasionally mistaken for them.

9. The cereal crop most severely damaged was maize, then millet and sorghum. The maize cobs were usually attacked at the tip but even when the grasshopper damage was partial, the destruction of the sheath exposed the core to attack by other pests such as Cetonid beetles and moths and to eventual fungus infection and decay.

10. In early October, a similar complex of species was recorded attacking rice in the area of Pouss along the Lagone in Cameroons. The dominant species were Hieroglyphus daganensis (ca. 30%) Orthoclitha venosa (ca. 15%) and Cataloipus, Amphiprosopia, Cyrtacanthaeris and a few others, the remaining 5%. The infestation was contained within about 35 x 20 km. It was heaviest south of Pouss, where Vetiveria, Echinochloa and other indigenous grasses were reduced to leafless canes and the grasshoppers had spread - mostly by swimming - into the adjoining rice, causing appreciable leaf damage. Initially the damage was superficial, but with the destruction of the natural habitat even greater numbers moved into the rice crop causing increasing damage particularly at the time of grain formation. The authorities alarmed by the situation appealed for help and OCLALAV treated 1245 ha. by aerial spraying.

11. Even heavier infestations by a similar complex of species were reported during August to October from the Senegal river valley, parts of southern Mauritania and S.W. Mali, northern Togo and especially northern Dahomey. In Dahomey alone the infested areas were said to be over 16,000 ha. in September and 22,000 ha. in October.

12. Damage was reported as extensive and quoted as 30 to 100 percent. Cereal crops were not alone in being attacked. Severe defoliation of Cassawa by swarms of Catantops axillaris was observed along the shores of Lake Chad, while damage to cotton was reported from Gombe Division in the N.E. State of Nigeria.

13. Probably the most outstanding grasshopper activity observed was the mass outbreak of the Senegalese grasshopper, Oedaleus senegalensis. Extensive damage over hundreds of hectares to bulrush millet was first seen north of Niamey in western Niger Republic, in mid-July. Extensive infestations were reported in the North East State of Nigeria between Maiduguri and Mongonu in early August and later in the month further infestations were recorded in the northern part of the state from the shores of Lake Chad to Damasak, 100 km. farther west. Across the border, the Diffa area of the Niger Republic was also said to be heavily infested. The grasshoppers were most numerous in the sandy areas characterized by the well known annual grass Cenchrus biflorus and the thorn tree Acacia raddiana and Balanites aegyptiaca, and the crop Bulrush millet (Pennisetum typoideum). The millet was attacked from the early stages of growth and it would seem that in many stages laying had occurred

in close proximity to the fields and possibly sometimes actually within them. Drastic defoliation reduced the plants to mere stalks over many thousands of hectares, while from the time of their formation the bulrush heads were attacked and partly or completely destroyed. In many localities the damage resulted in the loss of the whole harvest.

14. Following fledging from late September, the grasshoppers began to fly, often in swarms, moving predominantly by night. The infestation soon spread to other areas; among those attacked was the rice cultivations in the Yo-Danay area, along the Kamadugu-Yobe, where OICMA assisted with control by treating with an exhaust nozzle sprayer, some 300 ha. of infested rice, millet and adjoining fallows. The attack in this area and other northern areas eased as Oedaleus began to move southwards following the retreat of the Inter-Tropical Convergence Zone, but this only led to attacks in other more southerly areas lying in the path of the swarms and the scattered populations. The crops most vulnerable to damage at this stage were the late millet and massakowa - the dry-season guinea corn. The passage of large numbers of Oedaleus senegalensis was recorded every night at Maiduguri from 5 to 15 October. The heaviest invasion was on the night of 10/11th, when the streets and houses were filled with coulds of flying insects. They piled inches deep under the street lamps, where the inhabitants gathered them into sacks for food. By 12 October, the swarms reached the latitude of $11^{\circ}15'$, having moved over 250 km. from the Nigerian border.

15. In short, the grasshopper infestation was widespread and severe, involving virtually the whole of the Sahelian and the Sudan zones from the Sudan to the Atlantic, and from about the 18th parallel north to the 8th parallel south. The total area of infestation can only be guessed at being in the order of hundreds of thousands of hectares, possibly more. It is thanks to the abundant rains and a generally good harvest that the losses are borne with a degree of equanimity by some of the countries, though it is certain that at the level of the small farmer, who forms the backbone of agriculture in western Africa, there were numerous cases of hardship, particularly hard to bear, coming as they do, upon the recent years of drought and famine.

16. For the same reasons the information on the scale of control operations is as scanty and incomplete as on the extent of infestation and damage. Practically nothing is known of the measures undertaken by individual farmers and the national plant protection services to protect the crops. The efforts by the farmers could not have been very great and probably did not go beyond hand-picking, trenching and burning. Some of the bush and grass fires at the beginning of the dry season may have been started in the hope of killing the grasshoppers, but by then most of the grasshoppers had fledged and the fires may have had the opposite effect by herding them, thus promoting their gregariousness and mobility.

17. The hard-pressed local plant protection services mobilized all their resources, but even in the better organized and equipped areas they were scarcely able to deal with the situation. The scale of the infestation required aerial or at least mechanised spraying by vehicles, and appeals for assistance were soon launched to the two Locust Control

Organizations: OICMA and OCLALAV. OICMA was unable to provide an aircraft but helped with ground control operations to the extent of about 1000 ha in Nigeria and perhaps as much in Mali. OCLALAV put in the largest single effort, which probably represented well over half the total operations conducted to control the outbreak.

18. The figures of the areas treated and insecticides used, are extracted from OCLALAV monthly reports and given in TABLE II. The Table is not complete in that the information for November is still outstanding, but the figures are not likely to exceed those for October, both because the grasshopper activity began to decline and the stocks of insecticides began to run out.

19. While on the whole the operations were said to be successful and kills of up to 100% achieved in many cases, there were very appreciable escapes, for the size of the infestation was very much greater than the areas controlled.

## FORECAST FOR 1975

20. In view of our ignorance of the dynamics of grasshopper outbreaks in western Africa, any forecast must be given with considerable reservation. What is known for a fact is that the control operations were purely defensive and were insufficient to make an appreciable overall difference to the numbers of grasshoppers. Thus it is virtually certain that the various species are now, at the end of the 1974 breeding season, present in larger numbers than they were at the same time a year ago. Therefore, should the conditions and the course of events in 1975 be the same as in 1974, an even bigger outbreak will be the result. To be on the safe side, the preparations for 1975 should envisage this possibility, even though we cannot deny the more optimistic views such as that some of the species may migrate outside their normal range of distribution and suffer a decline due to unfavourable breeding conditions, or that conditions in 1975 may be unfavourable to grasshoppers and the outbreak will decline. The little we know of other grasshopper outbreaks suggests that they tend to start abruptly often as a result of a drastic change of the environment, soon reach a peak, then gradually decline over the next few years, as the natural balance becomes re-established. It therefore seems that a realistic provision for 1975 would be on the scale of what was required in 1974, but was unfortunately not available.

## CONSTRAINTS

21. Post mortems are never pleasant, but quite necessary if any improvement is to be made. What went wrong in 1974? Why theappalling damage to crops was not averted? Grasshopper control is normally the responsibility of the national plant protection services. On their side three constraints stand out: (a) Poor intelligence, (b) Lack of proper planning, (c) Inadequate resources and strategy.

a) Intelligence. For the outbreak to have occurred on such a devastating scale, the concentration and build-up of grasshoppers must have been taking place over a period of time, probably several years. Yet there was no information whatsoever about such a situation developing, or any measures taken to prevent its occurrence, or any preparations made to meet the emergency once it did occur. There is obviously much room for improving or perhaps creating a survey system for monitoring grasshopper populations.

b) Planning and Organisation:- Conducting control during the breeding season at the height of the rains when communications are at best difficult an d at worst impossible, is never easy and to be a success requires much advance planning and organisation: insecticide stocks have to be replenished, the equipment and transport overhauled and placed in strategic places, the personnel briefed and delegated to the various tasks, etc.etc. It is regrettable, but the events show that such advance planning and organisation fell short of what was desired. There is also a feeling that the gravity of the situation was not appreciated sufficiently early and the outside help sought only when it reached unmanageable proportions.

c) There is no question that the resources were short of the demand but whether with adequate intelligence and proper planning they would have been sufficient to check the outbreak is a moot point and chances are that there still would have been an emergency situation to contend with, for much of the breeding, especially by such mobile species as Oedaleus senegalensis, Aiolopus simulatrix and Catantops axillaris, occurred well away from cultivations in areas not normally covered by the national plant protection teams. Large populations were produced in such small areas and later invaded the crops. This situation imphasizes the inadequacy of the present control strategy which confines the activity of the plant protection teams to the cultivations and their immediate vicinity. There are two possible remedies; both demand proper understanding of the full scale of the grasshopper problem:- (a) either the national plant protection services undertake the whole burden of surveys and control that may be required to maintain a check on the grasshopper populations - this will require corresponding enlargement and improvement of the existing services - or, (b) it is decided that certain species, e.g. Oscuegalensis A. simulatrix and possibly Anacridium melanorhodon, due to their mobility, transcent the definition of national and deserve a recognition of international pests, whereupon their control could be entrusted to the existing Locust Organisations, OCLALAV and/or OICMA. Clearly, should such a decision be made, it will require the approval of the Advisory Council, appropriate amendments of the Charter and adequate strengthening of the Organisation(s) to allow the shouldering of the new responsibilities. The last point in particular is very important, for there is little doubt that, had OCLALAV been fully responsible for the grasshopper control and not merely called to the rescue, it would have been able to meet the situation more fully, by timely surveys and more appropriate control measures. For instance, in many cases, operations were stopped prematurely as the insecticide stocks ran out and one hopes that they might have found something more suitable than 'Queletox' for spraying of grasshoppers.

REQUIREMENTS FOR 1975

22. The forecast for 1975 is of further substantial grasshopper activity and threat to crops. In view of the recent exhausting campaign which has placed a heavy demand on the Plant Protection Services and the Locust Control Organisations, all but depleting the stocks of insecticides, help is urgently wanted to strengthen these various bodies by a provision of necessary funds for equipment, insecticides and the cost of maintaining personnel. Since the most effective form of help to the national organisations is more of long-term category, it is recommended to canalise the immediate help through the Locust Control Organisations who are best placed to deal with emergency situations.

23. OCLALAV:- This organisation has already demonstrated its ability and willingness to conduct effective grasshopper control. It has many strategically placed operational bases throughout the Sahel and the south Saharan zones of west Africa which are normally used for the control of the Desert Locust and weaver bird Quelea quelea and are equally well placed for mounting operations against grasshoppers. The member countries of OCLALAV are among the poorest and inevitably OCLALAV has suffered from chronic shortage of funds which has severely sapped its strength. Nevertheless, the organisation has demonstrated its goodwill by launching all its meagre resources to fight the grasshoppers, and as a result depleting them still further. Unless urgent help is given, the organisation may be unable to render any further service towards grasshopper control. The help required is principally in terms of insecticides, machinery, transport and operational funds.

INSECTICIDES. Three main types of insecticides are required:-

i)Persistent insecticides (e.g. Dieldrin), 5,000 gallons for use in natural habitats which function as service areas, away from cultivations. Insecticide to be applied at ULV and extra-low dosage of about 200-300 g/ha of Dieldrin 20, mortality resulting from cumulative build-up to the lethal dose.

ii)Non-persistent insecticides (e.g. Malathion, Fenitrothion or Procidacri, 20% & BHC) 10,000 gallons. ULV formulations. For use in actual crop areas.

iii)Dusts. BHC Dust 500 tons. The 'safe' insecticide which may be distributed to the farmers for use by themselves. Half the quantity to be supplied to OCLALAV, the other to the national plant protection services.

EQUIPMENT.

One spray aircraft (CESSNA 185 type).

One spray aircraft (Piper PA 18 type).

10 Exhaust Nozzle sprayers.

10 Long-wheel base Land Rovers or equivalent.

4 Light 4 x 4 trucks. 5-ton Unimogs or equivalent.

OPERATIONAL FUNDS 350,000

24. Especially to permit the recruitment of additional part-time personnel, purchase of spare parts, maintenance and repair of equipment.

25. OICMA This organisation appears to have fairly adequate stocks of insecticide of which only a little was used to assist with the control of the 1974 outbreak.
26. Regarding the equipment, it has recently launched an appeal for help in establishing its base in the Lake Chad Basin. If the requests are met in full, the Organisation whould be able to give more substantial help with the grasshopper control in the future. Of its demands the most vital is the provision of spray aircraft. The areas of infestation are likely to be vast and will require control along a very extended front. In addition to the above mentioned help to the Locust Control Organisations, it is recommended that some assistance be given to the national plant protection services. The help most appropriate to their needs is insecticides and portable dusters and sprayers. The proposed quantities are tabulated below, in Table III.

TABLE III

| | BHC dust (tons) | Gammalin 50 gall. drums | Malathion 50 gall. drums | Kinkelder sprayers, each | Exhaust Nozzle Sprayers | ULVA Sprayers |
|---|---|---|---|---|---|---|
| Senegal | 20 | | 20 | | 2 | 10 |
| Mauritania | 20 | | 20 | | 3 | 10 |
| Mali | 20 | | 20 | | 3 | 10 |
| Upper Volta | 10 | | 20 | | 1 | 5 |
| Dahomey | 20 | | 20 | | 2 | 10 |
| Ghana | 10 | | 5 | | | 5 |
| Togo | 10 | | 5 | | | 5 |
| Niger | 20 | | 20 | | 3 | 10 |
| Nigeria | 30 | 50 | 30 | 30 | 5 | 20 |
| Cameroun | 20 | | 20 | | 3 | 10 |
| Chad | 20 | | 20 | | 3 | 10 |

## LONG-TERM STRATEGY FOR CONTROL OF GRASSHOPPERS

27. Once the present emergency is over, the grasshopper problem will revert to its chronic state. In most years attacks will tend to be local resulting from an invasion of crops from the adjacent fallows and areas of natural vegetation which serve as habitats for grasshoppers. Theoretically such infestations can be controlled relatively easily by the existing plant protection services, especially when detected at an early stage. There is undoubtedly much room for improvement: some of it could be achieved by better crop management - elimination of fallows where grasshoppers multiply, more rational rotation of crops,

timing of planting, etc., and some by enlarging and improving the existing plant protection services and educating the farmers in the matter of detecting and reporting infestations and also conducting some of the control for themselves, for instance with such relatively safe insecticides as BHC dust, presenting little hazard to themselves or their stock when used judiciously.

28. The implementation of such a programme would require detailed studies on the biology, ecology and population dynamics of grasshoppers in relation to the phenology of crops and the vulnerability of crops to different species of grasshoppers. Operational research will also be required on the best methods of control, both ecological - elimination of fallows, possibility of using barrier traps, etc. - and chemical, in the best choice of insecticides and their manner of application.

29. Such rational control may minimize future outbreaks, but it will not be a complete guarantee against them, for some outbreaks may arise in areas away from cultivations on a scale beyond the resources of normal plant protection units. Examples of such species are Cedalus senegalensis, Aiolopus simulatrix and the true locusts, including the Red and Tree Locusts. The existing Locust Control Organisations, OCLALAV and OICMA, are best equipped to undertake the control of the other species which exhibit migrating and gregarizing propensitie The causes and mechanisms of outbreak of these species or even their seasonal life-cycles are at present practically unknown and require eludication, if rational control is to be achieved. Such research could also be undertaken by OICMA and OCLALAV, but it is obvious that in order to meet this additional burden, their existing structure will require appropriate strengthening.

30. The studies should be oonducted within an area where most of the grasshopper species of economic importance are known to be not only present, but frequently active and where most of the common crops, they are liable to attack are grown. To minimize loss of time in travel the lines of communication should be reasonably reliable. One such area is found alone the Niger Rivel Valley extending from the Tileusi valley north of Gao, south to Niamey and on to Dosso and Gaya through to Northern Dahomey. This base line provides a transit through a part of the South Saharan - Sahelian - Sudan - North Guinea zones, which has been the scene of considerable grasshopper activity in 1974.

31. The research project should run for a minimum of five years, if it is to eludicate such basic questions regarding each species, as: life forms, life cycle, number of generations, seasonal movements, ecology, feeding habits, relationship to crops and extent of damage, tendency to gregarious behaviour and its effects on physiology and morphology. The answers should help towards a better understanding of the wider problem of population and plague dynamics and help towards a rational strategy of their prevention.

32. The project will rely on OCLALAV to provide a chain of observers to conduct routine surveys and samples of populations at chosen observation sites. These observations will be planned and made under the full time supervision of an experienced entomologist assisted by

a senior technical assistant, preferably another entomologist. Allowance should be made for part-time participation of specialists in other disciplines:- Meteorology, Botany, Pedology. Adequate provisions should be made for:-

| | |
|---|---|
| - Transport | 6 light and 3 medium 4x4 vehicles |
| - Camping equipment | $ 5,000 |
| - Scientific equipment | $20,000 |
| - P O L | $50,000 p.a. |
| - Salaries | 120 expert man months $300,000 |
| | 12 consultant man months $24,000. |

These estimates are only tentative to give an approximate idea of the resources needed for long-term research.

TABLE II - Control Operations conducted by OCLALAV in 1974

| COUNTRY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER |
|---|---|---|---|---|---|
| SENEGAL | | Os. Boulel ?<br>Os. C. Bakel | ha BHC ? D 500 ha<br>70 h BHC ? | Os.Dagana heavy D<br>Os.M'Bane Inf.10000h<br>350 h 8800 k BHC | O.K.M.Ca N'Pourrie<br>3000h 650 l D5,50 l Su ULV<br>150 l D20<br>Bakel-N'dioum both sides of Senegal river 65000 ha<br>9400 l D 10 |
| MAURITANIA | | Os. Selibaby | Heavy infestation | O.K.Ac. 15,000h Inf. | G.Kaedii 1626h.6051 FULV,<br>551 F50 Col.D5; Mounguel<br>16h 160 KMHC; Boghe 620h<br>2601 FULV |
| MALI | A.O. Yaguine (W)<br>260 ha 740 KBHC | | OJ 18 ZONOZE | O.Nara 60,000 Inf.<br>BHC limited control<br>O.K.C. Terekolé Inf.<br>Yelimané Inf.<br>Os.Gao-Ansongo<br>900 h 5401 L | G.Gari-Terekolé-Yelimané<br>3550 ha 26,300 KBHC 25%<br>+ 230 l En.<br>O.H.L.Ansongo 8050h<br>3850 l BHC |
| NIGER | O. Ac. C. Gaya | | Os.Ouallam 1424 0205<br>2560 ha 750 l F50<br>550 l Fo 440 l D5<br>O.Goure, Nguigmi<br>Diffa. 2100 ha BHC | O.N'Guigmi 1675 LMS<br>40 - 85% D<br>O. Diffa 3100 h MS<br>20 - 95% D<br>9540K BHC 525 l BHC20 | O.SENiger 12000 ha Inf.<br>2020 h 4000 l BHC20 160 l F |
| DAHOMEY | | | H.1150/0315 -<br>1140/0335<br>70 ha damage MS | Gaya - Malanville<br>H.Z. 16,000 ha AS<br>1100 l Fo 33,500 l<br>BHC 20 | H.N.Dahomey 2200 h Inf.<br>heavy damage M.S.Maize Veg.<br>1800 l D 20<br>O.K.Mora 124 h 249 KBHC<br>O.K.Afade 662 ha 297 Q |
| CHAD | | | | CaK 1302/1518<br>3115 h 325 l D20<br>500 l D5 760 l D20<br>O.A.Mongo 180 h 500k<br>Abeche 50 h 200 k<br>Biltine 50 h 200 k BHC | |

TABLE II

| COUNTRY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER |
|---|---|---|---|---|---|
| CAMEROUN | | | | | H.Pooss 1245h 580F50 416F60 145 h 200 k BHC |
| UPPER VOLTA | | | | | O.Ac Gorom Gorom 1355 h 1210 l BHC |

KEY

**Grasshopper Species:**

| | |
|---|---|
| A | Aiolopus |
| Ac | Acrotylus |
| C | Catantops |
| Ca | Cataloipus |
| O | Oedaleus |
| Os | O. senegalensis |
| Oj | O. johnstoni |
| K | Kraussaria |
| Z | Zonocerus |

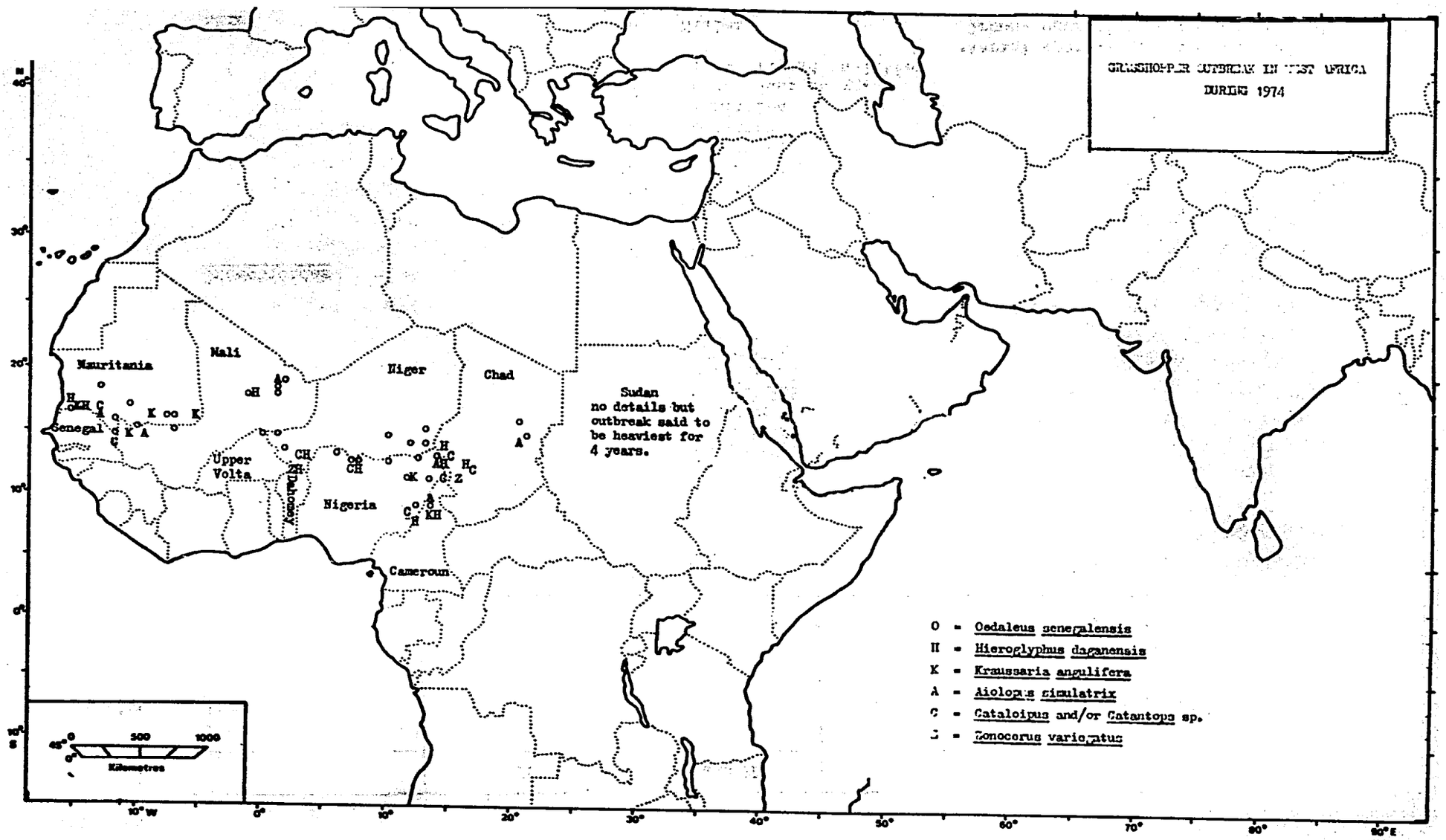
**Insecticides**

| | |
|---|---|
| D5 | Dieldrin 5% |
| D10 | Dieldrin 10% |
| D20 | Dieldrin 20% |
| F | Fenitrothion |
| Fo | Folition |
| L | Lindane 16% |
| En | Endrin 24% |
| Q | Quelotox |
| Su | Sumithion |
| BHC | K = dust in kg. |
| | l = liquid in litres |

**Crops**

| | |
|---|---|
| H | Millet |
| S | Sorghum |

*Aerial operations - underlined
Ground operations - not underlined


GRASSHOPPER OUTBREAK IN WEST AFRICA
DURING 1974
Mauritania
Mali
Niger
Chad
Sudan
no details but
outbreak said to
be heaviest for
4 years.
Senegal
Upper
Volta
Dahomey
Nigeria
Cameroun
O = Oedaleus senegalensis
H = Hieroglyphus daganensis
K = Kraussaria angulifera
A = Aiolopus simulatrix
C = Cataloipus and/or Catantops sp.
Z = Zonocerus variegatus
0 500 1000
Kilometres
10° W
0°
10°
20°
30°
40°
50°
60°
70°
80°
90° E

Appendix C.

## THE 1974 OUTBREAK OF GRASSHOPPERS IN WESTERN AFRICA

by G. Popov, C.O.P.R.

The 1974 Monsoon season witnessed an outbreak of grasshoppers. The outstanding feature of this outbreak was its massive scale; widespread damage was caused to a wide range of crops by many species of grasshoppers with diverse life cycles and ecological requirements in a vast area stretching from the Sudan to the Atlantic and from the southern borderlands of the Sahara to the Guinea savannah. Some of the grasshopper activity was seen at first hand by the writer and his colleagues. In particular the extensive surveys conducted by land and helicopter for the detection, study and control of the African Migratory Locust provided an excellent opportunity for parallel observations on grasshoppers. The results of these observations are to be described in detail elsewhere, but here a few cases are cited briefly by way of illustration.

In June there was an attack on early rain millet and guinea-corn in the Moran area of northern Cameroons by concentrations of Aiolopus simulatrix. Considerable damage occurred since neither the local plant protection service, nor the OICMA Team, which was called to the rescue, could organize effective control in time. Later, in mid-October, the second generation nymphs and young adults of this species were observed attacking the dry season guinea-corn, known as 'firki' or 'masakowa', then in the early and vulnerable stage of growth, near Marte in the black clay belt south-west of Lake Chad. The infestation was recorded over a distance of about one kilometre and it was feared that it may spread further*.

Aiolopus simulatrix is regarded as the most important grasshopper pest in the Sudan. Its importance in western Africa appears to be relatively recent, but has been growing in recent years. In addition to the Lake Chad basin, this species has also been active in the Tilemsi area of eastern Mali and along the Senegal River valley, where crops, especially sorghum, were attacked.

During August and September, there were widespread and locally severe attacks by a complex of species associated with the heavier soils along the shores of Lake Chad. The principal species were Nomadacris septemfasciata (the Red Locust), Cataloipus spp., Amphiprosopia gwynni, Catantops axillaris, Orthochtha sp., Hieroglyphus daganensis, Kraussaria angulifera, Cyrtacanthacris aeruginosa and Eyprepocnemis spp. The specific composition and the numbers of each species varied from one locality to another and at times the densities were very high, reaching to upwards of 50 per square metre. In some instances there was some manifestation of gregarisation; this was most pronounced in Nomadacris, which in several localities along the shore of the Lake formed smallaggregations of gregariously coloured nymphs and subsequently dense concentrations of adults. The dense concentrations of nymphs of Cataloipus also exhibited some cohesion and gregarious interattraction and being coloured in shades of rusty brown and black in the manner of the nymhs of Locusta, they were often mistaken for them. This occurred at Koloudia, south-east of Lake Chad, where damage to crops was recorded over several kilometres. The attack on crops was by incursion or foraging from the adjacent grasslands and fallows, which were evidently the breeding habitats. The periferal damage gradually spread deeper

into the fields. The drop most severely damaged was maize, then millet and sorghum. The maize cobs were usually attacked at the tip, but even when the grasshoppers damage was partial, the destruction of the sheath exposed the core to attack by other pests such as Cetonid beetles and to eventually fungus infection and decay.

In early October, a similar complex of species was recorded attacking rice in the area of Pouss along the Logone in northern Cameroons. The dominant species was H. daganensis (some 80%) Orthochtha Venosa (ca.15%) and Cataloipus, Amphiprosopia, Cyrtacanthacris and a few others, the remaining 5 percent. The infestation was contained within an area of about 35x20 km. The infestation was heaviest south of Pouss, where the indigenous grazes, Echinochloa pyramidalis, Panicum sp. Vetiveria nigritana were reduced to leafless canes and the grasshoppers had spread - mostly by swimming - into the adjoining rice, causing appreciable leaf damage. At the time of the visit the damage was as yet superficial, but given the large numbers of grasshoppers it appeared certain that with the progressive destruction of the natural habitat, ever larger numbers would move into the crops causing ever greater damage, particularly at the time of grain formation. Indeed a short while later, the authorities, alarmed at the extent of damage appealed to OICMA for assistance.

Cereal crops were not alone in being attacked. Severe defoliation of cassawa by swarms of Catantops axillarist was observed along the shores of Lake Chad east of Mongonu, while the Agricultural officer Gombe Division, reported heavy damage to cotton.

Probably the most outstanding grasshopper activity observed was

the mass outbreak of the Senegalese grasshopper, Oedaleus senegalensis. Extensive damage over hundreds of hectares to bulrush millet was first seen north of Niamey in western Niger Republic, in mid July. Extensive infestations were reported in the NE State of Nigeria between Maiduguri and Mongonu in early August and later in the month further infestations were recorded in the northern part of the State from the shores of Lake Chad to Damasak, 100 k. father west. Across the border, the Diffa area of the Niger Republic was also said to be heavily infested. The grasshoppers were most numerous in the sandy areas characterized by the well-known annual grass Cenchrus biflorus and the thorn tree Acacia raddiana and Balanites aegyptiaca, and the crop, Bulrush millet (Pennisetum typoideum). The millet was attacked from the early stages of growth and it would seem that in many stages laying had occurred in close proximity to the fields and possibly sometimes actually within them. Drastic defoliation reduced the plants to mere stalks over many thousands of hectares, while from the time of their formation the bulrush heads were attacked and partly or competely destroyed. In many localities the damage resulted in the loss of the whole harvest.

Following fledging from late September, the grasshoppers began to fly, often in swarms, moving predominantly by night. The infestation soon spread to other areas; among those attacked was the rice cultivations in the YoDanay area, along the Kamadugu-Yobe, where OICMA assisted with control by treating with an exhaust nozzle sprayer, some 300 ha of infested rice, millet and adjoining fallows. The attack in this area and other northern areas eased as Oedaleus began to move

southwards following the retreat of the Inter-Tropical Convergence Zone but this only led to attacks in other more southerly areas lying in the path of the swarms and the scattered populations. The crops most vulnerable to damage at this stage were the late millet and massakowa - the dry-season guinea corn.

The passage of large numbers of Oedaleus senegalensis was recorded every night at Maiduguri from 5 to 15 October. The heaviest invasion was on the night of 10/11th, when the streets and houses were filled with claods of flying insects, they piled inches deep under the street lamps, where the inhabitants gathered them into sacks for food. By 12 October, the swarms reached the latitude of 11° 15', having moved over 250 k from the Nigerian border.

The above eye-witness account is no more than a sample of the grasshopper activity in parts of the Lake Chad Basin. The overall grasshopper infestation was much more extensive involving vast areas in the northern states of Nigeria, parts of the Niger and Mali Republics, Mauritania and Senegal. Southwards grasshopper attacks were reported from the northern parts of the Upper Volta, Togo and Dahomey, while further east in the Sudan, grasshopper activity was said to be well above average.

Control. The hard-pressed local plant protection services were scarcely able to deal with this situation. Below is an excerpt from a personal letter from the plant protection officer in Kano State as an example of the state of affairs prevailing in areas where control was better organized.

"We in Kano State have been having a very busy time with grass-

hoppers this year. After we had controlled most of the problem areas in June - August, there was a reprieve of about a month before more problems started to develop. The early outbreaks were of Oedaleus senegalensis with occasional pockets of Catantops sp. later on. In September we began to receive reports of Hieroglyphus daganensis from the lowlying areas in Hadejia Emirate. By October 7 the second generation of O. senegalensis began migrating into Kano State in absolutely incredible numbers. In Kano alone there were millions of individuals each night attracted to the lights along Hadejia road. Almost simultaneously I received outbreak reports from Dambatta, Gumel and Hadejia. It was necessary to hustle more sprayers and chemicals from FDA Kaduna. Most of my sprayers were down because of extended use during June-August and insufficient spare parts. I was able to do something to partially alleviate the problem, but without transport most of the time it was difficult. Damage in some areas to maturing 'gero' was heavy and also to the 'maiwa'. It was so bad in some areas that the sorghum milky stage grains and cowpea flowers were also eaten up."

Appeals were made to OICMA and its sister organization OCLALAV who were able to come to the rescue especially as both the Migratory and the Desert Locusts, their prime responsibility, were relatively quiescent. OICMA gave some assistance with ground operations in the Lake Chad Basin and in the Lake Bo area of Central Niger Delta in Mali, where several hundred hectares were controlled. Unfortunately the helicopter, whic

might have been able to give more substantial help, proved to be unsuitable for the application of Malathion, the only suitable insecticide available for use on ripening crops.

OCLALAV gave considerable assistance by spraying 2000 ha in eastern Niger against Oedaleus and 11000 ha in northern Dahomey with a further 5000 ha in the adjacent parts of SW Niger against mixed populations of mesophilous species in the flood plains of the River Niger. More help was given in Mali and especially in Mauritania and the Senegal River Valley on both sides of the border, and also in the Dagana area of Senegal. The full extent of the operations is unknown at present, but despite these efforts crop losses were heavy, in places devastation was total for many kilometres. It is thanks to the abundant rains and a generally good harvest that the losses are borne with a degree of equanimity by some of the countries, though it is certain that at the level of the small farmer, who forms the backbone of agriculture in West Africa, there were numerous cases of hardship, particularly hard to bear, coming as they do, upon the recent years of drought and famine.

Discussion. The scale of the present outbreak is undoubtedly exceptional, but even in normal years grasshoppers are regarded as a considerable threat to agriculture in West Africa. The OICMA Training Courses held in Maiduguri in April, 1974, was attended by plant protection officers from most of the states of Nigeria and all the northern ones. When the latter were asked to name their most important pest problem, all replied without hesitation, "grasshoppers". The problem, as was pointed out in my 1970 report on a grasshoppers survey in the northern states of Nigeria, is basically a chronic one. It

involves many areas, types of environment and crops and a score or so species of grasshoppers with a wide range of biological and ecological characteristics. In most years the attacks tend to be local, resulting from an invasion of crops from the adjacent fallows and areas of natural vegetation which serve as habitats for grasshoppers. Such infestations can be controlled relatively easily by the existing plant protection services, especially when detected at an early stage. There is undoubtedly much room for improvement; some of it could be achieved by better crop management - elimination of fallows where grasshoppers multiply, more rational rotation of crops, timing of planting, etc. and some by enlarging and improving the existing plant protection services and educating the farmers in the matter of detecting and reporting infestations and also in conducting some of the control for themselves, for instance with such relatively safe insecticides as BHC dust, presenting little hazard to themselves or their stock when used judiciously.

The implementation of such a programme would require detailed studies on the biology, ecology and population dynamics of grasshoppers in relation to the phenology of crops, the vulnerability of crops to different species of grasshoppers. Operational research will also be required on the best methods of control, both ecological - elimination of fallows, possibility of using barrier traps, etc., and chemical in the best choice of insecticides and their manner of application.

Such rational control may minimize future outbreaks, but it will not be a complete guarantee against them, for some outbreaks may arise in areas away from cultivations on a scale beyond the resources of

normal plant protection units. Examples of such species are Oedaleus senegalensis, Aiolopus simulatrix and the true locusts, including the Red and the Tree Locusts. Organizations already exist for dealing with the Desert and the Migratory locusts and they OCLALAV and OICMA, are best equipped to undertake the control of the other species which exhibit migrating and gregarising propensities.

The causes and mechanisms of outbreak of these species or even their seasonal life-cycles are at present practically unknown and require elucidation if rational control is to be achieved. Such research could also be undertaken by OICMA and OCLALAV, but it is obvious that in order to meet this additional burden, their existing structure will require appropriate strengthening.

In view of the fact that the present massive outbreak of grasshoppers has certainly not been controlled to any appreciable extent and heavy infestations may well continue for some years if left unchecked, the matter must be treated with some urgency.

Appendix D.

# Problemes Actuels Poses A L'OCLALAV Exception Faite de la Lutte Contre les Sauteriaux (1974-1977)

Presented by Abdallahi Sidia

## SITUATION GENERALE

L'OCLALAV est un Organisme Inter-Etats de l'Afrique de l'Ouest chargé de la lutte intensive contre les grands fléaux des cultures que constituent les acridiens et oiseaux granivores, grégaires :

. Après une période d'accalmie acridienne, 1973 marque une très nette recrudescence de l'activité des deux principales espèces d'acridiens grand-migrateurs;

Locusta migratoria - Le criquet migrateur africain s'est manifesté d'Août à Novembre dans le Bassin du Lac Tchad. Les pullulations enregistrées ont nécessité une aide de l'OCLALAV auprès de l'OICMA pour des interventions dans les Etats du Tchad, du Cameroun et du Nigeria.

Schistocerca gregaria - Le criquet pèlerin a fait sa réapparition sous forme grégaire en fin de période de mousson dans la région Indo-Pakistanaise. Dès Janvier, des essaims ont trouvé en Arabie Saoudite et dans certaines régions limitrophes de la Mer Rouge, d'excellentes conditions de reproduction. Cette situation a nécessité des interventions locales de grande ampleur. Mais les symptômes enregistrés montrent une grande similitude avec ceux de l'année 1949 qui fut le prélude à la grande invasion généralisée du criquet pèlerin à partir de 1950. Cette menace sera précisée au début de la prochaine saison de mousson mais doit, d'ores et déjà, être prise très au sérieux.

Les problèmes de protection et de défense des cultures posés par les oiseaux granivores et les "sauteriaux" acridiens sédentaires, sans avoir l'exceptionnelle gravité des grands fléaux acridiens, ont pris au cours des dernières années une importance grandissante.

L'accroissement des surfaces cultivées alliées au phénomène général de la sécheresse, a entraîné une multiplication des régions soumises aux attaques de ces prédateurs, augmentant ainsi gravement les risques encourus par une économie essentiellement agricole.

C'est en effet un fait constaté,que l'équilibre écologique des Régions de climat tropical sec est précaire. Une parfaite exploitation de ce milieu écologique devrait pouvoir être adapté en fonction de ses potentialités réelles, étroitement liées à la pluviométrie. En période de sécheresse ses limites sont atteintes rapidement conduisant à une surexploitation du milieu qui entraîne une aggravation de la concurrence entre espèces animales dépendant d'un milieu végétal qui se restreint.

C'est dans ce contexte particulièrement fragile que s'inscrit le développement de l'économie agricole. Il doit s'accélérer, et en particulieren zone sahélo-soudanienne, sous forme d'aménagement hydroagricole.

Ceux-ci doivent permettre, à moyen terme, de limiter les risques grâce à une parfaite maîtrise de l'eau, seul moyen de faire face à la sécheresse.

Mais en contre-partie, ces vastes aménagements cultivés en céréales se trouvent particulièrement vulnérables aux attaques des migrateurs (essaims de criquet et d'oiseaux), et favorisent en fait indirectement, en raison des profondes modifications qu'ils apportent au milieu naturel, un développement considérable du parasitisme général.

Aussi, est-il indispensable de garder à l'esprit qu'un développement agricole rationnel ne peut se concevoir sans un développement parallèle de la protection phytosanitaire des cultures.

Participant à la Protection des cultures, les actions de l'OCLALAV assurent :

- Une protection indirecte de la production agricole de l'Afrique Tropicale. Elle devra se développer dans les années à venir.
- Une protection avancée des régions écologiques voisines de l'Afrique Tropicale humide et de l'Afrique du Nord-Ouest en occupant une position-clé dans le dispositif mondial de lutte contre le criquet pèlerin.

## DIFFICULTES

Une connaissance parfaite et instantannée de l'évolution biologique des espèces en cause, comme des conditions écologiques et météorologiques qui prévalent sur l'ensemble de sa très vaste zone d'action, sont indispensables à l'OCLALAV pour lui permettre d'assurer les interventions immédiates, seules capables de garantir une prévention efficace des fléaux dont elle a la responsabilité.

En particulier, la rapidité de réalisation des Traitements de destruction est un facteur fondamental de succès, il impose l'utilisation de gros moyens matériels, bien adaptés, servis par un personnel de haute technicité.

Dans ces conditions, l'Organisation doit assurer en permanence une parfaite maintenance des matériels et des moyens de lutte. La préparation rationelle d'une campagne de lutte intensive nécessite l'établissement d'un plan de campagne prévisionnel qui assure la totalité des besoins logistiques en matériels, personnels, produits et services, et lui impose des charges financières très lourdes.

Pour résoudre l'ensemble de ces problèmes l'Organisation se trouve actuellement confrontée avec des difficultés insurmontables,

Le budget annuel de l'Organisation n'a pratiquement pas varié depuis 1965

L'ensemble de ses charges a augmenté

L'inflation générale des prix mondiaux qui s'est engagée depuis quelques années s'accélère interdisant actuellement à l'Organisation une préparation rationnelle des campagnes, les améliorations matérielles et techniques qui s'imposent, ni même le simple remplacement normal du matériel parvenu en fin de potentiel.

Le budget actuel ne peut que couvrir les activités normales de l'Organisation : prospection et lutte préventive contre le criquet pèlerin et lutte antiaviaire, sans lui offrir la possibilité de faire face aux énormes interventions de lutte qu'imposerait une nouvelle invasion acridienne.

C'est pourquoi le plan d'investissement suivant a été présenté couvrant les 4 prochaines années dont u financement de première urgence, minimum indispensable au contrôle d'un début d'invasion du criquet pèlerin possible dès 1974.

## PLAN D'INVESTISSEMENTS OCLALAV

| NATURE | REPARTITION | | | | | | | | TOTAUX |
|---|---|---|---|---|---|---|---|---|---|
| | 1ère urgence | | 2ème urgence | | | | | | |
| | nB | Montant | Nb | Montant | Nb | Montant | Nb | Montant | |
| 1-Infrastructure Batiments | | | 10 | 60 500 | | | | | 60 500 |
| 2- Moyens de transport | 25 | 58 750 | 15 | 38 000 | 14 | 36 750 | 14 | 36 750 | 170 250 |
| 3- Moyens Radio | 2 | 5 000 | 10 | 5 260 | 11 | 9 560 | 9 | 3 980 | 23 800 |
| 4 - Moyens de lutte | 20 | 25 000 | 41 | 41 750 | 43 | 44 250 | 45 | 46 750 | 157 750 |
| 5 - Moyens aériens | | | 1 | 7 500 | 1 | 7 500 | 2 | 21 000 | 36 000 |
| TOTAUX | | 88 750 | | 153 010 | | 98 060 | | 108 480 | 448 300 |

## POINT I - INFRASTRUCTURE BATIMENTS

| Nature | Localisation | Répartition | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1ère urgence 1974 | 2ème urgence 1975 | | 1976 | | 1977 |
| | | | Nb | Montant (1) | Nb | Montant (1) | Nb | Montant (1) |
| Bases nouvelles et aménagement | Mali | | 2 | 13 500 | | | | |
| | Cameroun | | 1 | 8 500 | | | | |
| | Mauritanie | | 3 | 21 000 | | | | |
| Base aérienne | Niger | | 1 | 13 500 | | | | |
| Hangar/avion | Sénégal | | 1 | 4 000 | | | | |
| | TOTAUX | | 8 | 60 500 | | | | |

(1) : Montant évalué en milliers de Francs CFA.

## POINT 2 - MOYENS DE TRANSPORT

| NATURF | AFFECTATION | REPARTITION | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Urgence | | 2e urgence | | | | | |
| | | 1974 | | 1975 | | 1976 | | 1977 | |
| | | Nb | montant (1) | Nb | Montant (1) | Nb | Montant (1) | Nb | Montant (1) |
| 1-Land-Rover PU 109 Diesel tout terrain aménagée | RIM/Sénégal | 5 | 6 250 | 2 | 2 500 | 2 | 2 500 | 2 | 2 500 |
| | MALI | 4 | 5 000 | 2 | 2 500 | 2 | 2 500 | 2 | 2 500 |
| | NIGER | 3 | 3 750 | 2 | 2 500 | 1 | 1 250 | 1 | 1 250 |
| | TCHAD | 3 | 3 750 | 2 | 2 500 | 2 | 2 500 | 2 | 2 500 |
| | TOTAUX 1 | 15 | 18 750 | 8 | 10 000 | 7 | 8 750 | 7 | 8 750 |
| 2- Camion 2T Unimog 416 Diesel tout terrain aménagés | RIM/Sénégal | 3 | 12 000 | 2 | 8 000 | 2 | 8 000 | 3 | 12 000 |
| | MALI | 3 | 12 000 | 2 | 8 000 | 2 | 8 000 | 1 | 4 000 |
| | NIGER | 2 | 8 000 | 1 | 4 000 | 1 | 4 000 | 2 | 8 000 |
| | TCHAD | 2 | 8 000 | 2 | 8 000 | 2 | 8 000 | 1 | 4 000 |
| | TOTAUX 2 | 10 | 40 000 | 7 | 28 000 | 7 | 28 000 | 7 | 28 000 |
| Total général 1 + 2 | | | 58 750 | | 38 000 | | 36 750 | | 36 750 |

## POINT 3 - MOYENS RADIO

| NATURE | AFFECTATION | REPARTITION | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1ère urgence | | 2e urgence | | | | | |
| | | 1974 | | 1975 | | 1976 | | 1977 | |
| | | Nb | Montant (1) | Nb | Montant (1) | Nb | Montant (1) | Nb | Montant (1) |
| 1 émetteur récepteur CSF-BLU CBL 52 mobiles: véhicules | Mauritanie/ Sénégal | | | 2 | 1 400 | 2 | 1 400 | 1 | 700 |
| | MALI | | | 2 | 1 400 | 1 | 700 | 1 | 700 |
| | NIGER | | | 1 | 700 | 1 | 700 | 1 | 700 |
| | TCHAD | | | 2 | 1 400 | 2 | 1 400 | 2 | 1 400 |
| | Totaux (1) | | | 7 | 4 900 | 6 | 4 200 | 5 | 3 500 |
| 2- émetteur de détresse VHF type URC 4 121,5 MCS 247,0 MCS Liaison Air-sol Liaison Sol-Air | Mauritanie/ Sénégal | | | 1 | 120 | 1 | 120 | 2 | 240 |
| | MALI | | | 1 | 120 | 1 | 120 | - | - |
| | NIGER | | | - | - | 1 | 120 | 1 | 120 |
| | TCHAD | | | 1 | 120 | - | - | 1 | 120 |
| | Totaux (2) | | | 3 | 360 | 3 | 360 | 4 | 480 |
| 3- Emetteur récepteur grande puissance 200 W pour liaisons avec régions voisines Afrique du Nord-Ouest | | 2 | 5 000 | | | 2 | 5 000 | | |
| | Totaux (3) | 2 | 5 000 | | | 2 | 5 000 | | |
| | Total général 1 + 2 + 3 | | 5 000 | 10 | 5 260 | 11 | 9 560 | 9 | 3 980 |

## POINT 4 - MOYENS DE LUTTE

| NATURE | AFFECTATION | REPARTITION | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1ère urgence | | 2e urgence | | | | | |
| | | 1974 | | 1975 | | 1976 | | 1977 | |
| | | Nb | Montant (1) | Nb | Montant (1) | Nb | Montant (1) | Nb | Montant (1) |
| 1-Produit antiaviaire sélectif : avicide | Mauritanie | | | 8 | 10 000 | 8 | 10 000 | 8 | 10 000 |
| | MALI | | | 6 | 7 500 | 6 | 7 500 | 6 | 7 500 |
| | NIGER | | | - | - | - | - | - | - |
| | TCHAD | | | 9 | 11 250 | 9 | 11 250 | 9 | 11 250 |
| | TOTAUX (1) | | | 33 | 31 750 | 33 | 31 750 | 33 | 31 750 |
| 2-Produits antiacridiens stocks de sécurité | Globale | 20 | 25 000 | 8 | 10 000 | 10 | 12 500 | 12 | 15 000 |
| | Total général | | 25 000 | | 41 750 | | 44 250 | | 46 750 |

Nota : Les quantités prévues pour la période 1975/1977 s'entendent dans l'hypothèse d'une invasion de criquet pélerin parfaitement contrôlée dans toutes l'aire d'invasion.
Des quantités 10 fois plus importantes seraient nécessaires chaque année dans le cas d'une invasion généralisée qui pourrait alors durer plusieurs années .

## POINT 5 - MOYENS AERIENS

| NATURE | AFFECTATION | REPARTITION | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1974 | | 1975 | | 1976 | | 1977 | |
| | | Nb | Montant | Nb | Montant | NB | Montant | Nb | Montant |
| Avion traitement agric. équipé en pulvérisateur type PIPER PA 18 équipement radio complet | MALI/NIGER | | | | | | | 1 | 7 500 |
| | TCHAD | | | 1 | 7 500 | 1 | 7 500 | | |
| Avion mixte pour liaison-prospection-traitement-équipé en pulvérisateur type CESSNA 185 F Ag Carryall Equipement Radio complet + IFR | MALI/NIGER | | | | | | | 1 | 13 500 |
| | TOTAUX | | | 1 | 7 500 | 2 | 7 500 | 2 | 21 000 |

## RECAPITULATION GENERALE

| | 1974 | 1975 | 1976 | 1977 |
|---|---|---|---|---|
| Point 1 - Infrastructure batiments | | 60 500 | - | - |
| Point 2 - Moyens de transport | 58 750 | 38 000 | 36 750 | 36 750 |
| Point 3 - Moyens Radio | 5 000 | 5 260 | 9 560 | 3 980 |
| Point 4 - Moyens de lutte | 25 000 | 41 750 | 44 250 | 46 750 |
| Point 5 - Moyens Aériens | | 7 500 | 7 500 | 21 000 |
| Total général | 88 750 | 153 010 | 98 060 | 108 480 |

## Appendix E

# Projet D'Assistance Aux Etats Sahelians Pour La Lutte Contre les Sauteriaux (Cameroun, Mali, Mauritanie, Sénégal ... etc.) en 1974 - Recapitulation des Besoins par IOCLALAV en Debut 1974

**Presented by Abdallahi Sidia**

PRESENTATION :

Les attaques de plusieurs espèces d'acridiens sédentaires ont pris sur les cultures vivrières de la zone shélienne des proportions alarmantes depuis quelques années.

Ces acridiens, groupés sous le vocable "sauteriaux", s'ils ne sont pas susceptibles de se grégariser, peuvent dans certaines conditions, liées aux facteurs écologiques du milieu, dans lequel ils vivent, se concentrer en grand nombre au voisinage ou dans les zones cultivées.

La dessication naturelle ou la contraction de la végétation graminéenne sauvage sur laquelle ils vivent habituellement, conséquence de l'accroissement des surfaces cultivées et de la période de sécheresse actuelle, entraine en parallèle une augmentation rapide des dégâts sur graminées cultivées.

C'est en particulier, le cas spectaculaire des dégâts enregistrés sur cultures de sorgho de decrue, seule végétation verte disponible, en début de saison sèche et qui représentent, habituellement un aliment de choix pour ces insectes, en particulier au moment de la levée. Les cultivateurs se trouvent alors dans l'obligation de recommencer les semis une ou plusieurs fois ce qui entraine obligatoirement une baisse de rendement de 30 à 60%.

Ces conditions expliquent en partie que les sauteriaux représentent certainement à l'heure actuelle, le principal problème de défense des cultures posé aux services nationaux des Etats Sahéliens.

C'est pourquoi un financement partiel des moyens nécessaires à la lutte contre les sauteriaux serait susceptible d'apporter aux Etats Sahéliens une aide directement utile aux populations paysannes les plus éprouvées par la sécheresse.

Cette aide devait permettre la constitution des stocks de produits et moyens de lutte nécessaires ainsi que leur distribution avant la prochaine saison de moussan, dans les différentes régions agricoles vulnérables aux attaques de sauteriaux.

Par décision nº7/1973 le Conseil d'Administration de l'OCLALAV, après avoir considéré que les sauteriaux constituent un problème très important pour les différents Etats Membres a décidé que l'Organisation s'efforce de les aider à faire face à ce fléau, raison pour laquelle la proposition suivante est formulée, en tenant compte ces besoins exprimés par certains Etats.

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Cette aide limitée, serait actuellement la seule susceptible de permettre aux services nationaux avec l'aide de l'OCLALAV une bonne préparation de la campagne agricole prochaine.

## PROJET DE FINANCEMENT

| ETATS | DESIGNATION | QUANTITE | ESTIMATION (en milliers de FrsCFA) |
|---|---|---|---|
| MAURITANIE | HCH 25% poudre | 300 tonnes | 37.500 |
| | Fénitrothion 50% | 25.000 litres | 25.000 |
| | Pulvérisateur à dos type Holder | 50 unités | 2.500 |
| | Pulvérisateur sur pot d'échappement (Exhaust nozzle Sprayer) | 20 unités | 2.500 |
| | | | 67.500.- |
| MALI | HCH 25% poudre | 320 tonnes | 40.000 |
| | Poudreuse à main type Procall Rex | 320 unités | 3.750 |
| | | | 43.750.- |
| CAMEROUN | HCH 25% poudre | 150 tonnes | 18.750 |
| | Fénitrothion 50% | 10.000 litres | 10.000 |
| | Pulvérisateur à dos type Holder | 50 unités | 2.500 |
| | Poudreuse à main type Procall Rex | 100 unités | 1.250 |
| | | | 32.500.- |
| SENEGAL | HCH 25% poudre | 300 tonnes | 37.500 |
| | Fénitrthion 50% | 10.000 litres | 10.000 |
| | Malathion | 10.000 litres | 12.000 |
| | Timul 35 (Endosulfan) | 20.000 litres | 15.200 |
| | Son de blé | 200 tonnes | 2.600 |
| | Poste Radio CSF-BLU-CBL52 | 7 unités | 5.250 |
| | Sacs poudreurs | 10.000 unités | 1.500 |
| | | A reporter | 84.050.- |

| | | |
|---|---|---|
| | Report | 84.050.- |
| Pulvérisateur sur pot déchappement Exhaust nozzle sprayer | 10 unités | 1.250 |
| Pulvérisateur à dos (type Holder) | 125 unités | 6.250 |
| Poudreuse à main (type Procall-Rex) | 250 unités | 3.125 |
| Camion UNIMOG 416 | 10 unités | 35.000 |
| | | 129.675.- |

Arrondi à 130 millions de Francs CFA

Les estimations sont établis frais de transport compris jusqu'au lieu de distribution.

## RECAPITULATION

| Désignation | Quantité | Estimation (en milliers de francs Cfa) |
|---|---|---|
| HCH 25 % | 1 070 tonnes | 133 750 |
| Fénitrothion 50 % | 45 000 litres | 45 000 |
| Malathion | 10 000 litres | 12 000 |
| Tinnul 35 | 10 000 litres | 15 200 |
| Son de blé | 200 tonnes | 2 600 |
| Poste radio (Csf... | 7 unités | 5 250 |
| Sacs poudreurs | 10 000 unités | 1 500 |
| Pulvérisateur s/pot échapmt (Exhaust Nozzle Sprauer) | 30 unités | 3 750 |
| Pulvérisateur à dos (type Holder) | 225 unités | 11 250 |
| Poudreuse à main (type Procall Rev) | 670 unités | 8 125 |
| Camion Unimog 416 | 10 unités | 35 000 |
| | | 273 425 |

Appendix F.

Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviaire (OCLALAV) - Projet de Demande D'Aide D'Urgence Pour la Lutte Contre les Sauteriaux en 1974-75 - Demande Adressée à L'O.S.R.O. à Rome

Presented by Abdallahi Sidia

La longue période de sécheresse qui vient de s'écouler semble avoir favorisé, suite aux bonnes pluies de cette année, une pullulation massive de "sauteriaux". Les infestations de 1974 revêtent une ampleur sans précédent dans toutes les zones sahéliennes s'étendant de l'Atlantique au TCHAD.

La prévision de ce développement tragique de la situation avait provoqué des demandes d'insecticides et de matériel présentées par l'OCLALAV au nom des gouvernements aux diverses Organisations Internationales et pays donateurs en vue d'y faire face. Des réponses favorables, peut-être un peu tardives, ont faite suite à ces diverses requêtes parmi lesquelles l'assistance de l'OSRO, accordée aux divers gouvernements, a été vivement appréciée.

Comme vous le savez, les Etats ne sont pas suffisamment équipés ni entraînés pour faire face à ce fléau en année normale et à fortiori lorsqu'il prend, comme cette année, des dimensions inhabituelles.

L'OCLALAV, qui n'a pas dans ses attributions statutaires la lutte contre les sauteriaux, s'est trouvé sous la pression des Gouvernements des Etats membres, obligé d'intervenir dans les limites de ses possibilités, malgré toutes les difficultés techniques, matérielles, personnelles et financières. L'OCLALAV a malgré tout entrepris des prospections et des opérations de lutte aérienne et terrestre en MAURITANIE, SENEGAL, DAHOMEY, MALI, NIGER, TCHAD, CAMEROUN et HAUTE-VOLTA, couvrant déjà, à l'heure actuelle, une superficie de 130.000 hectares.

Les Gouvernements, intéressés pour les raisons indiquées ci-dessus, n'ont pu que, dans une assez faible mesure, aider à l'exécution de ces opérations.

Etant donné d'une part, les moyens limités de l'OCLALAV et le caractère généralisé et intense des infestations, et, d'autre part, le manque de préparation des services intéressés des pays membres, les opérations ont été trop tardives pour limiter suffisamment les dégâts.

En ce qui concerne l'OCLALAV, l'Organisation doit, pendant la saison de mousson, faire face simultanément à deux autres problèmes d'une importance au moins égale à celle des sauteriaux et qui entrent directement dans le cadre de ses responsabilités : il s'agit :

- D'une part, du criquet pèlerin qui s'est manifesté en MAURITANIE par des grégarisations couvrant plusieurs milliers d'hectares et ce, après une longue période

../.

de rémission. Il en est de même au MALI où les populations du criquet pèlerin commencent à augmenter après une absence presque totale de plusieurs années.

- Et, d'autre part, des oiseaux granivores dont le traitement des zones de nidifications repérées en particulier au MALI, au CAMEROUN et au TCHAD, ont entraînés l'engagement de la majorité de nos moyens d'intervention.

Il en découle que les résultats de cette campagne contre les sauteriaux des cultures pluviales ont été limités. Il reste encore à protéger les cultures de décrue qui représenteront cette année, rien que dans la vallée du SENEGAL (MAURITANIE et SENEGAL) environ 150 000 hectares.

Le moment nous semble donc opportun d'envisager des solutions à court, moyen et long terme pour lutter contre ce fléau qui constitue un des sujets les plus préoccupants des pays du SAHEL dans le cadre de votre Organisme, bien placé pour contribuer à leur financement et leur promotion.

Dans ce contexte, il est indispensable de définir le rôle que peut effectivement jouer l'OCLALAV. Etant donné la nature du problème "sauteriaux", notre Organisation, même si toutes les possibilités matérielles étaient mises à sa disposition, ne pourrait prendre à sa charge la totalité de ce problème intéressant des millions d'hectares de cultures vivrières traditionnelles, dispersées et souvent peu accessibles. Les services nationaux de la Protection des Végétaux doivent jouer inévitablement un rôle prépondérant. Toutefois, l'OCLALAV pourrait intervenir lorsqu'il s'agit de couvrir des superficies importantes par des moyens terrestres ou aériens à grand rendement dans les zones particulièrement infestées et où les moyens de lutte des services nationaux sont débordés.

En respectant les principes de cette politique, on peut suggérer les solutions suivantes :

1 - <u>Solution à court et moyen terme</u> -

a - Aide directe aux pays membres en insecticides et en petit matériel de pulvérisation (pulvérisateur à dos à moteur).

b - Une aide directe à l'OCLALAV lui permettant de jouer un rôle actif dans ces opérations.

En vue de poursuivre les opérations de lutte, <u>en particulier</u> dans la vallée du SENEGAL et également au TCHAD, CAMEROUN, et MALI, une aide immédiate de 40 Millions de Francs CFA nous semble indispensable. Le devis joint donne une estimation des diverses dépenses envisagées.

Si l'OCLALAV est appelé à jouer un rôle similaire à l'avenir pour des opérations de grande envergure, il est indispensable de renforcer son potentiel de lutte, en particulier en insecticides, véhicules et radio (voir devis ci-joint).

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2 - Solution à long terme -

a - Le problème "sauteriaux", dont les dégâts dans les divers pays, échelonnés sur une moyenne de plusieurs années, dépassent ceux de tous les ennemis des cultures, nécessite que des recherches biologiques et écologiques soient entreprises d'urgence sur les principales espèces afin de trouver des méthodes rationnelles de lutte. Dans ce but, il a été établi un projet régional de recherche, dont les bases principales figurent dans un avant-projet déjà envoyé à la FAO, début 1974 par l'OCLALAV (voir ci-joint).

b - Le renforcement et l'organisation de services spécialisés pour la défense des cultures dans chaque pays membre est la condition-clé de la solution, non seulement de ce problème, mais aussi des autres fléaux des cultures et des stocks de denrées entreposées. Ces services devront être capables d'assurer l'organisation de campagne précoce d'intervention avec la participation active des paysans.

Le projet PNUD/FAO '-030 sur la formation, actuellement en cours d'exécution, aidera dans ce sens, mais son concours sera limité étant donné les aspects parfois spécifiques de la Protection des Végétaux dans les différents pays.

En vue d'aborder le problème sur des bases solides et réalistes, le Directeur Général envisage de discuter ce problème directement avec les responsables de l'OSRO du CILSS à OUAGADOUGOU et à ROME. D'autre part, il est indispensable que des contacts directs soient organisés aussi fréquemment que possible.

# DEMANDE D'AIDE POUR L'OCLALAV

# POUR LA LUTTE ANTIACRIDIENNE

Commande à passer en 1974, livraison en 1975.

1 - INSECTICIDES -

Remplacement des quantités utilisées en 1974
soit environ 80.000 litres
Choix selon disponibilité et prix entre Fenthion ULV,
Folithion ULV — 120.000.000

2 - VEHICULES -

Remplacement des véhicules usagés et augmentation
du potentiel de lutte.
Véhicules de traitement et moyen porteur.
15 Unimogs Diesel 416 — 60.000.000
et véhicules de prospection
15 Land-Rover Pick-Up Diesel — 22.000.000 — 82.000.000

3 - RADIO -

Pour liaisons avec la Direction Générale,
groupements et équipes de lutte
2 Emetteurs récepteurs BLU grande puissance 200 W
15 " " BLU 50 W pour véhicule

Estimation = 18.000.000

220.000.000

24 OCT. 1974

ORGANISATION COMMUNE DE LUTTE ANTIACRIDIENNE ET DE LUTTE ANTIAVIAIRE (O. C. LA. LAV)

## DEMANDE D'AIDE D'URGENCE POUR L'OCLALAV

1 - Avions pour prospection et traitement -

- Location avion pour prospection ou de traitement
- Location pilotes et mécaniciens avion pour les avions de l'OCLALAV
- Fonctionnement des avions de l'OCLALAV

25.000.000 F CFA

2 - Véhicules -

- Pour la prospection, les traitements au sol et l'appui logistique des avions
- Frais carburant, huile, pièces détachées, pneumatiques

10.000.000 F CFA

3 - Personnel -

- Personnel saisonnier, nourriture en campagne

5.000.000 F CFA

40.000.000 F CFA

# A D D I T I F (Novembre et début Décembre)

1 - A part les interventions aériennes entreprises par l' O C L A L A V, les Gouvernements intéressés ont de leur part effectué des traitements terrestres dans le cadre des services nationaux de la protection des végétaux avec l'assistance de l'OCLALAV.

En Novembre et Décembre, 80.000 hectares supplémentaires ont été traités par avion dans la région du fleuve SENEGAL avec les moyens de l' O C L A L A V et l'assistance de la FRANCE, ce qui porte la superficie totale traitée par avion à 210.000 hectares.

2 - Les services nationaux des pays intéressés ont aussi profité de l'aide de l' OSRO et de l' USAID sous forme de produits et appâts insecticides.

Appendix G.

# Avant Projet Recherches Sur Les Sauteriaux en Afrique de L'Ouest Pendant 3 Ans (1975-1977)

Presented by Abdallahi Sidia

## I - JUSTIFICATION

Les céréales représentent la base de l'alimentation des populations dans l'ensemble des pays d'Afrique de l'Ouest et leur développement est indispensable pour assurer la nourriture normale des populations.

Diverses espèces de criquets sédentaires appelées "sauteriaux" se reproduisent toutefois dans les zones non cultivées, autour des champs cultivés et causent souvent des dégâts sérieux aux cultures vivrières, la destruction pouvant parfois être totale.

Contrairement aux espèces de criquets migrateurs les sauteriaux sont difficiles à combattre étant donné le chevauchement des stades larvaires des diverses espèces et la diversité de leur comportement et de leurs cycles évolutifs.

Les connaissances concernant ces insectes sont extrêment limitées en raison du nombre réduit d'études entreprises à ce sujet ce qui rend aléatoire les méthodes de lutte pouvant être envisagées.

La végétation spontanée, surtout graminéenne, constituant la base essentielle de la nourriture des sauteriaux, l'action de l'homme, en accélérant la destruction de la végétation naturelle, en étendant les superficies cultivées et en surexploitant le milieu, a créé un milieu favorable aux attaques des sautariaux et accentué les possibilités de leur développement. Ce problème s'est particulièrement aggravé au cours de ces dernières années suite à l'incidence de la sécheresse.

Sauf des cas très localisés la lutte entreprise par les services publics et par les agriculteurs contre ces insectes a toujours été très limitée et les résultats ont rarement été satisfaisants en raison des difficultés et des lacunes mentionnées plus haut: Le projet de recherches, sujet de cette note, est envisagé pour remédier à cette situation.

Au cours d'une première phase de 3 ans, couvrant la Mauritanie, le Sénégal et le Mali,(1) le projet recherchera une connaissance de la biologie et du comportement alimentaire des sauteriaux ; il effectuera des recherches sur les procédés de lutte chimique et les possibilités de prévention écologique et agronomique. La diversité des problèmes posés et l'immensité des territoires touchés par ce problème implique la prévision d'un deuxième plan de 5 ans en vue de définir les conditions optima de prévention et d'intervention.

(1) Haute-Volta, Niger, Tchad

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## II - OBJECTIFS DU PROJET

Le but est de définir des méthodes de lutte contre les sauteriaux et de préciser la stratégie à mettre en oeuvre pour que les dégâts de sauteriaux ne représentent plus un danger aux cultures ni un obstacle à leur développement. Pour atteindre cet objectif le projet devra :

- identifier et localiser les populations de sauteriaux
- décrire la dynamique de leur population
- préciser les exigences et préférences alimentaires des principales espèces
- rechercher et expérimenter les méthodes de lutte chimique, physique et agronomique susceptibles de réduire l'importance des dégâts
- préciser le champd'application et les méthodes d'évaluation des prix de revient des différents procédés de destruction ou de prévention
- proposer aux Gouvernements participants une stratégie de lutte et de prévention
- former le personnel scientifique et technique chargé de mettre en oeuvre les méthodes préconisées par le

## III - IMPLANTATION DU PROJET

Le projet exercera ses activités au cours de la phase I dans les pays suivants :

Mauritanie - Sénégal - Mali - Tchad - Niger/ Haute-Volta couvrant ainsi les zones climatiques soudano-sahélienne et sahélienne recevant entre 300 et 800 mm.

L'aire du projet sera subdivisée en 2 zones d'activités : Ouest et Est.

a) la zone Ouest couvrira la Mauritanie - le Sénégal et Ouest du Mali

b) la zone Est couvrira l'Est du Mali - le Niger, le Tchad. et la Haute-Volta

ORGANISMES COOPERATEUR S DES GOUVERNEMENTS

L'OCLALAV en étroite collaboration avec les ministères compétents des pays intéressés.

Le projet travaillera en coopération avec les organismes de recherches et d'expérimentation suivants :

- Projet PNUD/FAO de recherches agronomique et de développement agricole pour la mise en valeur du Bassin du Sénégal - Station de GUEDE, KAEDI, MATAM
- IRAT , station de BAMBEY (Sénégal) - RICHARD-TOLL (Sénégal) DELI (Tchad) et tout autre station ou organisme de recherches sur la production céréalière pouvant apporter sa coopération au projet

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Le projet collaborera directement aves les services agricoles des gouvernements intéressés. Les travaux s'effectueront au bénéfice des organismes nationaux de déf défense des cultures.

## IV - APPORTS DU PROJET ( Plan I ) 3 ans

### 1 - Personnel

| Zone Ouest | Zone Est |
|---|---|
| 1 entomologiste | 1 entomologiste |
| 1 écologiste botaniste | 1 spécialiste lutte opérationnelle |
| 1 agronome | |

Il est évident que l'écologiste, l'agronome et le spécialiste de lutte opérationnelle feront des déplacements fréquents entre les deux zones. L'entomologiste de la zone Ouest assurera la direction du projet.

En plus 12 mois/homme de consultant seront fournis au cours de la première phase du projet.

| | | |
|---|---|---|
| Montant total en | $ EU | 480 000 |

### 2 - Contrats de sous-traitance

| | | |
|---|---|---|
| Avions de liaison et de pulvérisation | $ EU | 50 000 |

### 3 - Formation

| | | |
|---|---|---|
| | $ EU | 20 000 |

### 4 - Fourniture matériel

| | | |
|---|---|---|
| Insecticides | " | 10 000 |
| 5 véhicules de prospection | " | 20.000 |
| 1 véhicule de liaison | " | 3 000 |
| Matériel de campement | " | 3 000 |
| Matériel scientifique | " | 3 000 |
| Matériel de pulvérisation expérimentale | " | 5 000 |
| Total | | 594 000 |

## V - APPORTS DES GROUPEMENTS

### a) Personnel

| | Zone Ouest | Zone Est |
|---|---|---|
| Entomologiste | 1 (Oclalav) | 1 (Gvt Niger) |
| Ingénieur agricole (Déf. cult.) | | 1 (Gvt Niger) |
| Ingénieur ITA | 1 (Gvt Mali) | 1 (Gvt Tchad) |
| Ingénieur ITA | 1 (Gvt Sénégal) | |
| Ingénieur ITA | 1 (Gvt Mauritanie) | |
| Fonctionnaire Administratif | 1 (Oclalav) | |
| Prospecteurs | 1 (Gvt Mali) | 1 (Gvt Niger) |
| | 1 (Gvt Sénégal) | 1 Gvt Tchad) |
| | 1 (Gvt Mauritanie) | |

.../.

| | | |
|---|---|---|
| Chauffeurs | 1 (Gvt Mali)<br>1 (Gvt Mauritanie)<br>1 (Gvt Sénégal) | 1(Gvt Niger)<br>1 (Gvt Tchad) |
| Commis dactylographe | 1 (Oclalav) | |

b) - BATIMENTS - MATERIEL - FOURNITURES

A répartir entre OCLALAV et pays intéressés.

12 MARS 1974

ORGANISATION INTERNATIONALE CONTRE LE CRIQUET MIGRATEUR AFRICAIN

O. I. C. M. A.

B. P. 136 - BAMAKO - MALI

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Presented by G. Diagne

DEMANDE D'AIDE OFFICIELLE EN RAPPORT AVEC LA CONJONCTURE ACRIDIENNE DANS LE SAHEL ET L'EXTENSION DES ACTIVITES DE SURVEILLANCE ET DE LUTTE PREVENTIVE DE L'OICMA

## I. HISTORIQUE

Le Criquet Migrateur Africain (Locusta migratoria migratorioides R. and F.) est un des trois criquets migrateurs qui ont, de tous temps, régulièrement envahi les pays africains au Sud du Sahara provoquant dévastation généralisées et famine. En 1925, une grande pullulation de ce criquet à partir de l'Aire grégarigène du Delta Central du NIGER, du MALI, a conduit au fléau d'invasion acridienne de 1928 à 1941 qui a provoqué la destruction générale des récoltes et la régression de l'économie agricol de plusieurs pays africains.

Afin d'éviter de telles pullulations dans le futur, une Organisation Internationale (OICMA) a été établie en 1952 par les trois puissances coloniales d'alors : BELGIQUE, FRANCE, et ROYAUME UNI.

En 1962, une nouvelle convention révisée, qui plaçait la responsabilité de la lutte préventive sur les épaules des pays africains, est entrée en vigueur, après signatur et ratification par les pays suivants : CAMEROUN, REPUBLIQUE CENTRAFRICAINE, CONGO-FRAZZAVILLE, REPUBLIQUE DEMOCRATIQUE DU CONGO (maintenant ZAIRE), COTE D'IVOIRE, DAHOMEY, GAMBIE, GHANA, HAUTE-VOLTA, KENYA, MALI, MAURITANIE, NIGER, NIGERIA, SENEGAL, SIERRA LEONE, SOUDAN, TANZANIE, TCHAD, OUGANDA. La ZAMBIE et le TOGO ont adhéré par la suite à l'Organisation respectivement en 1968 et 1970.

Depuis l'entrée en vigueur de la nouvelle convention de l'O.I.C.M.A., l'Organisation a assumé son principal rôle de surveillance et de lutte préventive dans l'Aire grégarigène du NIGER et a protégé avec succès les états membres d'invasions acridiennes qui auraient eu des conséquences identiques à celles du dernier fléau.

Actuellement, un Projet de Recherche sur le Criquet Migrateur Africain a été financé par le PNUD pour une période de 5 ans (1970 - 1975). Ce Projet vise à effectuer des Recherches Opérationnelles sur les méthodes pouvant conduire à une lutte préventive plus efficace et plus économique contre le Criquet Migrateur Africain. On espère que la réalisation de ces objectifs allègera les charges financières des Etats Membres pour la lutte antiacridienne préventive.

## 2. EVOLUTION DE LA SITUATION ACRIDIENNE

### 2.1. CRIQUET MIGRATEUR AFRICAIN

Depuis fort longtemps, il existe autour du Bassin du Lac Tchad une population autochtone du Criquet Migrateur Africain (Locusta migratoria migratorioides R. and F. dont l'Aire Grégarigène principale se trouve dans le Delta Central du Niger au Mali.

Ces dernières années, les conditions écologiques ont été très favorables à la reproduction du Locusta dans le Bassin du Lac Tchad.

C'est ainsi qu'en 1969 et surtout en 1970, nous avons assisté à la formation de bard larvaires et d'essaims de Criquets Migrateurs Africains qui ont causé d'importants dégâts aux cultures. Les interventions effectuées par les services nationaux de Protection des Végétaux du CAMEROUN et du NIGERIA ainsi que les équipes de l'OICMA ont permis d'éviter l'invasion des autres pays situés dans le Bassin du Lac Tchad. Cette région devait être reconnue comme une Aire Grégarigène secondaire.

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En 1973, une situation acridienne très dangereuse s'est de nouveau développée dans le Bassin du Lac Tchad dans 3 pays membres de l'OICMA (CAMEROUN, NIGERIA et TCHAD). Le Criquet Migrateur Africain a produit, cette année encore, des bandes de larves et d'essaims d'adultes dans cette aire grégarigène complètement différente, située au Sud-Ouest du Lac Tchad. A partir de cette zone, les criquets ont envahi plus de 100.000 hectares de terres cultivées en maints endroits des trois pays précités et ont aggravé une situation déjà très sérieuse et préoccupante causée par la sécheresse et la perte des récoltes dans ces régions.

Les opérations de traitement effectuées par l'OICMA, les pays membres affectés et avec l'assistance de l'OCLALAV, ont limité dans une large mesure, l'étendue et l'invasion acridienne.

La saison des pluies 1974 a également provoqué une nouvelle résurgence du Criquet Migrateur Africain aussi bien dans le Bassin du Lac Tchad que dans le Delta Central du Niger au Mali.

A l'heure où sont écrites ces lignes, les traitements se poursuivent au Nigéria dans la région de NGALA et au Mali autour du Lac Faguibine, et plus de 20.000 ha ont été déjà traités.

## 2.2. SAUTERIAUX

Sous le vocable "sauteriaux" sont désignées plus de 200 espèces de criquets sédentaires considérés autrefois comme des acridiens d'importance secondaire.

Une trentaine d'espèces ont un intérêt d'ordre économique de par les dégâts causés aux cultures.

Toutefois, les espèces identifiées comme étant les plus dangereuses sont les suivantes:

- Oedaleus Senegalensis
- Oedaleus Nigeriensis
- Aïolopus simulatrix
- Hierogliphus daganensis
- Catantops axillaris
- Kraussaris angulifera
- Cataloïpus Sp

Après plusieurs années consécutives de grande sécheresse, le Sahel connait actuellement une invasion acridienne généralisée qui s'étend de la Mauritanie au Soudan. Les causes de cette explosion inattendue sont probablement dues aux changements écologiques survenus dans les régions sahéliennes au cours de ces dernières années. De longues périodes de sécheresse suivies d'une saison des pluies normale, ont peut-être modifié le comportement des sauteriaux.

Les dommages occasionés aux cultures depuis le mois d'Août 1974 sont considérables le mil en particulier, a subi des attaques repétées à tous les stades de son développement ; les plus graves s'étant manifestées au moment de l'épiaison et de la maturité des grains.
Au Tchad, au Niger, dans le Nord du Cameroun, du Niger, du Dahomey et du Togo, en Haute Volta, au Sénégal, en Mauritanie, 75 à 80 % de la récolte de mil est détruite sur plusieurs milliers d'hectares.

Le Mali également n'a pas été épargné ; les zones les plus éprouvées sont celles des régions de Kayes, Nioro, Yélimané à l'Ouest et des Lacs NIANGAY, Do et GAROU où plus de 200.000 hectares de cultures vivrières sont endommagés de 70 % à 100 %. Dans la région de GAO, la plupart des champs de sorgho et de mil se trouvant le long du Tilemsi ont été entièrement ravagés

Les cultures dites de crue sont également menacées de destruction si des mesures urgentes ne sont pas prises pour les protéger.

.../...

## 3. DISPOSITIONS PRISES PAR L'OICMA ET LES PAYS MEMBRES

3.1. Suite aux signalisations des invasions acridiennes dans le Bassin du Tchad des opérations de traitement ont été menées dans la limite de leurs moyens par l'OICMA, l'OCLALAV et les services nationaux de Protection des Végétaux du Cameroun et du Nigéria, interventions qui ont permis, dans une large mesure de limiter l'extension du fléau.

3.2. Les sessions 1974 du Comité et du Conseil Administratif de l'OICMA ont examiné l'évolution des activités acridiennes au Sahel et dans le Bassin du Lac Tchad et ont pris les décisions suivantes en rapport avec l'urgence de la situation

a) que les activités de surveillance et de lutte préventive de l'Organisation soient étendues au Bassin du Lac Tchad qui est reconnu officiellement comme une nouvelle aire grégarigène du Criquet Migrateur Africain.

b) que deux bases pour la surveillance et la lutte contre LOCUSTA et les sauteriaux à l'intérieur des aires grégarigènes soient établies dans le Bassin du Lac Tchad à MAIDUGURI (Nigéria) et à GAROUA (Cameroun) ;

c) que l'assistance internationale soit sollicitée pour l'extension des activités de l'OICMA dans la nouvelle aire grégarigène dans le Bassin du Lac Tchad pour la fourniture de matériels et produits.

3.3. L'OICMA a créé deux bases de lutte en Avril et Mai 1974 à MAIDUGURI (Nigéria) et à GAROUA (Cameroun). Les Gouvernements du Nigéria et du Cameroun ont fourni les infrastructures nécessaires, bureaux, logements, hangars et facilités nécessaires pour le bon fonctionnement des bases et l'efficacité des activités de lutte.

L'OICMA a fourni le personnel ainsi que les matériels et produits pour l'équipement de ces bases, avec l'assistance de certains pays et a continué à assumer sa mission de surveillance et de lutte préventive contre Locusta dans l'aire grégarigène au Mali

3.4. Concernant l'invasion généralisée du Sahel au cours de la saison des pluies 1974 les pays concernés n'étaient pas, ou peu préparés à faire face à cette nouvelle calamité.

Il s'agit d'un problème de défense des cultures qui devrait être résolu par chaque organisme national chargé de la protection des végétaux (Ministère chargé de l'Agriculture) ; malheureusement, les services nationaux sont inexistants, ou bien ont une possibilité d'action très limitée. Le personnel qualifié est rare, les agricultueurs ne sont pas formés aux techniques de défense des cultures, les moyens de traitements et les insecticides manquent.

Devant l'ampleur des dégâts causés aux cultures par les sautériaux, l'OCLALAV et l'OICMA ont mobilisé tous leurs moyens pour faire face au fléau ; mais ceux-ci sont nettement insuffisants pour assurer une protection efficace dans tous les pays.

Aussi, l'assistance internationale est-elle nécessaire non seulement pour aider les pays à structurer leur service national de Protection des Végétaux, mais également pour renforcer les moyens d'intervention des Organisations régionales telles que l'OICMA et l'OCLALAV.

## 4. AIDE SOLLICITEE PAR L'OICMA

Conformément aux décision du Conseil Administratif et du Comité Exécutif de l'OICMA, la présente requête est adressée à l'assistance internationale pour une aide urgent afin de pouvoir d'une part contenir la situation acridienne explosive actuelle et d'autre part, éviter la formation d'un autre fléau du Criquet Migrateur Africain et des sautériaux au cours de ce siècle.

Les besoins actuels de l'OICMA peuvent se subdiviser en :

- Besoins immédiats pour la Campagne 1974
- Besoins pour la Campagne 1975
- Besoins à long terme (plan triennal)

4.I. Les besoins immédiats pour la Campagne 1974 consistent essentiellement en produits insecticides et moyens financiers pour le traitement, par voie aérienne, de 90.000 hectares de cultures de décrue au Mali.

a) Produits : soit 45.000 litres de fénitrothion, formulation ULV
ou fenthion " "
ou Dursban " "
soit 90.000 litres de MalathionULV 96 % w/w,

b) Frais de traitement 51.300.000 Frs CF

- Frais d'épandage par avion 6.300.000 frs CFA
180 heures de traitement à
raison 35.000 frs CFA/h de vol

- Frais de personnel, de transport
et d'approche au sol 500 frs CFA/ha 45.000.000 frs CFA

4.2. Besoins pour la campagne 1975

Les matériels et produits ci-dessous devraient être mis à la disposition de l'Organisation au plus tard fin Mai 1975 afin de lui permettre d'intervenir efficacement contre les pullulations acridiennes dès le début de la saison des pluies.

a) Moyens aériens

2 Avions agricoles Cessna 185 AGWAGON ou Piper Pawnee
300 heures de vol d'hélicoptère pour la période Juillet-Décembre 1975

b) Moyens de transport terrestre

2 camions tous terrains, 10 Tonnes
6 camionnettes MercedèsUNIMOG 4I6

c) Insecticides

50.000 litres de fénitrothion ou fenthion ou Dursban, formulation ULV

d) Matériel radio

2 Emetteurs-Récepteurs 400 watts

4.3. Besoins à long terme

Ces besoins devraient nous être fournis selon un programme triennal à partir de

a) Moyens de transport terrestre

- 10 camions tous terrains, 10 Tonnes
- 12 camionnettes Mercedès Unimog 4I6
- 16 Pick-up Land Rover 109
- 4 Station Wagon Land Rover 109

b) Insecticides
soit 100.000 litres de fénitrothionou fenthion ou Dursban, formulation ULV
soit 250.000 litres de Malathion, formulation ULV

c) Matériel radio
10 Emetteurs-Récepteurs 100 watts
30 Emetteurs-Récepteurs 3 watts portatifs.

## 4.4. PLAN TRIENNAL D'ASSISTANCE A L'OICMA

| DESIGNATIONS | ANNEES | | | TOTAL |
|---|---|---|---|---|
| | 1976 | 1977 | 1978 | |
| **1. VEHICULES** | | | | |
| Camions tous terrains 10T | 4 | 3 | 3 | 10 |
| Unimog 416 | 4 | 4 | 4 | 12 |
| Pick up Land Rover 109 | 8 | 4 | 4 | 16 |
| Station Wagon Land Rover | 2 | 2 | - | 4 |
| **2. INSECTICIDES** | | | | |
| Fénitrothion ou Fenthion | 40.000 | 30.000 | 30.000 | 100.000 |
| ou Malathion | 80.000 | 75.000 | 75.000 | 250.000 |
| **3. RADIO** | | | | |
| Emetteur Récepteur 100 W | 6 | 4 | " | 10 |
| Emetteur Récepteur 3 W | 20 | 10 | " | 30 |

## 4.5. REPARTITION DE L'AIDE SOLLICITEE DANS LES BASES DE L'OICMA (PLAN TRIENNAL)

| LIEUX | MATERIELS | | | | | | |
|---|---|---|---|---|---|---|---|
| | Camion 10T | Unimog 416 | PU Land Rover 109 | S.W. Land Rover 109 | Insecticides en litres | E/R 100W | E/R 3W |
| KARA | 2 | 4 | 4 | 2 | 20.000 | 2 | 8 |
| KAMI | 1 | 1 | 1 | - | 10.000 | 1 | 4 |
| DOGO | 1 | 1 | 1 | - | 10.000 | 1 | 2 |
| SAN | 1 | 1 | 1 | - | 10.000 | 1 | 2 |
| NIAFUNKE | 1 | 1 | 1 | - | 10.000 | 1 | 2 |
| MAIDUGURI | 2 | 2 | 4 | 1 | 20.000 | 2 | 6 |
| GAROUA | 2 | 2 | 4 | 1 | 20.000 | 2 | 6 |

L'OICMA serait reconnaissante à l'assistance internationale de bien vouloir accorder cette requête une suite prompte et favorable.

BAMAKO, LE 2 DECEMBRE 1974

P. Le Conseil Administratif de l'OICMA

G. DIAGNE

Appendix I.

Invitation to an Ad Hoc Government Consultation on Pesticides in Agriculture and Public Health

Rome, 24-28 February 1975

Reply Requested by

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Presented by W. Furtick

The Director-General of the Food and Agriculture Organization of the United Nations has the honour to invite attendance at the Ad Hoc Government Consultation on Pesticides in Agriculture and Public Health, which will be held at FAO Headquarters in Rome from 24 to 28 February 1975. The opening meeting will begin at 10:00 hours on Monday, 24th February 1975. This Consultation is being convened on an urgent basis in accordance with Resolution X (Pesticides) of the World Food Conference which was subsequently reviewed by the FAO Council at its 64th session. It is open to all FAO member nations and to observers.

The Consultation will be conducted in English, French, Spanish and Chinese. The Provisional Agenda and Notes are enclosed. Further documentation will be forwarded as soon as available.

The Director-General would appreciate receiving by the names, official titles and addresses of the representatives designated to attend.

Due to the technical nature of several subjects to be discussed at the Consultation, it is desirable that Government delegations include personnel who have some basic understanding of the general subject matter.

In view of recent developments, visa requirements for entry into Italy are more strictly enforced and participants should therefore be

advised to enquire at the nearest Italian Embassy or Consulate whether entry visas to Italy are required.

## AGENDA NOTE

### Background

The special session of the FAO Council in July 1974, in response to the DCOSOC Resolution approved two action proposals regarding pesticides. The first proposal called on governments and industries of exporting countries to ensure production and allocation of adequate supplies of pesticides for developing countries. The second proposal requested the Director-General of FAO to set up an information system on pesticide supplies and demand. The Director-General of FAO implemented the information system on pesticide supplies and demand following the July Council meeting. Questionnaires were sent to FAO or UNDP representatives in each of the developing countries for use in consultation with the government and local distribution authorities, to determine demand trends, both current and short range, in relation to past use. Attention is drawn to the general problems of availability of supplies and sharply rising prices faced by the pesticide importing countries and to the fact that this situation affected adversely food crop production programmes in developing countries and required international study and cooperation. The Council recognised the crucial role pesticides play in agricultural production and the importance of their assured supply at reasonable prices.

In the light of these considerations and in view of the relevant Resolution on pesticides by the recently concluded World Food Conference, the Council agreed with the Director-General's proposal to convene an ad hoc government consultation as soon as possible with the participation of industry representatives and of WHO, UNIDO and UNEP and the World Bank, to review the world pesticide supply/demand and price situation as well as the overall subject of efficient and safe pest control techniques.

Timetable

The Director-General of FAO has arranged accordingly for an ad hoc Government Consultation of Pesticides in Agriculture and Public Health to take place from 24 to 28 February 1975 at FAO Headquarters, Rome. This timing will enable the report of the Consultation to be considered by the Council and Conference at their next sessions.

Documentation

The Council stressed the need to examine thoroughly the entire subject of pesticides and plant protection with emphasis on supply and demand as affecting developing countries. Several delegates to the World Food Conference also indicated their wish to raise issues of particular importance to their governments in the forthcoming ad hoc Consultation. Delegates are therefore invited to present brief written reports (if possible not exceeding 1200 words) containing a short analysis of the main factors bearing on recent developments of pesticide demand, supply and prices and the basic tendencies likely to influence the short and longer term situation, to be discussed particularly under Agenda Item 6. Delegates are requested to make available, in either English, French or Spanish, 200 copies of these reports for distribution at the Consultation.

General information and documentation to be prepared is referred to in the following notes on the individual agenda items:

Item 5 - Pest, Disease and Weed Control Problems causing Major Reductions in World Food Supplies

Delegates are urged to include a pertinent, brief, summary in their "country report," preferably on a crop basis. It would be extremely useful if they could also include estimates of losses in major crops by cause(s) if known. The need for crop loss assessment and suitable methodology as a basis for development of sound plant protection programmes will also receive attention under this agenda item.

Item 6 - The Current Situation and Future Prospects on Pesticide Supply and Demand, with Emphasis on Problems in Developing Countries

It should be noted that trends and prospects for pesticide supplies and prices (medium and long-range) will be reviewed under this agenda item.

Both country delegates and industry should be prepared to furnish information in order to be able to assess the situation as fully as possible.

As a basis for discussion an attempt will be made by the Secretariat to summarize the latest information, including industry's views, on the basis of data available up to December 1974, to enable the Consultation to review the current situation for pesticide supplies and possibly prices, and to consider the major trends in pesticide

production, consumption and trade with a view to assessing medium and longer term outlook. Information will be provided at the Consultation on any important subsequent developments. Discussion will include, among other aspects, supply and demand information, and research and development (by industrial sector and by national and international sector).

Item 7 - Consideration of Establishment of Pesticide Reserves and Necessary Mechanisms for Emergency Operations

Discussion will include consideration of establishing a small coordinating unit, such as the one originally established for fertilizers, as a first step in organizing a "pesticides reserve" programme. In the case of emergency operations and large scale control programmes the desert locust control scheme will be examined as a possible model for such operations.

Item 8 - Major Factors Retarding Introduction of New Pesticides and Limiting Distribution and Optimum Use of Existing Ones

Industry and the Secretariat will prepare papers outlining constraints and recommending appropriate national/international action for discussion. "An International Programme for the Control of Pests affecting Agriculture and Human Health" which was adopted by participants at a Rockefeller-foundation sponsored meeting, held in Bellagio, Italy in April 1974, will be discussed under this agenda item.

Training requirements and programmes on the efficient and safe use of pesticides and establishment of future mechanisms of coordination and strengthening of such activities will also be covered under this item.

Item 9 - Needs for International Standardization of Pesticide Registration Requirements, Testing and Environmental Rules on Procedures

Working papers will be prepared both by industry and the secretariat for review and further discussion. These will outline specific needs for registration standardization, past international attempts to coordinate standards on quality control and efficacy, toxicological testing, residue control, etc.

Item 10 - Current Status and Prospects of Alternative Methods of Pest, Disease and Weed Control

The following general aspects will be reviewed: present status of integrated pest control, use of insect diseases, biological and safety testing requirements for such diseases, use of behaviour changing and growth and genetic disruption compounds, plant resistance to pests and diseases, potential of horizontal resistance to retard resistance breakdown, etc. The entire subject of alternative methods will be discussed in detail, including present state of development and future prospects, practicality in use, cost considerations, relevant advantages and disadvantages compared to chemical control and recommendations for future action.

Additionally, the FAO/UNEP cooperative global programme will be outlined and discussed.

Item 11 - Review of FAO/WHO Pesticide Programmes

Discussion will include a review of past history and accomplishments of these programmes, their present status and

future plans (both short and long range) and needs for future coordination and strengthening.

Appendix J.

Presented by J. Gentry

# WEST AFRICAN REGIONAL PEST MANAGEMENT PROJECT[1/]

USDA Participating With AID

Background:

Losses caused by plant pests in the West African Sahelian Region are limiting factors in agricultural production and, consequently, the overall economic development of the countries involved. An AID-sponsored study team of experts made an appraisal of the existing crop protection situation in parts of this area in 1972 and aptly described conditions as follows:

> "Present lo ses to pests in African countries visited are consistently large, at times catastrophic, and were deemed intolerable and a serious handicap to country development. Therefore, the development needs justify intensive and coordinated efforts made at an international level in research, training and extension in the various disciplines of plant protection . . . . Most research efforts currently underway are in the field of production but advances in plant protection must proceed simultaneously. Without such program development, increases possible from better crop varieties and improved cultural practices may be negated. The countries visited varied rather widely in plant protection capability, but there is a need for a very positive approach to programming country needs on a priority basis. More gains would result in crop production through effective plant protection programs

than through additional production research in many instances. Many of these countries do not have the capability to attack their food crop protection programs at this time thus these recommendations are made to accelerate capability in this area. The ultimate goal, of course, is to raise their capability, not only to solve problems themselves but to provide their own training on a self-perpetuating basis."2/

The application of U.S. technology to this problem directly through trained personnel will bring marked improvement in crop protection practices in the region over time. The long-term goal is development of incountry capability and sufficiency; however, real benefits will start generating immediately through attention to emergency needs, problem definition, and improved communications. Therefore, the following project is proposed.

1/ This draft proposal was requested by Office of Central and West African Regional Affairs, AID/W.
2/ Sasser J. N. et al. 1972. Crop Protection in Senegal, Niger, Mali, Ghana, Nigeria, Kenya, Tanzania and Ethiopia. U.S. Agency for International Development, Washington, D.C.

Objective:

In concert with national governments and other interested organizations, establish or develop functional plant protection organizations in West African Sahelian Region countries.

Plans for Achieving Objective:

1. Establish and staff a Regional Pest Management Project headed by a coordinator with a Plant Protection Specialist stationed in each recipient country as a counterpart to appropriate Ministry of Agriculture offices.

2. Provide liaison on intra- and interregional basis on administrative and operational matters interlocking with goals of regional organizations such as FAO, OICMA, OCLALAV, and other agencies interested in development of agricultural resources of the region.

3. Provide leadership in developing viable plant protection organizations in each country through:

a. Advising on sound management practices, including staffing, planning, budgeting, and evaluation.

b. Identification of professional and practical training needs on the short and long term. Provide for or conduct short courses, field demonstrations, and other needed incountry training. Assist in selecting candidates for professional training and make necessary arrangements.

c. Encouraging and assisting in the development of effective survey, extension, and control systems.

4. Provide technical assistance in plant protection operations as follows:

a. Direct and conduct surveys to determine major pest problems (insects, disease, nematodes, weeds), assess population and incidence levels for treatment purposes, estimate crop losses.

b. Determine and carry out demonstrations of the most effective and economical methods of pest control, integrating chemical, cultural, and biological methods as indicated. Give special attention to post-harvest pest problems.

c. Provide instruction in pesticide safety including protection of applicators and impact on the nontarget environment.

d. Identify major research needs and assist in establishing programs to address such needs.

e. Provide technical advice and consultation to regional organizations and other interests operating in the area.

f. Introduce regulatory philosophy to assist countries in guarding against introduction of exotic plant pests.

g. Provide progress reports on activities of the project, by country and by region, at designated intervals.

Timeframe of Program:

A minimum of 5 years will be required to make significant gains in this area. If project is approved early in CY 1975, target would be to have Regional Coordinator at post by July 1 and remainder of staff onboard by end of CY 1975.

Leadtime will be needed for language training of personnel prior to departure.

Personnel:

Manyears -- 7.5

1 Coordinator GS-14 or GS-15 (will also serve as specialist for Senegal).

1 Administrative Assistant GS-9

5 Plant Protection Specialists GS-13

1/2 U.S. Backstopping

Regional Headquarters--Dakar, Senegal.

Country Posts--Senegal, Mali, Upper Volta, Niger, Chad, Mauritania.

Additional countries can be staffed as required.

Budget: (To be developed)

1. Personnel
2. Travel
3. Support, including vehicles, equipment, supplies, etc.
4. Administrative management and technical backstopping.
5. All other.