

Report of the Seventh Session of the
DESERT LOCUST CONTROL COMMITTEE
TECHNICAL GROUP

Rome, Italy

12 – 15 June 2000



Plant Production and Protection Division
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome 2000

TABLE OF CONTENTS

	Page
OPENING	1
UPDATING/REVISING THE DESERT LOCUST GUIDELINES	1
PRACTICAL IMPLEMENTATION OF ENVIRONMENTAL MONITORING IN THE DESERT LOCUST	2
ESTABLISHING A NETWORK ON DESERT LOCUST TRAINING AND RESEARCH	5
THE ROLE OF GPS TECHNOLOGIES IN DESERT LOCUST CONTROL OPERATIONS	7
REVIEW OF NEW LOCUST OPERATIONAL METHODOLOGIES USED BY APLC, WITH A VIEW TO THEIR POSSIBLE TRANSFER TO DESERT LOCUST MANAGEMENT	9
REVIEW OF THE MANDATE OF DLCC	10
ADOPTION OF THE REPORT	12
DATE OF THE NEXT MEETING AND POSSIBLE SUBJECTS FOR DISCUSSION	12
CLOSURE OF THE MEETING	12
APPENDIX 1: LIST OF PARTICIPANTS	13

OPENING

1. The Seventh Session of the Desert Locust Control Committee Technical Group was opened by Mr. Niek Van der Graaff, Chief, Plant Protection Service. He welcomed the five members present, and thanked them for the time and effort they were putting into the Group. He expressed particular appreciation of the presence of Dr. Graeme Hamilton who had come from Australia despite the serious locust outbreak in his country. He noted that the sixth member Dr. Van Huis had been unable to attend as he was away on sabbatical leave. Mr. Van der Graaff noted that, at the 35th Session of the DLCC, it had been agreed to reconstruct the Technical Group so that its discussions became much more technical. The FAO Secretariat had been charged with choosing members according to their individual ability, expertise and experience in locust management.
2. Mr. Van der Graaff noted that the first item on the provisional agenda was a discussion of the draft revised and updated Desert Locust Guidelines. He took the opportunity to thank all the individual experts, organizations, commissions and specialized agencies from locust-affected countries and from the donor community, who had contributed to this important work. The Natural Resources Institute of the U.K. had made an especially important input. He remarked that several other of the agenda items could have significant repercussions on the way that locust management was implemented and the conclusions the Group reached and the recommendations it made to the DLCC would be examined very closely. He wished all success to the meeting's deliberations.
3. In discussions on how to chair the meeting, members agreed to ask FAO to take the chair so that they would all be able to contribute freely. They also agreed to nominate Mr. Bachir Chara as their spokesperson to present the results of the meeting to the next DLCC Session. Members further agreed to divide up the task of preparing the report among themselves and asked the Secretariat to integrate these contributions into the final report. It was decided, in the interests of limiting the size and cost of the report, to include only summaries of the working papers.

UPDATING/REVISING THE DESERT LOCUST GUIDELINES

Summary of working paper AGP-DLCCTG-00/2

4. The working paper explained that the first editions of the Desert Locust Guidelines, published between 1992 and 1994 were well received by users. The DLCC and the Locust Commissions had requested a revision to make available new technological developments.
5. The meeting learned that the revised draft includes technical information in a clearer more easily updated format, modified according to user feedback. The proposal is that the five revised guidelines (Biology and Behaviour, Survey, Information and Forecasting, Control, and Campaign Organization and Execution) be bound in a ring binder with a new guideline on Environmental Monitoring of Desert Locust Campaigns. The revised publication will include a glossary and index to improve accessibility.

6. A revised layout was used in the revision for each topic, in which the right hand page contains explanatory text, tips and frequently asked questions. The left side is used as an aide memoire presenting a summary of the text and illustrations explaining the concepts and methodologies involved. Page headers, colour coded for each guideline, aim to improve navigation between and within guidelines. Pages requiring regular revision are date stamped to enable readers to check that the latest update has been inserted.
7. The draft revision of the original five guidelines was circulated in December 1999 to over forty experts in affected countries and elsewhere, and to date a third have responded. Their constructive comments together with those from the DLCCTG and the Locust Group will be incorporated into a final version. The guideline on environmental monitoring awaits completion of the illustrations before being refereed. The meeting was also told that after publication, the guidelines could also be distributed in a more interactive format as a CD or on the Internet.

Discussion

8. The meeting was unanimous in welcoming the revised layout as being attractive as well as being clearer and easier to use than the earlier edition. The consensus was that the advantages of having all six guidelines bound together for immediate reference outweighed problems anticipated in taking such a large volume into the field. One solution proposed for field teams was that key pages could be laminated for their use in the field.
9. The meeting decided against recommending that two additional guidelines, one on the economics of Desert Locust management and the other on contingency planning for control, should be included in present volume. They felt that it was likely to take a considerable amount of time to develop sufficient consensus about the former and that contingency planning was too country specific for a guideline to be issued.
10. The meeting agreed that the guidelines were important documents and **RECOMMENDED** that publication in English, French and Arabic should be facilitated and completed before additional work be undertaken on internet and CD versions. It was agreed that all efforts should be made to eliminate repetition and inaccuracies that had been identified. It was considered that the sections on other species and remote sensing satellites, as presently written, lacked relevance for inclusion in Desert Locust Guidelines. It was **RECOMMENDED** that the section on other species cover only aspects of identification and possible confusion with Desert Locusts. The section on remote sensing should be simplified and made relevant to Desert Locust work. The Group **FURTHER RECOMMENDED** that, given the scope of the revision and that some sections still had to be completed, selected experts should re-read each guideline once more before publication.
11. It was agreed that the work involved was considerable and **RECOMMENDED** that a technical editor be brought in to prepare the index and to ensure uniformity of style and clarity of English. The meeting felt that giving priority to finalizing the English version would facilitate a speedy and cost-effective translation into French and Arabic.

It was suggested that a Desert Locust expert should be available to work with the translator to ensure that terminology was correctly translated into French and Arabic.

12. The meeting urged that all efforts be made to complete the guidelines and translations before the DLCC meets in 2001. After thorough discussion, the following time bound proposal for completing the guidelines was **RECOMMENDED**:-
 - DLCCTG members to lodge their comments on current drafts before the meeting closes.
 - DLCCTG to suggest experts suitable for reading the final draft of each guideline before the meeting closes.
 - Authors and illustrator to incorporate comments on the current draft of the five original guidelines and send them to the nominated experts by the end of **November 2000**.
 - Experts comments to be completed by the end of **December 2000**
 - Final drafts of the illustrations and text on environmental monitoring guideline to sent for refereeing by the end of September 2000.
 - Comments to be returned to author by the end of December 2000.
 - Final amendments by authors by the end of January 2001.
 - Preparation of style editing and of index by **mid-March 2001**.

13. The meeting briefly considered how costs of completing and publishing the guidelines could be met by joint funding between FAO, the Commissions and other donors. The estimated cost of completing and publishing the English version was about \$US55 000 - 60 000, assuming that Locust Group staff prepare the final drafts. DLCC had allocated \$ 50,000 to the Guidelines costs during the biennium 1999 – 2000. With a further contribution in 2001, the costs of the English version would be covered. Additional funds would then be required for translating and publishing the French and Arabic version. It was **RECOMMENDED** that FAO contact donors and the Commissions to call for contributions once the exact costs were known.

PRACTICAL IMPLEMENTATION OF ENVIRONMENTAL MONITORING IN THE DESERT LOCUST

Summary of working paper AGP-DLCCTG-00/3

14. The working paper pointed out and summarized the hazards associated with the use of pesticides in the control of locusts. Locust control operations are usually considered as emergency activities and they affect a wide variety of ecosystems. Furthermore in most of the locust-affected countries, there is often a lack of knowledge of the properties and quality of pesticides, limited maintenance of equipment, deficient transport and storage facilities, lack of proper information etc. All these add up to the problem of the health and environmental hazards associated with Desert Locust control.

15. The health/environmental hazards cause concern to governments and their partners who wish to improve this situation and reduce the related risks. To address this issue, many governments have developed campaign strategies which envisage maximum efficacy at minimal costs and damage. Risk management plans should be based on an analysis of all costs and benefits, including the costs of environmental damage during a campaign. Control campaigns should be flexible with respect to intervention

decisions, choice of pesticides, and spray methods, in order to reduce damage in conditions that are difficult to predict. Follow-up activities are an integral part of risk management planning and include after-treatment monitoring and clean up.

16. Safety issues should be addressed partly through proper legislation which regulate the activities of international agencies and local authorities. For its part FAO has been able to provide guidelines on all topics related to pesticides and these are regularly updated and revised. It is therefore suggested that similar guidelines be prepared on the subject of environmental monitoring and risk assessment in Desert Locust control.
17. Surveillance of spray operations mainly concerns the extent of use of Good Practice and to a limited extent investigation of actual damage, including health effects on workers. Most of this work can be done by trained spray supervisors, with the support of specialists (chemists, doctors).
18. Research on side-effects needs to be carried out separately from contingency actions, to ensure proper scientific standards being met.

Discussion

19. In general, the meeting supported the inclusion of the proposed guideline for environmental monitoring in the current revision/updating exercise. It was expected that the new guideline would be ready for review by specialists and by members of the DLCCTG by the end of September 2000. It was agreed that the guideline should also cover aspects of storage and transport of pesticides.
20. It was noted that the working paper did not define all the elements of the environment that need to be monitored and recognized the difficulty of comprehensive coverage. The different environmental problems experienced in various countries were recognized and different scenarios were needed to deal with them.
21. The guideline should be designed for the benefit of a wider group of staff working in the various environmental protection agencies and institutions.
22. The meeting endorsed the conclusions/recommendations, made in the working paper, with some amendments (see para 24 *et seq.*). It was agreed that proposing a fixed percentage levy on pesticide purchases to cover the costs of environmental monitoring was not practical and that it was not realistic to expect FAO to establish an environmental monitoring post in the Locust Group. Since computerized software for risk assessment was not yet available for use on locusts, it was also agreed to postpone this element for a future discussion.
23. The meeting **RECOMMENDED** that an *ad hoc* committee be established by FAO to examine the environmental issues of locust control and that the various concerned agencies, such as UNEP and WHO, be invited to participate.
24. Since the mid-eighties, much effort has gone into research and surveillance of the safety and side effects of locust operations. The Group **RECOMMENDED** that

priority should again be given to having the accumulated knowledge and techniques extended to all levels of workers involved in locust control. It was **FURTHER RECOMMENDED** that on-the-job training should be provided to all staff dealing with environmental monitoring.

25. Risk management is an integral part of locust control operations. It was **RECOMMENDED** that risk management should be a standard element of planning and financing locust campaigns.
26. The Group **RECOMMENDED** that extensive data on the pesticides used in locust control should be available locally in a concise and comprehensive form. These data should be provided by the manufacturer and locust affected could, if they wish, call upon FAO to check the data for completeness.
27. In locust campaigns supported by FAO, it was **RECOMMENDED** that safety and environmental surveillance should be carried out either by specialized teams or individuals (environmentalists) or by trained supervisors (technicians), depending on the institutional structure and competence of the national services involved.

ESTABLISHING A NETWORK ON DESERT LOCUST TRAINING AND RESEARCH

Summary of working paper AGP-DLCCTG-00/4

28. All countries that are affected by locust outbreaks stress the need for appropriate training of their plant protection and locust survey and control staff, in the various fields related to locust control. There is also a common wish to participate in and/or contribute to applied research trials. Furthermore it has often been suggested that a database on Desert Locust research projects being carried out by individuals, institutions and organizations should be available, so that all interested parties can be aware of what studies are underway.
29. Since the last locust plague in 1986-1989, there have been various efforts by FAO to provide locust-affected countries with information on Desert Locust (DL) research activities. These were based on repeated requests from the affected countries at DLCC meetings and at other events. Although some information was distributed, it appears to have been of very little practical use to the affected countries. This can be attributed to a breakdown in the distribution of the information to the appropriate personnel, as well as to poor (or lack of) identification of who exactly the target audience was and how they could benefit from such data.
30. There is still a need to match the availability of training courses and applied research trials with the people from affected countries that would most benefit. The challenge remains the development and management of a functioning network allowing the timely distribution and sharing of information. The goal of such a network needs to be the wide distribution and interchange of information from FAO to the countries but also from the countries to FAO and not just the development of a raw data bank.
31. The working paper gives some examples of how the information/data could be managed and distributed. It examines the features of each method and also looks at the

resource/cost implications. The perceived strengths and weaknesses of each method are given. A number of open questions and issues are proposed to the DLCCTG for discussion.

32. The several possible alternative network systems that satisfy the aims, target audience and the objectives are given below :
1. **Database** : in the form of a dynamic “DL training and research events directory”, which could be maintained on the web.
 2. **“Participatory Approach” Database**: anyone from a country and organization could input and update the data directly on the Internet, after being given the necessary authorization by a system administrator. The database should include a similar search function to that of Option 1.
 3. **Dynamic Web Page**: changing constantly with the announcement and completion of meetings, courses or workshops related to DL training and research. The network would rely mainly on electronic forms for data exchange and communication.
 4. **Web-zine**: on-line viewable and downloadable electronic newsletters that can be archived (similar to the monthly FAO DL bulletin). As for web pages, the announcements and information on a Web-zine change constantly with the completion of meetings, courses or workshops related to DL training and research. Such zines can be distributed by email as PDF attachments.
 5. **Leaflets, Newsletters and CD-ROMs** : distribution of information on training and research events is based on printouts that need to be distributed (via airmail) to affected countries in time.

Discussion

33. The Group confirmed that there was a need for information exchange on: a) Desert Locust training events, research and research trials; b) acridid research world-wide, for better coordination and the sharing of experience; c) previous research results (publications, unpublished reports), to avoid duplication of effort; and d) operational research. The Group therefore **RECOMMENDED** the establishment of a network.
34. It was re-affirmed that FAO should play a coordinating role in:
- collecting and making available this information;
 - fostering the exchanges and dialogue on all aspects of Desert Locust management;
- and that lessons learnt from previous attempts to fulfil this role should be taken into account.
35. It was agreed that the proposed network should concentrate on the most useful information, be simple to access and to use, be dynamic and up to date, not duplicate existing databases, involve minimal cost and maintenance, and should aim not to add a significant extra burden to the Locust Group.
36. The Group considered that, for a network designed for information exchange on the Desert Locust, Option 2, i.e. a Participatory Approach Database, with a link to the

current FAO locust webpages, would be most suitable. It was **RECOMMENDED** that FAO explore this option and the possibility of its being hosted either within FAO, or preferably outside, by modifying existing databases such as Ecoport or Wisard.

37. The Group **RECOMMENDED** that the web page be accessible through the Locust Group's web page and that it includes the following elements/characteristics:
- a table of locust activities coming up or proposed, involving training, field research, and research trials, the data to be input, maintained and updated by the users themselves;
 - access for the exchanging of views (a forum) should be open to all *bona fide* interested parties, but the question remains as to how selection of users might be made;
 - access to databases (eg. Wisard) allowing detailed information to be obtained on projects/activities underway. Users would be invited to keep their information up to date;
 - access to databases on previous research results, publications, and unpublished reports on the Desert Locust and on other acridid species. These databases would be created/made available according to criteria to be defined.
38. The Group **RECOMMENDED** that a consultant be recruited to develop a rough draft of the web page and to establish how it should link to other databases. A draft of the first experimental version should be submitted to the DLCC for approval, with a view to establishing the web page for a trial period of a year, to assess its usefulness, the degree of interest in it, and to see how it functions. It was further **RECOMMENDED** that the requirements of Locust Group staff time be kept to a minimum.
39. The Group **RECOMMENDED** that FAO should give maximum publicity to the web page, once established, in order to elicit the greatest number of reactions and exchanges of views, so that it may be perfected and adapted to the best needs of its users.

THE ROLE OF GPS TECHNOLOGIES IN DESERT LOCUST CONTROL OPERATIONS

Summary of working paper AGP : DLCCTG – 00/5

40. The working paper described research undertaken by the Norwegian-funded project GCP/INT/651/NOR "Improving Pesticide Application Techniques for Desert Locust Control", working in collaboration with the EMPRES Central Region. The paper explored the potential use of GPS technology to improve the precision of both aerial and ground spraying.
41. The paper contained some background information on GPS technology and described errors caused by several factors. These errors limit the use of GPS technology in locust operations but are overcome by a process of differential correction (DGPS). This correction is achieved by the inclusion of an additional ground or satellite-based signal. Recently, a significant source of error called selective availability, a deliberate degradation of the signal by the US Department of Defence, was removed.

42. DGPS is widely used in precision agricultural spraying for track guidance. Once the target block has been defined in the on-board computer the spray pilot is guided along each spray run and can precisely identify the spray on / spray off points. A more even coverage of the target is achieved. The trial results presented clearly demonstrated that the use of DGPS would improve the efficiency and effectiveness of aerial application.
43. Some promising results of trials using DGPS for track guidance of ground-based applications were also presented. Again a significant improvement in target coverage could be anticipated from the use of this technology even by inexperienced staff. At the moment the systems are costly but the removal of the selective availability error raises the possibility that a highly cost effective system based on conventional GPS could be developed for track guidance of ground-based applications, albeit with slightly less accuracy than a DGPS system.

Discussion

44. The meeting agreed that GPS technology has already been of immense value in locust operations and was unanimous in supporting the rapid adoption of DGPS to assist spraying operations. Several examples of previous successful use of DGPS technology in aerial application were discussed.
45. It was agreed that the use of DGPS could benefit locust operations in a number of ways. It would assist greatly in ensuring targets were treated with the desired chemical dose, and that chemical was applied only to the intended target. The benefits from this would be more effective kill, reduced cost, reduced risk of spraying sensitive areas and improved work rate. DGPS would increase the efficiency of chemical use by improving calibration or even removing the need for it. Many DGPS systems can log exact position throughout the sortie giving a permanent record of the exact position of targets. The meeting agreed that this would provide accountability for all concerned in the spray operation, and would be useful data source for investigations into application methods.
46. The meeting expressed concern that the cost of equipping all ground application vehicles with DGPS could limit its adoption, but recognized that the cost of units would be recovered after a period of spraying through reduced pesticide use. It was felt, however, that the recently improved accuracy of conventional GPS might provide an opportunity for development of a highly cost effective track guidance and recording system for ground application.
47. The meeting **RECOMMENDED** that:
 - the existing standard FAO aircraft contract should be changed to make the use of DGPS mandatory, and that other locust control bodies should be encouraged to include such specifications in their own contracts.
 - the trials aimed at evaluation of DGPS systems for ground-based spraying, and the development of a cheaper system based on conventional GPS, should continue ; if possible this work should be done by the Norwegian-funded project in collaboration with national locust organisations,

- following the anticipated successful completion of the field trials, FAO with EMPRES, the Norwegian-funded project, the Commissions and the donors, should organize the holding of a field demonstration to encourage the rapid adoption of this technology into operations,
- the draft Desert Locust Guidelines be modified where appropriate to include the use of DGPS, and possibly GPS, for track guidance.

REVIEW OF NEW LOCUST OPERATIONAL METHODOLOGIES USED BY APLC, WITH A VIEW TO THEIR POSSIBLE TRANSFER TO DESERT LOCUST MANAGEMENT

Summary of Working Paper AGP: DLCCTG – 00/8

48. The working paper explained that the Australian Plague Locust Commission implements a preventive control strategy for three locust species. While there was nothing radically new in the APLC's approach, the present period was an exciting one in which new control agents potentially offered greater flexibility in dealing with each situation.
49. It was explained that initial survey assessments are made by only eight staff covering about 400 km per day by vehicle, usually with 40 stops of 5 minutes each. These surveys are designed only to identify which areas include potential locust control targets and should therefore be surveyed by air. The Australian Plague Locust forms bands which can be seen, by a skilled and experienced locust officer and/or the pilot, from the air at 500 – 700 m. altitude and a cruising speed of 100 knots. One aircraft or helicopter can survey 4000 sq. km. per day.
50. Forecasting outbreaks is facilitated by remote sensing NOAA imagery. Field data are entered into a palmtop computer via customized entry screens by the survey officer and can be transferred directly to the GIS system at HQ, through an HF modem link, thus providing HQ staff with comprehensive up-to-date survey information.
51. A large proportion of control actions are assessed afterwards, normally 72 hrs later. Such assessments include checks for non-target kills. DGPS is standard equipment for aerial spraying and there are moves towards making it mandatory. All hopper band spraying by the APLC is done from the air because one aircraft can cover what 40 ground crews could spray. Currently all spraying is done by blanket coverage using fenitrothion, but this season barrier treatments with fipronil will be tried operationally for the first time. Operational trials using metarhizium, classified as such because metarhizium is not yet fully registered in Australia, will also be tried on up to 30,000 ha, using material manufactured in Australia. Certain minimum thresholds are used to help make the decision to spray, but they are not fixed and flexibility is allowed.

Discussion

52. The Group expressed its great interest in the information provided on APLC's operations and were impressed by the evident good management system, the

professionalism of the staff , the ability to mobilize resources rapidly and the regular financial support provided. The methods used for survey and to detect bands from the air were especially noted. The Group considered that there were significant and important differences between the behaviour and habitat of the Australian locust species and of the Desert Locust, which meant that some of the Australian methodologies could not easily be applied to the Desert Locust.

53. It was noted that the APLC expected to achieve control of about 70% of all locust upsurge populations. Control emphasised the elimination of populations most likely to damage grasslands and crops. The costs of a higher percentage kill would be disproportionate to the benefits. The Group noted that the APLC normally carried locust control four years out of every five.
54. The Group noted with interest the APLC system for instant electronic transfer of survey and control data to its HQ and that smoke generators were an essential part of effective aerial spraying. The use of smoke by pilots allowed them to judge if the pesticide was settling on the target and how much it was drifting. It also enabled pilots sometimes to spray in very hot (more than 45 degrees) and low wind conditions even in the middle of the day, if the smoke showed that there was limited thermal activity and sufficient drift.
55. It was noted that the APLC plans to test *Metarhizium anisopliae* operationally in the coming season. The variety being used is also *acridum*, i.e. the same variety as in Green Muscle, but the isolate was found in Australia. The Group noted with interest that metarhizium will be used in complementarity with conventional pesticides. It was recognized that if the results of the large-scale trials are positive, the experience that APLC would gain could be of considerable benefit to efforts in the Desert Locust regions to employ the same technique.
56. Taking into account the differences in the locust species and in the general locust management situation applying in Australia as compared to the Desert Locust and its regions, the Group **RECOMMENDED** that the techniques and methodologies used by the APLC should be examined closely. Those which might be applicable to Desert Locust, should be introduced to management practices for this species. It was therefore essential that close collaboration between the APLC and Desert Locust affected countries be maintained, including exchange visits of staff and of reports/publications produced. It was **RECOMMENDED** that initially both the field data transfer system and the smoke-generators should be investigated with a view to adoption for the Desert Locust.

REVIEW OF THE MANDATE OF DLCC

Summary of working paper AGP :DLCCTG-00/7

57. FAO has provided technical assistance and advice on administrative and institutional arrangements during the current, serious outbreak of the Italian Locust affecting mainly Kazakhstan and potentially eight other central Asian countries: Azerbaijan, Georgia, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan and Afghanistan, Iran and Pakistan in southwestern Asia. It has also responded to calls for assistance with outbreaks of Moroccan Locust and the Migratory Locust.

58. Kazakhstan, the most seriously affected country, has indicated that it would welcome the establishment of a Locust Commission for the countries of the region. The working paper proposed that the mandate of the DLCC be extended to include these and other species with recent histories of outbreaks such as the Malagasy Migratory Locust.
59. The working paper noted that the last, 35th, session of the DLCC held in 1999 had given little support for enlarging its mandate and sought a technical viewpoint on this issue.

Discussion

60. DLCCTG members considered that the DLCC was constituted to ensure international coordination and rapid response to the Desert Locust, a widely distributed pest that migrates between countries whether in recession or plague. They considered that adding additional locusts would lead to less focused meetings, where differences between locusts could easily lead to misunderstandings about the appropriateness of preventive actions for particular species. Confirmation was sought and received from the Secretariat that the Technical Group was authorized to consider variations in the mandate of the DLCC.
61. The Group noted that an increase in the number of species being considered by the DLCC had previously been raised and rejected on more than one occasion and suggested that other locusts could be dealt with more expeditiously at separate forums, such as additional Commissions. They noted that observers from organizations dealing with other species had been present at DLCC meetings. The use of observers was felt to be an appropriate mechanism to share common aspects of locust control and environmental protection that were being discussed in the context of preventive Desert Locust control.
62. The Group recognized the interest of countries affected by other locust species to organize themselves, and welcomed any moves to form new Commissions or other separate forums for such species.
63. It was noted that outbreaks of the Moroccan Locust within the Maghreb were dealt with nationally or regionally. The Secretariat sought clarification from the meeting whether this implied that the Group's view was that such locusts would be better treated within an IPM plant protection context. The meeting expressed unanimously the view that preventing swarms reaching crop areas was the most appropriate strategy.
64. The meeting sought and obtained confirmation that the mandate of the Locust Group already allowed them to coordinate issues for all economically important locust species and other migratory pests, and that the provision of other forums for other species was a tenable option.
65. The Group **RECOMMENDED** that the DLCC should be retained as a forum exclusively for Desert Locust, and, that as in the past, observers involved with other species be invited.

ADOPTION OF THE REPORT

66. Following discussion of the text and agreement of necessary amendments, the Report of the Seventh Session of the Desert Locust Control Committee Technical Group was adopted unanimously

DATE OF THE NEXT MEETING AND POSSIBLE SUBJECTS FOR DISCUSSION

67. It was agreed that the date of the next meeting of the DLCCTG would be decided after the next meeting of the DLCC which was expected to be held in May or June 2001.
68. The Group suggested that possible topics for discussion at the next DLCCTG meeting could include :
- advances in the use of satellite imagery for Desert Locust forecasting ;
 - contingency planning, its coverage and implementation ;
 - the transfer of data from field to local locust centre, from locust centre to FAO and its use in the Desert Locust Bulletin ;
 - progress in the use of biopesticides ;
 - research results from the EMPRES programme ;
 - improvements to the Desert Locust Bulletin.

CLOSURE OF THE MEETING

69. Mr.A.Hafraoui, Senior Officer i/c the Locusts and Other Migratory Pests Group, thanked all the participants for the efforts they had made to discuss thoroughly the technical questions put forward. He mentioned in particular the members of the DLCCTG, the invited speakers and the FAO regional staff. He noted that there seemed to be general agreement that the technical content of the meeting had been a considerable improvement over those of previous Technical Group meetings held in the last few years. The contributions of participants that had allowed such fruitful discussions were much appreciated and it was hoped that this appreciation would extend to the members of the DLCC itself. He wished everybody a safe journey home and closed the meeting.

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