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# DESERT LOCUST CONTROL COMMITTEE

## Thirty-eighth Session

## Rome, 11-15 September 2006

# SUMMARY OF THE 9th REPORT OF THE PESTICIDE REFEREE GROUP

(Agenda Item 14)

### INTRODUCTION

This working paper was prepared by the Chairman of the Pesticide Referee Group, Dr. G. Matthews. The DLCC may wish to adopt the report of the last meeting of the PRG.

### SUMMARY OF THE 9TH PESTICIDE REFEREE GROUP MEETING

The Pesticide Referee Group has now met on nine occasions, with the last meeting held in Rome 18 – 21 October 2004. This was the first time that the PRG had met during an upsurge of locusts, so there were several questions arising from the current control operations. In particular there was concern expressed by FAO that organophosphate insecticides were being used. This was said to be due to the alleged recovery of locusts, after knockdown, if pyrethroids were used.

**Pyrethroids**

The dosage set for deltamethrin had been discussed at previous meetings, at which it had been considered that the initially recommended dose of 15g a.i./ha could be reduced to 12.5 g a.i./ha as reports had indicated good efficacy at this rate. However it had been recognised that a higher dosage would be needed for fully grown hoppers. The 9th meeting was able to see data from a further trial which showed that the locusts failed to recover when treated with 17.5 g a.i./ha. Differences in efficacy were considered to be possibly due to temperatures in the field, as pyrethroids have a negative temperature coefficient, i.e. are more toxic at lower temperatures. Pyrethroids do act quickly, the 'knockdown' effect, but the poisoning symptoms observed may be reversed by raising the temperature of the insects, thus reducing mortality. Thus locusts knocked down early in the day may recover if their body temperature rises during the day. A higher dosage (17.5g ai/ha) allowed for application at higher temperatures. The PRG decided that both dosages should be listed and a choice made in relation to the stages of the locusts being treated and temperature conditions.

**Fipronil**

The use of this insecticide has stimulated considerable debate in view of significant adverse environmental effects after its use at a relatively high dosage in Madagascar. It was agreed that in future

fipronil would only be recommended for hopper control as a 'barrier' treatment, as environmental side-effects were generally lower using this technique, provided the gap between 'barriers' was sufficiently wide and not exposed to spray drift. It was also important that precautions be taken to avoid repeated treatments due to the persistence of deposits, which might lead to an accumulation of adverse effects and put the environmental premium of the barrier technique at risk. It was therefore recommended that the coordinates of all spray blocks should be recorded, and spatio-temporal spray histories of locust-infested areas be derived to manage this risk. Where fipronil was applied it should be at a much lower dosage than previously used, namely 4.2 g ai/ha within the 'barrier' which would be equivalent to 0.6g ai per protected hectare.

**Insect Growth Regulators**

The application of insect growth regulators such as diflubenzuron was also related to the discussion on barrier treatments, the aim of which is for hoppers to collect a lethal dose while crossing a treated strip. The width of a barrier (one or more swath widths) and distance between barriers that had to be used would depend on:

a) mobility of the hoppers
b) insecticide used ( persistence)
c) the terrain/vegetation (plant density)
d) wind speed and direction during application
e) height of application

*The last two of these do not determine what width is required, they determine what width is possible or inevitable*.

Precise application recommendations that were valid under all circumstances could not be given since they depended on local conditions, but when there was an effective single swath width of 100 m, a track spacing of 700 m was recommended. The PRG felt that the design and data analysis of barrier studies needed to be improved, and that some of the available data were not analysed optimally. It was therefore recommended that data should be re-analysed in order to complete the data base. The PRG further recommended that the conditions for barrier treatments be clearly defined and respected in operational control, and that the barrier technique should not be confounded with irregular blanket treatment, a technique also known as RAAT (reduced area-agent treatment *sensu* Lockwood & Schell, 1997). Although used primarily as barrier treatments, there is the possibility that IGRs might be used as a overall treatment but at a lower dose.

***Metarhizium anisopliae***

It was disappointing that the biological control agent *Metarhizium anisopliae* var. *acridum* isolate 330189 had not been tried on an operational scale in the early stages of the upsurge in West Africa, as a similar product was being used operationally in Australia. There was now one manufacturer of this biopesticide in Africa, who reported that formulation problems had been overcome, although there needs to be on-going verification, Limited new data on the efficacy and environmental impact of the biopesticide has shown no adverse effects on non-target organisms, although there is a possibility of adverse effect on non-target grasshoppers. It was noted that speed of kill with *Metarhizium* is slower when hot days were followed by cold nights, thus in using it, meteorological conditions must be considered. However in view of its importance in ecologically sensitive areas it was felt that FAO should attempt to facilitate the availability and use of this mycoinsecticide in other regions affected by the Desert Locust.

**New insecticides**.

The gap between the 8$^{th}$ and 9$^{th}$ PRG meetings had been due to the lack of new data on existing or new insecticides from manufacturers. This lack of data meant no insecticides, such as imidacloprid or spinosad, which have different modes of action to listed compounds, could be added to the recommendations for locust control.

**Pheromones**

It had been suggested that a pheromone of the Desert Locust (specifically phenyl acetonitrile) might be combined with an insecticide ("attract and kill"), but no data detailed field trial data has been provided

to the PRG. Although only very small quantities of the pheromone are said to be needed, the PRG did express concern about the mammalian toxicity of phenyl acetonitrile.

**Environmental Considerations**
Previous reports of the PRG had provided tables that indicated the risk of adverse effects on non-target organisms. These tables were updated where possible based on new evidence from field data and experience. The risk assessments were also brought into line with international criteria.

**Field Operations**
As organophosphate insecticides were being used operationally, the PRG reviewed human toxicity data as, apart from acute toxicity, there could be chronic effects after recovery from an acute intoxication. Exposure of spray operators when filling sprayers, especially with formulations of chlorpyrifos or fenitrothion could seriously reduce their acetyl-cholinesterase (AChE) level. Clearly operators must be trained and wear coveralls, gloves, boots and face shields. It was also felt that there should be mandatory health monitoring, so that operators were rested or given alternative work if the AChE level fell significantly. Chemical transfer by pumps with closed coupling to the container was essential to minimize exposure.

The interval between the last spray and harvesting of crops was discussed as it was important that insecticide residues should not be present, so industry was asked to provide the data. Pyrethroids with a quick action were preferred when crops had to be protected.

The PRG again felt that there was insufficient feedback concerning the efficacy of recommended insecticides under operational conditions. While it was recognised that in emergency situations it was difficult to assess the immediate effects of a treatment, it is important to correlate the advice based on trials with large scale operations. Advice had been given on application criteria, but it was not always clear whether the appropriate dose and track spacings had always been followed, despite on-going efforts to provide training. Further large-scale trials were advised to increase the information on recommended insecticides, especially the use of barriers and biopesticides. The possibility of convening a PRG meeting in a locust-affected country was raised.

The PRG expressed concern that the locust control campaign in West Africa had relied nearly exclusively on organophosphate insecticides. As these are considered among the more dangerous products according the environmental and human health risk assessments it was recommended that a wider range of insecticides should be included in the Desert Locust control programme, with emphasis on the less hazardous products and more rapid deployment during the early stages of an upsurge.