

LU·BI·LO·SA 3

The Newsletter of Phase 3 of the LUBILOSA Programme
LUBILOSA - Lutte Biologique contre les Locustes et Sauteriaux
The Biological Control of Locusts & Grasshoppers

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WELCOME

Welcome to the second edition of LUBILOSA 3. The feedback we received from the first newsletter was very positive, with numerous requests from all over the world to join our mailing list. This was helped by an article in IPMnet News (see box) written by Allan Deutsch that advertised LUBILOSA 3. However if you know of anyone involved in locust and grasshopper control who doesn't presently receive a copy, and would like to, then please let me know (contact details in box).

LUBILOSA has had a very busy and successful few months since the last newsletter with the Programme Management Committee (PMC) meeting in Delemont, Switzerland, submission of a report to the FAO Pesticides Referee Group, development of a policy statement on gender, operating procedures for the Expert Advisory Committee (EAC) and a document on the means to "Removing barriers to commercialisation for mycoinsecticides". This is in addition to the ambitious programme of research and development that has been carried out with trials completed and data analysed for Niger and Sudan and the organisation of trials in South Africa with the Plant Protection Research Institute (PPRI).

The PMC brings together representatives of all the partners and the four donor agencies sponsoring LUBILOSA to review progress and to discuss the future direction of the Programme. The two day meeting discussed the Programme Leader's (Chris Lomer) report, log frameworks and the finances of the Programme. In addition issues of efficacy, production, socioeconomics, gender, marketing and commercialisation were discussed; some of the outcomes of which are evident in the articles in this newsletter.

It was on the advice of the PMC that LUBILOSA submitted a dossier on *Metarhizium flavoviride* for consideration by the FAO Pesticide Referee Group, which proved so successful, and it was also the advice of the PMC that has led to the development of the LUBILOSA Gender Policy Statement (see articles) and a new focus on the issues of commercialisation through the production of the document entitled "Removing the barriers to commercialisation" of the LUBILOSA mycoinsecticide (available on request - David Dent).

Two other important events require special mention, first the appointment this year of Hugo de Groote as the socioeconomist for LUBILOSA. Hugo is based at IITA, Cotonou, Benin and will have a vital role to play during this implementation phase of

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the Programme - we all welcome his involvement and look forward to the contribution he will undoubtedly make to strengthening both our participatory approaches and our socioeconomic capability. The second important event has been the success of the field trials carried out last year in Niger comparing *Metarhizium* and the chemical fenitrothion. Analyses of these data have shown that despite its slower rate of kill, overall acridid population reduction was greater for the *Metarhizium* than the fenitrothion treated plots after 21 days.

I look forward to reporting further developments in later editions of the newsletter.

THE EFFICACY ISSUE

The efficacy and performance of biopesticides has always been directly compared to their chemical counterparts which has tended to emphasise their poor persistence, poor storage capabilities and their less than 100% kill rate. The advantages of biopesticides in terms of low mammalian toxicity, low environmental hazard, low costs of registration, ease of use and in some cases ease of production are often ignored or overlooked in the debate. However, this has not prevented commercialisation and increasing utilisation of biopesticides. For instance, the world market for *Bacillus thuringiensis* is currently \$192 million per year and yet it is only expected to kill 80% of target insects, 80% of the time. Recognised constraints of biopesticides do not necessarily interfere with their commercialisation and use, depending on the demands and priorities of the market in which they are deployed.

Mycoinsecticide development for control of locusts and grasshoppers faces two major concerns with regard to its perceived efficacy, these are its slow speed of kill (>90% in 7-21 days) and the difficulty this creates in proving efficacy in large scale trials because of the high mobility of acridid populations after treatment. Neither of these problems are new to pesticide control of locusts, rather the difficulties have been forgotten with the use of faster acting organophosphate and pyrethroid insecticides. The problems of slow kill and of assessing efficacy in highly mobile acridid populations were also experienced, and more importantly unresolved, with the "classic locust insecticide" dieldrin.

Dieldrin takes between 7-21 days to achieve an LD50 against the desert locust *Schistocerca gregaria* (MacCuaig, 1983) with mortality never exceeding 14.5% in 24 hours. In the field, estimates of effectiveness of control with dieldrin were very difficult to make and there were very few well documented field trials (Bennet and Symmons, 1972). The review by Bennet and Symmons (1972) went on to say that further research was required to improve field trials methodology but they gave no indication as to how research might resolve the problems.

LUBILOSA and our collaborators (including PPRI; South Africa) have been proactive in addressing these issues of slow speed of kill and proving efficacy in mobile acridid populations. This has been achieved through:

- field trial comparisons with a chemical insecticide: in a ca. 50 ha. plot trial fenitrothion was compared with IMI330189 *Metarhizium flavoviride* treatments. After initial high mortality of acridids in the fenitrothion treated plots, acridid population levels were higher than those in the *Metarhizium* treated plots after only 9 days. The advantage of a high initial kill had been countered by the more sustained killing

power of the *Metarhizium*. (for further details contact Juergen Langewald, IITA Benin.)

- the use of markers to enable more effective and routine monitoring of treated, mobile acridid populations.
- the development of improved operational procedures to increase work rate and thus, help to overcome the logistical problems of treating mobile populations.

LUBILOSA has developed a mycoinsecticide that is virulent, effective and continues to develop new ways of addressing control of mobile pest populations.

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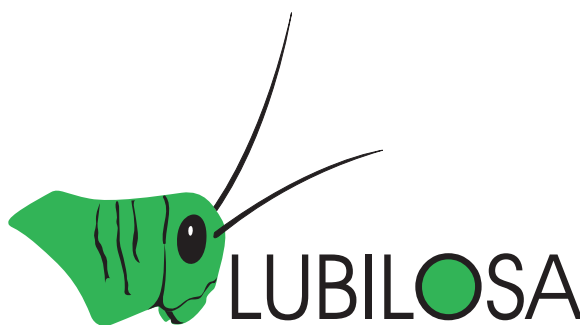
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A LOGO FOR LUBILOSA

There is little doubt that LUBILOSA is well known throughout the scientific community. However, in Phase 3 one of our activities is to build partnerships and links with commercial companies. This calls for a different approach in the way we market and present ourselves as a programme. In this context it is important for LUBILOSA to have an identifiable image and a logo provides a simple means of helping to achieve this.

A number of potential logos were produced and after consultation among LUBILOSA scientists there were two preferred options. With our main "target group" in mind it was important to select a memorable logo that was both appropriate and indicative of LUBILOSA. After much heartache the final decision came down in favour of the logo printed below which will now be widely used on our headed notepaper and publications.



LUBILOSA GENDER POLICY

The implementation phase of the LUBILOSA Programme needs to address the issue of whether or not the implications of the development and dissemination of the mycoinsecticide are different for women and men. In addition, if the research and implementation of activities are to achieve their purpose, both the differential knowledge and experience of men and women in locust and grasshopper control systems, and their roles and responsibilities within the programme need to be taken into account. This recognition of the significance of gender within LUBILOSA has now been built into the Programme's overall development strategy and is applied to all aspects of its operations.

LUBILOSA is committed to ensuring that the Programme will benefit women and men by:

- developing a greater understanding of gender issues as they apply to the biological control of locusts and grasshoppers.
- ensuring all programmes of work allow for gender considerations.
- developing appropriate action to address gender imbalances within LUBILOSA's organisational structures.
- contributing to the changing policies of international locust control organisations, donor agencies, governments and other organisations, in favour of women's involvement in scientific research, development, dissemination and use of biological control for locusts and grasshoppers.

A copy of the LUBILOSA Gender Policy statement will be forwarded to all LUBILOSA staff. If you are a collaborator or an interested party and would like a free copy of the LUBILOSA Gender Policy and the Strategy for implementation then please request a copy from David Dent, LUBILOSA Programme Manager.

IPMnet News

IPMnet News is an on-line Global Integrated Pest Management Information Service sponsored, produced and provided by the Consortium for International Crop Protection. The monthly service is posted on the world-wide-web at:

<http://ipmwww.ncsu.edu/cicp/cicp.html>

NEWS IN BRIEF

Collaboration with ICIPE : Discussions between Christiaan Kooyman, Matt Thomas and Dr. Hassanali (ICIPE, Nairobi) and Dr. Majzoub Bashir (ICIPE, Sudan) have explored the possibilities for collaboration in developing mycoinsecticide/pheromone control strategies for locusts in East Africa.

Hugo de Groote is now employed as LUBILOSA socioeconomist based at IITA, Benin.

LUBILOSA mycoinsecticide gains approval from the FAO Pesticide Referee Group for use in the control of locusts in conservation and environmentally sensitive areas.

Successful trials in Niger indicate value of *Metarhizium* compared to chemical fenitrothion.

Modifications to the mass production unit in Cotonou to improve harvesting and packaging of the conidia was completed by the end of February ready for full scale production for this year's field season.

Ine Stolz joins the team in Cotonou to work on ecotoxicology. Ine will be studying for her Ph.D and working with Ralf Paveling at the University of Bale.

"The only place where work comes before success is in a dictionary" - V. Sasoon

MYCOINSECTICIDE USE APPROVED

One of the recommendations arising from the PMC in Delémont, Switzerland was that LUBILOSA should submit an application to the Desert Locust Pesticides Referee Group of the FAO to obtain approval for its operational use. There was some concern among the management team that such a submission may be premature. The time to meet the next deadline for submission was very short and the decision was made in October to follow the PMC recommendation. Roy Bateman spent a busy month collating and producing the necessary documentation that included a description of the mycoinsecticide, its mode of action, strategy for use and field evaluation, an assessment of the advantages of a biological acridicide and a full review of the trials data LUBILOSA had available at that time. This was combined with copies of key published papers and relevant LUBILOSA documents. The documents were submitted on time and all the hard work was rewarded with success! The FAO report produced early in the new year stated that *Metarhizium flavoviride* was approved for operational locust control in conservation and environmentally sensitive areas. This result was particularly pleasing because it was so unexpected at this stage in the programme; a testament to all the hard work that has gone into the research and development of this mycoinsecticide !

LUBILOSA PROFILES



Christiaan Kooyman obtained an Msc in Hydrobiology, Entomology and Public Health from the Agricultural University Wageningen in 1979, and moved from there to a job as Principal Lecturer at Anambra State Polytechnic, Nigeria until 1983. At this time he took up a Research Officer position working on a termite project based at Kisii in Kenya, which lasted for two years. Christiaan then involved himself as a consultant in

locust and grasshopper control in Sudan and Niger until taking up his first position with LUBILOSA as the Project Leader in Niamey, Niger (1990/95). A highly valued member of the LUBILOSA team Christiaan has now taken responsibility for coordinating programme activities in East and Southern Africa from his base at the CABI Regional Office in Nairobi.

The new LUBILOSA mass production unit at IITA Cotonou was completed and commissioned at the beginning of 1996. Thanks to the hard work of **the LUBILOSA Mass Production Team**, over 100 kg of conidia powder of the standard isolate IMI 330189 was produced between February and December 1996. At the current application rate (5×10^{12} conidia/ha), this was sufficient to treat over 1000 ha. Calculated over the year, the average output of conidia powder was 2 kg/week, although during intensive production, the maximum output reached as high as 6 kg per week. The six members of the mass production team are pictured below; from left to right are Cooperi, Romain, Nina, Gabriel, Nöelie and Etienne.

Cooperi Gnahoui Loukomi joined the mass production team in 1996 and had previously worked with the LUBILOSA field team in the monitoring of field trials. He is now a valuable member of the production team and works on all stages of the production process. Cooperi was born in Ouidah, a village on the coast of Benin renowned as the centre of the Voodoo culture.

Romain Houenoussi is the longest standing member of the production team, having joined LUBILOSA in 1991. When Romain started working on the mass production of *Metarhizium*, spores were produced on the surface of agar in old whisky bottles. Things have moved on considerably since these early

days and Romain is now responsible for the maintenance of the sophisticated spore extraction equipment, fondly referred to within the project as the "Mermelbat"! Romain is married with two children.

Nina Jenkins joined LUBILOSA in 1991 and has been responsible for the development of the mass production procedure from agar slant cultures in whisky bottles to the current standardised two stage system. Nina completed her PhD thesis on mass production of *Metarhizium* in 1995 and spent last year in Cotonou commissioning and supervising modifications to the new production unit. She will relocate back to IIBC Ascot early in 1997 and will be seeking collaborators with whom to develop an industrial sized mass production facility to ensure that the LUBILOSA product is available on the market by the end of 1998. Nina is married to Matt Thomas, who also works on the LUBILOSA Programme.

Gabriel Heviefio is the production supervisor, he is responsible for the overall running of the mass production unit and organises the daily activities of the team. Gabriel also carries out all the quality control procedures on the final product and keeps detailed records for each production run both as hard copies and on computer in a database package. Requests for supply of spores are received by Gabriel who carries out a final quality control check to ensure that every batch sent out is of equal high quality before organising their shipment. Gabriel has been working with LUBILOSA since 1993, he is married and has 4 children.

Nöelie Dossou is the newest member of the production team, she joined the LUBILOSA project in July 1996. Nöelie has worked as a technician at IITA since 1994 having previously worked on a project investigating the biology and life cycle of the parasitic weed *Striga*. She now plays a role in all stages of the production process and her work is highly valued. Nöelie is also responsible for the routine maintenance and servicing of the safety equipment in the mass production unit. She is married with 3 children

Etienne Dagbozoukou has been with the project for just over a year and has rapidly learnt the various microbiological techniques necessary to ensure the production of a reliable, high quality product. Etienne plays a role in all stages of the mass production routine from inoculation of the liquid culture through to drying, extraction and packaging of the spores. Etienne comes from a village in the south of Benin, but now lives just outside of Cotonou. He has two children.

