

## Discussion Document

### R&D for Biopesticides and other “Natural” agents in Developing Countries

*R.P. Bateman - Version: 19 March 2004*

Rational Pesticide Use (RPU) is a sub-set of effective, sustainable, Integrated Crop Management - provides an appropriate framework for collaboration between all the stake-holders involved with pesticides (of all types) for crop protection. One aspect of RPU is the development and promotion of biopesticides and other natural products – which are commonly seen to be both environmentally and toxicologically benign.

Due to concerns about the deleterious effects of chemical pesticides, there has been considerable interest in participatory research involving “natural agents” in farmer field schools and similar rural development extension exercises. Apart from their biological origins, natural pesticides (including plant extracts, micro-organisms and entomopathogenic nematodes) are commonly of two types:

- Agents developed into products by national and international research organisations with adequate funding (*e.g.* ‘Green Muscle’ - the locust mycoinsecticide developed by the LUBILOSA Programme with €15 million support for work including initial assays, toxicology, field testing and participatory training);
- Agents developed locally by farmers or other interested parties at low cost (often plant extracts, but sometimes also micro-organisms).

There are commonly two issues raised with the use of natural pesticides:

1. Efficacy (with concerns about consistency);
2. Toxicology (likewise with possible inconsistency between batches - including secondary substances produced on processing).

Whereas the first matter can perhaps safely be left to field testing and peer review, there are substantial liability issues with the second – that may even arise at the field testing stage.

Some of the most toxic substances known to science are natural in origin (*e.g.* *Clostridium botulinum* toxin). On the other hand, there is enough history of use of “familiar” agents such as neem extract, *Metarhizium anisopliae* and *Trichoderma harzianum* to suggest that, in all probability, the risks are very small. Developers of micro-organisms are more confident with agents cease growth at temperatures of >37° than those able to grow at human body temperature. All should be aware of the allergenic risks of inhaling proteinaceous material. In Europe and North America, such risks are examined as a part of regulatory processes. There is no history of dubious agents (*i.e.* those that do not pass tier 1 tests) continuing with further product development. There is also an ongoing debate, in the UK and elsewhere, on how stringent regulation of natural agents should be. On one hand, attempts to apply rigid chemical pesticide regulations to biological agents delay implementation and raise the development cost of potentially beneficial biopesticide products. On the other hand, regulations that are too slack or non-existent, allow sub-standard products to appear on the market; which undermine consumer confidence in both those products and other natural agents.

A rigorous policy on this issue is needed in sponsoring organisations and research groups involved in the development of natural agents, in jurisdictions where pesticide regulation is less stringent. Where development of the agent has been initiated externally (as in the LUBILOSA Programme) it is incumbent on the research organisation to establish low risk (usually by carrying out at least basic toxicological tests before field testing). Where the agent has been developed locally, it is important that both the research is carried out and the risk is assessed by those directly involved. In both cases, a framework of prior informed consent by all concerned would initially be most appropriate.

INTERNATIONAL PESTICIDE APPLICATION RESEARCH CENTRE  
Imperial College, Silwood Park  
Buckhurst Road, Sunninghill,  
Ascot, Berkshire, SL5 7PY, UK

Tel: +44 [0] 207 5942 383  
Fax: +44 [0] 207 5942 450  
Web: <http://www.iparc.org.uk>

