Nature's ecofriendly arsenal of pesticides*

In recent years, there has been a burgeoning interest and increasing awareness concerning the role of biopesticides in maximizing crop protection. Also, their ability to minimize the adverse effects like environmental contamination and health hazards caused by indiscriminate use of synthetic pesticides is now fully appreciated. All these were amply evident from the presentations made by scientists who came from different parts of the country and participated in a National Symposium on 'Biopesticides and Insect–Pest Management' which deliberated on matters relating to:

- Botanicals and their role in agriculture,
- Microorganisms in insect pest management and
- Chemistry of plant products in insect pest control.

Citing the example of neem in adversely affecting, in diverse ways, the biology of a variety of insect pests, this conference highlighted the potential of many other plants, notably, *Vitex negundo, Ocimum sanctum, Phyllanthus deblis, Strubulus aspera, Mentha spicata, Chloroxylon swietinia, Cassia fistula, Annona squamosa, Zanthoxylum limonella, Curculigo orchioides, Evolvulus alsinoides, Strychnos nuxvomica* and several species of *Derris, Mundulea, Tephrosia, Milletia* and *Pongamia* for use as biopesticides (Tables 1 and 2). Chemical constituents of the bio-active ingredients of some of these botanicals which exhibited antifeedant property were identified as those belonging to flavones, isoflavones, rotenoids, coumarins and acetogenins.

Table 1. Leaf extracts of plants with potential to cause larval mortality in *Culex quinquefasciatus*

Plant	Larval mortality (%) within a specific period (h)	
	24	48
Vitex negundo	55	100
Tephrosia purpurea	100	–
Cassia fistula	85	100
Strubulus aspera	88	100
Chloroxylon swietinia	100	–

Table 2. Plants exhibiting antifeedant property to larvae of *Spodoptera litura*

Plant (leaf components)	Magnitude of antifeedant effect in terms of area (in sq mm) of leaf ingested during 24 h period	
Phyllanthus deblis	+	(576.8)
Zanthozyllum limonella	++++	(128.2)
Curculigo orchioides	++	(376.6)
Evolvulus alsinoides	++	(309.8)
Strychnos nuxvomica	+++	(244.0)

Increase in number of plus signs against a plant reflects degree of antifeedant effect of its leaf.
Total area of leaf of each plant provided to the larva at the start of experiment is 1350 sq mm.

Issues relating to the utilization of various biocontrol agents in insect–pest management were also discussed. Attention was specially focused on the positive role played by microbial pathogens like Nuclear Polyhedrosis Virus (NPV) and *Bacillus thuringiensis* (Bt) endotoxin in suppressing the populations of *Helicoverpa armigera* and *Spdoptera litura*, notorious pests of cotton. The need for the application of biotechnological skills to produce genetically-engineered crop plants endowed with Bt toxin gene to augment the efficiency of this microbial pesticide for insect pest control was emphasized. Other prospective organisms shown to display biocontrol qualities against insect pests were fungi (*Beauveria bassiana* and *Nomuraea rileyi*), the red mite *Eutrombidium trigonum* and nematodes belonging to the families Steinernematidae and Heterorhabditidae.

Without ignoring the relevance and value, even today, of the age-old and deep-rooted philosophy that 'nature exists for the harmony and convenience of all life on earth', a consensus was reached in this symposium to a) encourage research on biopesticides as an interdisciplinary investigative activity involving entomologists and chemists, b) develop simple technologies for formulations, c) adopt biosafety procedures and, d) implement strict quality control measures for testing the efficacy of these products before employing them as part of a comprehensive integrated insect pest management strategy in agricultural operations.

*Based on the National Symposium on 'Biopesticides and Insect–Pest Management' sponsored by Council of Scientific and Industrial Research, Department of Science and Technology, All India Association for Christian Higher Education, University Grants Commission, Department of Environment (all based at New Delhi), Tamil Nadu State Council of Science and Technology, Chennai and conducted at the Entomology Research Institute, Loyola College, Chennai 600 034 on 26 and 27 February 1998.

S. Ignacimuthu, Entomology Research Institute, Loyola College, Chennai 600 034, India