

Insecticides

....DNP makes food packaging that repels insects

Dai Nippon Printing has developed technology which enables it to incorporate an insect repellent into its ink and packaging materials. The repellent, made from tree sap oil, is placed in porous microcapsules made of silica. The packaging can deter insects for about six months, and is likely to be used by food manufacturers (<http://www.nni.nikkei.co.jp>)

....Strong results for new tick control agent in Connecticut study

Earth BioSciences announced the results of the independent efficacy study on its Tick-Ex product. The research, which was executed under a Collaboration Agreement with the Connecticut Agricultural Experiment Station, demonstrated an 85% reduction in tick population on lawns and an 81.6% reduction in wood plots within two areas of high tick infestation in two key Connecticut locations, Westport and Weston. Tick-Ex is a natural biocontrol product and an environmentally safe pest control agent, based on in-licensed proprietary technology and subsequently developed by Earth BioSciences. Following the receipt of these positive results, Earth BioSciences has entered into discussions with Bayer for distribution within North America. The business plan of Earth BioSciences provides for accelerated commercialisation of all technologies and products through co-operative agreements with distributors in the US (<http://www.taensa.com>)

....Vestergaard Frandsen unveils 'ZeroFly' sheets

The \$22 M Danish company Vestergaard Frandsen has introduced an insecticide-incorporated plastic sheeting under the brand name ZeroFly. ZeroFly is developed to provide shelter and to prevent vector borne diseases such as malaria in slums and during emergencies. ZeroFly is being manufactured in Gujarat in facilities that have been licensed by the company for manufacturing and nearly 45,000 pieces have been manufactured since September 2002. Vestergaard Frandsen expects sales of Rup 250 M from ZeroFly and its other product (insecticide-incorporated bed net, Permanet) during 2002 from its Indian operations. Vestergaard Frandsen proposes to introduce ZeroFly blankets by early 2003 and ZeroFly tents by late 2003 (<http://www.vestergaard-frandsen.dk>)

....West Nile virus

Sawyer Products, the US's largest supplier of permethrin insect repellents to the US military and the retail market, has increased its efforts to make it easier for Florida residents to obtain the new products recommended on 9 September 2002 by the Florida Department of Health. In the new guidelines, the Department has recognised the need to give better protection to its residents and has upgraded its West Nile Virus protection recommendations. These recommendations now include a system similar to that which US Military has been using safely and effectively for over a decade. In addition to applying a Deet-based insect repellent to the skin, the Florida Department of Health now also recommends using a permethrin repellent on clothing. Sawyer's permethrin binds to the fibres of fabric, similar to colorants, and remains effective for up to 6 weeks, through multiple washings. Permethrin may be used on clothing, sleeping bags, tents, or stroller nettings. The Deet is encapsulated into a time-release polymer delivery system. (<http://www.sawyerproducts.com>).

Herbicides

...broad-leaved weed control

BASF is promoting its new herbicide Picopro in a sponsored review on autumn broadleaved weed control. Picopro is a mix of picolinafen (16 g/l) and pendimethalin (320 g/l) that controls troublesome broadleaved weeds and gives some measure of control of grasses. Broadleaved weeds in cereals are increasingly worrying, especially in early drilled crops and milder winters. BASF forecasts that Picopro will gain market share at the expense of diflufenican.

....Syngenta promotes Hawk herbicide

Syngenta is using a novel approach in the marketing of Hawk herbicide. By spraying the clodinafop and trifluralin mix through variable pressure nozzles, the company claims the grower can apply the herbicide on a greater area at the correct growth stage of blackgrass giving a potential 10% yield increase.

Fungicides

....Take-all

Monsanto has sponsored the UK's first national survey of the incidence of take-all in wheat; 5% of the wheat grown in England and Scotland was covered. The company's seed dressing Latitude

(silthiofam) increased the yield of second grown wheat by 1.2 tonnes/ha, well above the 0.5 tonnes response needed to cover the treatment cost of £25/ha. Bayer CropScience claims that its seed dressing Jockey (fluquinconazole) also performed well in independent trials in 2002. Morley Research Centre, however, reports that both products gave variable results with little to choose between them.

Delivery

Seed coating technology

Seed coating technology is a natural extension of the traditional pesticide broadcast application, where emulsifiable concentrate, wettable powder and suspension concentrate formulations are dispersed at the time of planting. Uniqema developed a seed coating technology for one of the leading companies in the crop protection industry that now serves as their lead formulation. The coating technology maintains the physical stability of the active ingredient by incorporating its SemKote latex emulsion polymers as binders. Through its relationship with National Starch and Chemical, Uniqema has made available a series of off-the-shelf emulsion polymers specifically for use in seed coating formulations. Seed coating technology offers farmers the opportunity to reduce the amount of pesticides that enters the environment because it is concentrated in a small area rather than being spread over a large one (<http://www.uniqema.com>)

Herbicide toxicity studies

Research at the University of Wisconsin and at the Universidad de Valparaiso in Chile has found that low doses of a common mixture of herbicides can cause reproductive problems in mice. A 20% increase in failed pregnancies was found when mice were exposed to doses seven times lower than the maximum allowed in drinking water in the US. Studies have also found crop workers and lawn service applicators to have a higher than average rate of non-Hodgkin's lymphoma. 2,4-D is not classified as a human carcinogen under the EPA's legislation introduced in 1997. A toxicity reassessment review is currently being undertaken by the EPA that is due for completion in 2004.

Plants control molting of insects

Plants containing very high concentrations of ecdysteroids have been found by a team

headed by Vladimir Volodin from the Institute of Biology in Syktyvkar. These are saw-wort (*Serratula coronata*) and catchfly (*Silene tatarica*). Ecdysteroids are insect molting hormones which appear in the body of a caterpillar to let it pupate and successfully turn into a butterfly, but the dose should be appropriate. Plants that suffer every spring from attacks of hungry young caterpillars have “learned” to produce molting hormones to overdose and kill the insects. Prior to blooming, ecdysteroids are accumulated in high concentrations in leaves, and caterpillars, who eat these, soon become pupas, but never develop further – just die. So, the wise plants fabricate a natural pesticide controlling the numbers of insects of certain species.

Presumably, nearly all plants have genes responsible for the synthesis of ecdysteroids, but they are active in only few species. If the dormant genes of, e.g., potato were activated, then the potato could produce certain substances to kill Colorado beetle. These genes could be activated using genetic engineering (<http://www.informnauka.ru>)

Resistance management

A central concern in regulating genetically modified Bt crops is the risk of insects evolving resistance to the Bt toxins. To reduce this risk, the “high dose/refuge” strategy is now being used, in which non-Bt fields (refuges for insect pests) are planted near Bt fields (where there is high dose of toxin).

In the November 2002 issue of *Ecology Letters*, Ives and Andow use mathematical theory to explain how the high dose/refuge strategy works. This analysis leads to several unexpected results. For example, for some Bt crops and some pests, spraying insecticides in refuges should not severely compromise the value of refuges. This makes the high dose/refuge strategy more practical by allowing farmers to protect their crops in refuges. The new theory could lead to new resistance management strategies.

Atrazine makes wild frogs hermaphroditic

According to research by Tyrone Hayes at the University of Berkeley, California (*Nature*, 2002, 419, 895–896), atrazine is making male frogs grow female gonads in the US Midwest, possibly implicating the herbicide in the declining amphibian populations worldwide. Previous concerns over atrazine’s ability to disrupt sex hormones has led many European nations to ban it. Hayes and his colleagues checked leopard frogs (*Rana pipiens*) and atrazine levels at 8 sites from Iowa to Utah. They found that up to 92% of male frogs at sites contaminated with atrazine had abnormal gonads. In the lab, almost a third of leopard frog tadpoles developed mixed gonads when exposed to 0.1 ppb atrazine, well below typical environmental levels. The same happened with male African clawed frogs (*Xenopus laevis*).

Diamondback moths

Scientists from the US Department of Agriculture–Agricultural Research Service (USDA-ARS) are using naturally occurring viruses as a new approach for helping to control diamondback moths, which are world-wide pest of cruciferous crops such as cabbage, turnip and broccoli, causing about \$1 billion a year in crop losses and pest control costs. Fluorescent brighteners, when used with moth-infecting viruses, can enhance the potency of the virus. Fluorescent brighteners are chemicals that take in ultraviolet light and re-emit the energy as visible light.

Research entomologists Martin Shapiro and Robert Farrar of ARS’ Insect Biocontrol Laboratory in Beltsville, Md., have been testing a newly discovered nucleopolyhedrovirus of diamondback moth.

The nucleopolyhedroviruses (NPVs) now under study are naturally occurring viruses, each of which infects only a few insect species. The viruses are promising alternatives to pesticides for many important pests, especially caterpillars. While some NPVs have been known to infect the diamondback moth, none was

particularly potent against it. In lab tests, the fluorescent brightener made the virus four times more effective against the moth caterpillars.

Snippets

...The European Union is funding a microbial biotechnology project with China and a consortium of collaborators that includes Leicester University and Genencor International. The project is seeking novel microbes, genes and enzymes from the unique and remote Chinese environments in Inner Mongolia and Tibet.

...a protein known as DIRI has been identified by workers at the University of Toronto, in collaboration with the Salk Institute in California and the John Innes Centre, Norwich, as being a key component in plants developing systemic acquired resistance to diseases.

...CSIRO have identified the exotic pest, the small hive beetle *Aethina tumida*, endemic in South Africa and in the USA, in Australian hives. The larvae of the beetles tunnel through combs, eating honey and pollen and killing bee brood, completely ruining the combs. The discovery will lead to changes in hive management in an attempt to control the incursion.

...A scientist has told the US Environmental Protection Agency advisory panel that a one to one relationship should be assumed between toxic residues and skin when modelling risk exposures. The current field model used contains an invalid assumption that equilibrium will be reached when skin and surface concentration equalise, but that is not found in experiments conducted. A linear relationship between the area of skin contact and arsenic transfer should be assumed.