

Resistance

...*Strobilurin resistance increasing*

Dow AgroSciences reports that resistance by wheat mildew spores to strobilurin fungicides has risen from less than 5% in 1999 to 70% in Scotland and 60% in south-east England in 2000. Equivalent figures in Germany and France in 2000 are 77% and 80% respectively. The frequent spraying by growers of low rates of the strobilurins (many wheat crops are given 3 or even 4 applications) without the use of mixtures of other fungicide products are seen as a major cause. The practice is against the recommendations of the inter companies' Fungicide Resistance Action Committee (FRAC) that recommends a limit of 2 treatments per season thereby prolonging the lives of the strobilurins.

...*Syngenta defends new seed treatment*

Syngenta has developed a new, second generation seed treatment for control of insects such as virus-carrying aphids in sugar beet and other crops. Thiamethoxam, sold as Cruiser, Adage and Helix in some markets, is a second generation member of the neonicotinoid class of chemistry. It is seen as a challenger to imidacloprid, sold as Gaucho, which dominates the sugar beet market with some 75% share. The first pest resistance to imidacloprid has been recorded in glasshouse crops in Greece and fear has been expressed that its chemical similarity to thiamethoxam could increase the speed of resistance development to both compounds. Syngenta argues, however, that its compound affects different receptors in aphids, is used at lower rates and distributed in the plant more quickly.

...*breeding can help to protect bees from Varroa mites*

The *Varroa* mite has become a serious problem for bee keepers as they reduce the bees' energy and productivity and can kill a colony within two years unless treated with pesticides. Unfortunately, even these expensive chemicals are becoming less effective as the mites develop resistance to them. Workers at Minnesota State University have bred a colony of bees that were able to remove the parasites and their larvae from the hives and maintain honey production levels. Unfortunately, when more than 15% of the bees were infested they were overwhelmed by the mites but, used in conjunction with pesticides, they are clearly a useful tool for the protection of bees from this harmful parasite.

Organic production

...*Serenade biofungicide approved as an organic agriculture product*

AgraQuest Inc has entered the organic farming industry after a new formulation of its biofungicide Serenade was registered by the US Environmental Protection Agency and added to the list of approved crop protection products by the Organic Materials Review Institute (OMRI). The California Environmental Protection Agency's Department of Pesticide Registration and the Washington State Department of Agriculture's Organic Food Program also have approved the new formulation. Serenade is based on AgraQuest's patented strain of *Bacillus subtilis*, a microorganism that is effective against several crop damaging pathogens, including powdery mildew, walnut blight, *Botrytis* bunch rot and fire blight. The original wettable powder and the newly registered organic formulation of Serenade are approved for use on vines, fruits, hops, peanuts, vegetables and walnuts. Three new crops - carrots, broccoli and onions - have been added to the US EPA label for the organic formulation. Used on grapevines, Serenade is the one product that effectively controls all major diseases including powdery mildew, *Botrytis* bunch rot, and sour rot in addition to suppressing downy mildew.

...*organic orchards are more profitable than conventional ones*

Workers at Washington State University have compared orchards growing Golden Delicious apples using conventional, integrated and organic methods. The study lasted six years and, although they took longer to reach profitability, by the end of the trial organic methods were placed first in environmental sustainability, profitability and energy efficiency. Integrated practices were placed second with conventional farming methods last. In a blind taste test, untrained tasters rated the organic apples as the sweetest. (For more information see J. P. Reganold *et al.*, 2001, Sustainability of three apple production systems. *Nature*, 410, 926-930).

...*garlic - new organic insecticide?*

Organic farmers are using increasingly large quantities of 'natural' insecticides to help combat the infestation of their crops by phytophagous insects. Garlic Barrier is a strong liquid garlic concentrate that when diluted and sprayed onto crops repels

insects and thereby protects the crop. It is claimed that the odour disappears in minutes but the repellent effect lasts, it is harmless to birds, farm workers and the environment (<http://www.garlicbarrier.com> for more information).

...*organic Austria?*

Within the European Union, Austria has more organic farming than any other member state with approximately 10% of its land in organic production. The government has encouraged this by using European subsidies to support farmer conversions. It is now being urged by a consortium of four environmental groups (Greenpeace, WWF, Global 2000 and Vier Pforten) to double this commitment.

...*the Philippines goes organic*

The potential market for organic food production has been identified by the Philippine Department of Agriculture as a means of establishing a dependable and high value export market. As such, the Department is to establish a committee designed to encourage and support farmers who wish to change to organic production. The programme will be monitored by certification programmes that will comply with US and EU organic standards.

...*Japanese organic supply unit*

Sumitomo has announced that it is to establish a new subsidiary in Japan to advise organic growers on preventative insect control, use of crop protection agents in organic crops and marketing organic produce. The subsidiary, Nihon EcoAgro, will also supply products for use in these crops.

Methyl bromide replacements

Dow AgroSciences has developed a new soil fumigant, InLine, proven to be as good as methyl bromide in eliminating soil dwelling organisms that damage crops. InLine contains around 60% 1,3-dichloropropene and 35% chloropicrin. Strawberry plots treated with InLine have generated crop yields of 95-110% compared to methyl bromide according to a study conducted by US Agricultural Research Services in California. Methyl bromide is currently sold at \$3.50/lb while InLine sells for just below \$2/lb. The company is awaiting state and federal approvals to use InLine on strawberries as a replacement for

methyl bromide. Methyl bromide is scheduled to be phased out by 2005.

Exotic water weed control

The USDA Agricultural Research Service (ARS) has entered into a 3-year Cooperative Research & Development Agreement (CRADA) with SePRO Corporation of Carmel, Indiana, to mass produce and formulate the fungus *Mycoleptodiscus terrestris* as a biocontrol agent to control hydrilla. Hydrilla is an exotic weed, originally from Asia, that grows so competitively with other aquatic plants that biological diversity may be threatened in many lakes and streams. It is notorious for clogging marinas, snarling fishing lines and interfering with flood control and hydroelectric power generation. In times of drought, these weeds can also obstruct the flow of irrigation water.

Destruction of sheep dip solutions

The EA Technology Environmental Group has shown that the patented DEM Cell electrochemical oxidation process can provide effective, economical and environmentally safe destruction of organophosphate (OP) sheep dip solutions. It has been shown in 18 months of laboratory and pilot-scale trials that the DEM Cell, which uses dished electrode membranes to oxidise toxic organic substances, breaking them down to carbon dioxide, nitrogen and water, rapidly destroyed sheep dip solutions containing diazinon.

Heat treating packaged fruit

Instead of the use of ethylene dibromide (EDB) to control fruit flies, exporters on the Cook Islands are using a high-temperature forced-air (HTFA) treatment, comprising a treatment at 47.2°C for 20 minutes in sealed chambers. The method has been demonstrated with papaya and mangoes, and there are plans to expand exports to other produce, including aubergines. If carried out properly, the treatment even enhances the market quality of the fruit. It produces an even colour on the fruit, and slows down the rate of internal ripening. This helps to extend fruit shelf-life and the fruit flesh does not develop the bitterness which is characteristic of fruit treated with EDB. The treatment can also be adapted to the control of temperate pests in avocados, litchis, bell peppers, nectarines and apricots.

Plant protection signalling by day and night

De Moraes *et al.* (*Nature*, 2001, 410, 577-580) have shown that tobacco plants use different blends of volatile compounds by day and by night. In daylight, plants under attack by herbivores emit blends that attract parasitic or predatory insects, which destroy the herbivores. By night, attacked tobacco plants release volatiles (mainly blends of small, unsaturated derivatives of fatty acids) that repel nocturnal pregnant moths, which are looking for somewhere to deposit their eggs.

Duo controls Melaleuca

Scientists at the USDA Agricultural Research Service Invasive Plant Research Laboratory at Fort Lauderdale, Florida, are working with colleagues from the University of Florida, University of Adelaide in Australia, the CSIRO and the ARS Australian Biological Control Laboratory to develop a team of two organisms – the *Fergusonina* fly and the nematode *Fergusobia* – to help to limit the spread of the invasive weed *Melaleuca quinquenervia*. The female *Fergusonina* fly carries the nematodes in her ovaries and deposits them, along with her eggs, into young *Melaleuca* buds. The female *Fergusobia* nematodes and the fly larvae that hatch then feed on enlarged plant cells created by the microscopic nematodes. Eventually, galls form on infested buds, preventing flowers and seeds from developing.

Plant-stroking machine

Researchers from the University of Greenwich and Hadlow College have developed a plant-stroking machine which they believe can improve the quality of young plants, especially vegetables and bedding plants – producing shorter, stockier specimens – by a process called thigmomorphogenesis (a change in growth or form as a result of touch). The electronically controlled machine, brushes the tips of young plants. The idea is based on the fact that plants generally respond to an increased degree of physical disturbance, from touch or wind movement, by growing shorter and stockier. It is hoped that thigmomorphogenesis could help to overcome some of the growth problems of plants in protected environments without resorting to the use of chemical growth regulators. See <http://www.hadlow.ac.uk/chelsea2.htm>

Tesco boosts organic crop research

The UK supermarket chain Tesco is aiming to set up the biggest research project into organic crop production in the world. Large tracts of agricultural land have been set aside for study into organic production, and a special research centre, funded substantially by Tesco, has been established at Newcastle University (<http://www.tesco.com/organic/>).

Snippets

...a new active ingredient, the first in the blight market since 1994, joins battle with fluazinam, cymoxanil and mancozeb. Zoxium comes from Rohm and Haas and will be marketed in mixture with mancozeb as Electis by Interfarm UK and as Roxan by Dalgety. The compound has a novel mode of action and no resistance to any phenylamide resistance strain has been detected in the laboratory.

...scientists at the Horticultural Research Institute (HRI), Wellesbourne have isolated and patented two genes from bacteria that produce substances toxic to certain nematodes. Added to a carrier bacterium they could be used to control nematode pests.

...Celgro Corp., of Warren, New Jersey, USA, have been awarded a US patent for S-imazalil, the chirally pure version of imazalil, covering the composition and methods of use of the fungicide.

...the new Syngenta herbicide pyrifthalid, which controls grasses (especially *Echinochloa*) in rice paddies, has received its first registration in South Korea. Further registrations are expected to follow in major rice-growing countries throughout Asia.

...according to a report in *Nature Biotechnology* (2001, 19, 371), George Wagner and colleagues at the University of Kentucky at Lexington, have genetically modified tobacco plants so that they produce large quantities of a aphid-repelling substance called cembratrienediol within tiny glands called trichomes. The modified plants were significantly less colonised by aphids than in normal unmodified plants.