Managing Ornamentals Sustainably (MOPS)

Project Overview

Background

Crop protection is a significant area of research for the AHDB. For the ornamentals sector it is especially important as few crop protection products come onto the market with label recommendations specifically for ornamentals. Many widely used conventional chemical products have already or are predicted to become unavailable over the next decade as new European legislation takes effect. Resultant gaps in the crop protection options have already been experienced by ornamentals growers and the situation will become still more difficult in the future. A further tranche of product withdrawals is likely following the implementation of Regulation (EC) (1107/2009) that requires assessment of inherent hazard as well as risk and the definition of many popular products as “endocrine disruptors”.

To help counter this situation and provide new solutions for ornamentals growers, the MOPS project has been set up. One of the main objectives of the project is to assess new crop protection products highlighted by the HortLINK SCEPTRE project (Sustainable crop and environment protection – targeted research for edibles). The SCEPTRE project screened around 285 conventional products and biopesticides on a range of edible crops. A number of these products were extremely effective on pest and disease problems similar to those experienced by ornamentals growers and were therefore recognised as having potential for use by ornamentals growers.

To be included in the MOPS programme, products must fulfil certain criteria; show promise for efficacy against the target pest or disease, have potential for use in an IPM strategy, have the manufacturers’ support for an EAMU on ornamentals and have no adverse effect on plant growth or quality.

Summary

In the first year of the MOPS project novel products including seven conventional fungicides and three biofungicides were screened against powdery mildews and rusts, and five conventional insecticides and five bioinsecticides were screened against aphids, whitefly, western flower thrips and vine weevil.

An overview of the experiments on the various crop protection products carried out is given in Table 1 showing the test crop, and the number of novel products tested. The leading novel

products and the commercial standard treatment used for comparison for each target are shown in Table 2.

Table 1. Overview of the crop protection products screening experiments

Target	**Test crop**	**Number of novel crop protection products tested**	
		Conventional	Biopesticides
Powdery mildew	Hawthorn	3	3
Powdery mildew	Aster	5	2
Powdery mildew	Pansy	5	2
Rust	Bellis	5	2
Rust	Antirrhinum	5	2
Aphid (peach potato)	Pansy	2	3
Whitefly (glasshouse)	Verbena	2	4
Thrips (western flower)	Verbena	3	3
Vine weevil	Fuchsia	1	3*

*three nematode products used in addition

Table 2. Leading novel products (code name in numerical order) identified for control of target diseases and pests

Target	**Test crop**	**Commercial standard**	**Leading three* novel products**	
			Conventional	Biopesticides
Powdery mildew	Hawthorn	Signum	**10**,39,**77**	38,**47**,**105**
Powdery mildew	Aster	Signum	**10**,**25a**,**77**	11,**105**
Powdery mildew	Pansy	Signum	**10**,**25a**,**77**	**47**,**105**
Rust	Bellis	Signum	**25a**,**77**,177	**47**,**105**
Rust	Antirrhinum	Signum	**25a**,**77**,177	**47**,**105**
Aphid (peach potato)	Pansy	Movento	**200**,**59**	**62**,**130**,**179**
Whitefly (glasshouse)	Verbena	Teppeki**	**59**, 208	**62**,205, **179**
Thrips (western flower)	Verbena	Actara	48,**200**,207	**179**,201,**130**
Vine weevil	Fuchsia	Exemptor		**130**,205

*where fewer products were tested or fewer showed promise a smaller selection was made

**similar product Mainman has an EAMU for ornamental plant production and should be used instead of Teppeki.

Three conventional fungicides 10, 25a and 77 were particularly useful, performing well against both powdery mildew and rust diseases. Three biofungicides 47, 105 and Serenade ASO had broad spectrum activity against both powdery mildew and rust.

Conventional insecticides 59 and 200 both had activity against peach potato aphid and in addition 200 had activity against western flower thrips and 59 against glasshouse whitefly. Conventional insecticide 59 is a neurotoxin and is relatively fast acting, whereas 200 works by ingestion and tends to be slower acting, it has translaminar activity which is useful in situations where spray coverage is difficult.

The bioinsecticides 62, 130 and 179 are of particular interest, having good activity against peach potato aphid and in addition some activity against whitefly (62), western flower thrips (130, 179) or vine weevil (130). All are contact acting so would require good spray coverage to achieve the best results.

The products shown in bold will be carried forward for extended phytotoxicity testing on a range of protected ornamentals and HNS. Note that a few leading treatments will not be taken forward for further phytotoxicity testing either because the nature of the product means that there is little risk of phytotoxicity or because there is already sufficient information known about them.

All treatments used in the vine weevil control experiment were effective in reducing numbers of vine weevil larvae apart from 179. The most effective treatments were Exemptor incorporated and drenches of Calypso, 205 and three nematode products; Nemasys L, Larvanem and SuperNemos.

A further area of work focused on disinfectants and soil and surface sterilisation. Nine disinfectants were screened against *Fusarium* and *Pythium* on surfaces, a biological anaerobic soil disinfection technique was tested against *Fusarium* in soils and a heat treatment was evaluated for control of *Fusarium*, *Pythium* and *Phytophthora* on nursery materials and debris.

Three disinfectants; Disolite, Unifect G and Domestos, were noted as particularly effective against *Fusarium* and *Pythium* on different surfaces. Choice of disinfectant will depend on the target disease, the surface to be treated and the odour corrosiveness and biodegradability of the product.

A recent development in soil sterilisation has been the biological system of anaerobic soil disinfection using organic by-products as soil amendments. These products encourage specific anaerobic soil bacteria to build-up which produce fungitoxic chemicals. A number of

proprietary products (sold as 'Herbie') have been developed in the Netherlands for soil disinfection. These were tested for the first time against *Fusarium*, a common soil-borne disease in cut flower crops. One particular Herbie product (14.3) halved the level of infestation when used with a starter culture, however the disease was not eliminated. Further work will be carried out focusing on Herbie 14.3 using a higher rate.

The Foamstream system designed for weed control on hard surfaces consists of a lance which delivers water at 90°C with additives that create a heat-retaining foam. It has potential for sterilisation so in this experiment it was tested for efficacy against matting inoculated with *Pythium* and *Fusarium* and roots with a natural *Pythium* and *Phytophthora* infection. It effectively killed *Pythium* and *Phytophthora* and checked *Fusarium*. Tests on different plastics commonly used on nurseries did not show any damage from a two second exposure.

Work planned for 2015

The work planned for 2015 is summarised in Table 3.

Table 3. Overview of various crop protection product screening experiments

Target	**Test crop**
Powdery mildew	Hawthorn
Powdery mildew	Aster
Rust	Bellis
Aphid (melon and cotton)	Hebe
Tortrix caterpillar	Choisya or similar
Nematode (leaf and bud)	Bed clean-up & identification

Five fungicides and five insecticides will be tested for phytotoxicity and visible residues in two trials on a range of representative crops including two bedding plant, two pot plant, two cut flower and six nursery stock species.

Some of the disinfectants shown to kill *Fusarium* and *Pythium* will be used on naturally infested glasshouse surfaces and their efficacy evaluated.

The future after MOPS

It is important that work to develop new pesticides for ornamental plant production continues after the MOPS project is completed and that no momentum is lost. At present it is planned that work on ornamentals will be included in the crop protection project that is scheduled to follow on from SCEPTRE.