

# Grower Summary

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## PO 012

**Evaluation of the non-metalaxyl-M  
based fungicides/programmes  
against metalaxyl-M resistant  
strains of *Plasmopara obducens***

Final 2013

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Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

HDC is a division of the Agriculture and Horticulture Development Board.

**Project Number:** PO 012

**Project Title:** Evaluation of the non-metalaxyl-M based fungicides/programmes against metalaxyl-M resistant strains of *Plasmopara obducens*

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**Previous report/(s):** None

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### **Further information**

If you would like a copy of the full report, please email the HDC office ([hdc@hdc.ahdb.org.uk](mailto:hdc@hdc.ahdb.org.uk)), alternatively contact the HDC at the address below.

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## Headline

Fungicides programmes are available which confer good, although not complete control of the metalaxyl-M resistant strain of *Plasmopara obducens*.

## Background

Downy mildew of impatiens caused by *Plasmopara obducens* was first reported in the UK in June 2003 and caused considerable economic damage to commercial crops and municipal plantings, especially, though not exclusively, in the South of England. Initially emergency statutory action was taken by the Plant Health and Seeds Inspectorate (PHSI) and the downy mildew pathogen on impatiens was declared notifiable. This was revoked in 2005 on the proviso that the industry took on responsibility for management of the disease through implementation of an industry code of practice (Good Horticultural Practice (GHP)). Between 2004 and 2006, the disease was not reported in commercial crops but reappeared at low to moderate levels in 2007. In the following year (2008) the disease was once again quite widespread and damaging, especially in municipal and other outdoor plantings. In 2011, early and widespread outbreaks were reported in vegetative cutting raised material and due to a lack of fungicidal control (related to the introduction of a metalaxyl-M resistant strain) the infection soon spread to seed raised crops with devastating impacts on UK production.

Work in the HDC funded projects (PC 230, PC 230a and PC 230b) has contributed to a greater understanding of the disease and has provided guidance to help minimise outbreaks (e.g. HDC briefing notes issued in 2011 and updated in 2012). It was clear from this work that spray programmes which included metalaxyl-M were the most effective against the disease. With the discovery of resistance to this active ingredient late in 2011, production of susceptible *Impatiens walleriana* in the UK fell dramatically and this, to some extent, has taken the pressure off. However, where growers have continued to offer this bedding plant species, growers and their advisers now have to make educated guesses on suitable spray programmes. The work aims to provide fungicide efficacy data against the metalaxyl-M resistant strain to assist growers in making informed decisions on suitable fungicide programmes, helping to minimise spread where infections arise.

## Summary

### ***Fungicide efficacy***

Initially thirteen fungicides were examined in laboratory-scale efficacy tests. These were applied as protectant treatments as both spray and soil applications. Efficacy tests were carried out on six week old impatiens ('DeZire White'), using a metalaxyl-M resistant isolate

of *P. obducens*. The results indicated that a number of products, with differing modes of action, gave effective control of the metalaxyl-M resistant strain of *P. obducens* particularly when applied as a spray treatment. These included Fenomenal (fosetyl aluminium + fenamidone), Revus (mandipropamid), Paraat (dimethomorph) and a coded product HDC F33. The number of fungicides showing control of the metalaxyl-M resistant strain was encouraging, as this meant that spray programmes could be identified which did not rely on a single mode of action or active ingredient.

The initial laboratory scale tests were followed up with a semi-commercial scale trial using impatiens 'DeZire White' grown in six-packs inoculated with the metalaxyl-M resistant strain of *P. obducens*. Twelve treatment programmes were examined which included a 'standard programme' (Proplant (propamocarb-HCL), Fubol Gold (mancozeb and metalaxyl-M) and Previcur Energy (fosetyl aluminium + propamocarb HCL), seven individual products applied as either a two or four foliar spray programme, a soil incorporation treatment and three experimental treatments applied as either two, three or four spray programmes. All plants were inoculated with a metalaxyl-M resistant strain of *P. obducens* after at least one treatment of a programme had been applied. Three disease assessments were carried out two, four and six weeks after inoculation. Most programmes trialled gave a significant reduction in downy mildew symptoms by the first assessment. By the final assessment the standard programme (which included metalaxyl-M as the second application) and the two treatment single product programmes, other than where Paraat or Revus had been applied, failed to control the disease. Where a four treatment single product programme was used it always provided better disease control than an equivalent two treatment programme. Overall, the programmes which gave the greatest reduction in disease were the four treatment Revus programme and experimental programme 2 which had Fenomenal, Paraat and Revus in the programme. Even the best performing programmes succumbed to the disease with almost all plants showing signs of disease, however, plants had been inoculated with a high spore concentration and severe disease pressure was maintained throughout the experiment, which meant that programmes were tested under inoculum loads which would not necessarily occur commercially.

From the trials carried out here programmes containing Paraat and Revus, both of which are already approved for use on protected ornamentals, offer the greatest potential for controlling the metalaxyl-M resistant strain of *P. obducens*. Programmes including Fenomenal and HDC F33 in addition to Paraat and Revus also showed potential; though HDC F33 cannot be used commercially until such time products based on this experimental active can be approved.

### **Crop Safety**

Twelve fungicides were examined in crop safety trials on seedlings from the impatiens series 'DeZire' and 'Accent'; white, red, lavender (for 'DeZire') and lilac (for 'Accent') varieties were tested for both series. Seedlings were tested against full and half rate applications of each treatment, with assessments of phytotoxicity and the number of deformed seedlings for each series and colour made. The first assessment identified some plant deformities, however, these seemed to relate to the impatiens series or colour rather than the chemical treatment as there was no difference in the level of deformity between control or treated plants. No other signs of phytotoxicity were observed. Following the second assessment differences between treatment and control plants were only noticed for the impatiens from the 'Accent' series following treatment with Fubol Gold (mancozeb and metalaxyl-M) where there appeared to be a higher number of deformed or blind plants.

### **Financial Benefits**

In the UK, the annual retail value of the impatiens crop has previously been estimated to be ca. £40m. The introduction of *Plasmopara obducens* and particularly the development of a metalaxyl-M resistant strain in 2011 demonstrated how a breakdown in disease control has the potential to almost completely destroy annual production as well as undermine consumer confidence in this commercially important product. The current value of the UK impatiens crop is not currently known but it is anticipated to be significantly lower than previous estimates suggest.

Establishing the suitability of fungicide programmes to control the newly introduced metalaxyl-M resistant strain of impatiens downy mildew will ensure growers have available to them (subject to product approval) the most effective currently available fungicides and spray programmes to minimise losses that may result from any future outbreaks. The control of both strains of *Plasmopara obducens* during production is essential if the UK market for impatiens is ever to recover.

### **Action Points**

- To minimise the introduction of downy mildew on the nursery use only seed-raised impatiens and avoid importing vegetative cuttings that have been shown previously to carry a high risk factor in terms of downy mildew, including resistance, infection.
- As far as possible grow impatiens as outlined in the HDC guide for 'Good Horticultural Practice for the Prevention and Control of Impatiens Downy Mildew', and the HDC Factsheet 11/09 'Impatiens Downy Mildew'.

- Ensure that spray programmes do not rely on a single mode of action or active ingredient. Such alternation with fungicide programmes will reduce the risk of further resistant populations developing.
- Have downy mildew infected impatiens tested to identify the metalaxyl-M sensitivity of the infecting pathogen.