

**Project title:**

Management of downy mildew disease of pea crops and its possible resistance to metalaxyl

**Project Number:**

VG00031

**Project Leader, Your Organisation, Phone number:**

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**Start: 2000 Finish: 2004**

**Aim:**

This project aims to determine whether:

- *Peronospora viciae* strains in Australia are resistant to metalaxyl;
- Metalaxyl treated seed is providing adequate disease control on seeds and young seedlings;
- There are alternative products for the control of metalaxyl resistant downy mildew;
- There are other methods of managing downy mildew.

**Expected outcomes:**

- Downy mildew and *Ascochyta* collar rot are the two major processing pea diseases that can reduce pea yield. The two diseases are present in almost all pea seeds and crops. Generally, in field trials conducted in this project, pea yields increased one to three tonnes per hectare following improved management of these diseases.
- A total of 16 isolates of *P. viciae* were collected from pea crops at different sites in northern Tasmania for bioassay tests in 2001. 38% of isolates tested were sensitive to metalaxyl, 31% were resistant and another 31% were partially resistant. This was consistent with similar resistance development in New Zealand.
- This is the first report of metalaxyl resistance following its use as a pea seed dressing for downy mildew control in Australia and New Zealand.
- Metalaxyl (Apron), applied as foliar spray application, was also shown to give poor downy mildew control on seedlings and maturing plants in the field.

**1. Seed infection control**

- This project demonstrates the importance of seedborne infections, as well as the effectiveness of seed dressings with several active ingredients in controlling several major pathogens and diseases. Fungicide seed dressing is the most cost effective method of controlling seedborne infections and early seedling diseases.
- The fungicide seed dressings Apron + P-Pickel T, Aliette Super, and Wakil XL, generally gave the best performance, consistently increasing plant density and seedling growth.
- These fungicide seed dressings, each consisting of a mixture of three active ingredients, are all formulated to control both downy mildew and *Ascochyta* infections on pea seeds.
- As a high proportion of the downy mildew isolates were resistant to metalaxyl, Aliette Super and Wakil XL are recommended for use as alternative seed dressings, for overcoming the problem of metalaxyl resistance.
- Seeds treated with Aliette Super or Wakil XL and stored for almost one year showed no adverse effects on germination and seedling growth.

## 2. Field infection control

- One to two foliar fungicide spray applications were shown to consistently reduce the incidence and severity of downy mildew in pea crops, and improved pea yield, in field trials conducted over three years. Prior to this project, there was no effective or affordable control method for field downy mildew.
- Agri-Fos applied with Bravo or Penncozeb gave the best downy mildew control.
- Bravo reduced *Ascochyta* collar rot severity. Agri-Fos or Penncozeb, however, have little or no effect on collar rot. Therefore, 1.8 L/ha Bravo + 3.5 L/ha Agri-Fos were effective against both downy mildew and collar rot.
- Agri-Fos + Bravo, followed by Agri-Fos + Penncozeb, appeared to give the best collar rot and downy mildew control, and subsequent yield improvement.
- This use of these relatively low cost fungicides (Agri-Fos, Bravo and Penncozeb) against downy mildew and *Ascochyta* rot, provides growers a cost effective and affordable method of managing field infections of the two major pea diseases.
- Among the different types of spray adjuvants examined in the trials, little or no advantage could be found with their addition to the fungicides.

### Communication / Industry liaison:

- Many of the project's findings have already been adopted by the processing pea industry during the project in 2002 and 2003. The use of alternative seed treatments, as well as Agri-Fos + Penncozeb or Agri-Fos + Bravo, are already industry standards for downy mildew management. Therefore, recommendations made at the end of the project are expected to be a formality.
- A poster was presented at the International Plant Pathology Congress that was held at Christchurch, New Zealand, on 3-7 February 2003. Copies of the poster were provided to Horticulture Australia and voluntary contributors.
- Results of this project were presented to the National Vegetable Pathologists Working Group and Industry Development Officers from all states at Adelaide on 21-23 April 2004.
- A poster was also presented to South Australian growers at the Virginia Horticultural Centre, South Australia, on 22 April 2004. Printed flyers of the poster were also made available to growers.

### Other issues:

- The project was initially scheduled to complete in September 2003, but was extended for another year, to enable three field trials to be re-scheduled from 2002/03 to 2003/04, to ensure that the trial objectives were met successfully. The dry weather and field conditions in 2002 were not conducive to disease.
- Note that the two alternative pea seed dressings, Aliette Super and Wakil, are registered for use in New Zealand, but not in Australia. As almost all processing pea seeds are imported from New Zealand, and seeds could be treated there before shipment to Australia, there is no plan by the seed-dressing manufacturers to register them in Australia. This arrangement, while satisfactory, is not ideal, as some pea seeds produced in Australia could not be treated with these alternative seed dressings.
- Unfortunately, most agricultural chemical companies are reluctant to invest in the evaluation and registrations of new actives for vegetable seed dressings, due to its diversity and small seed volume.