Nursery Management of Downy Mildew, Particularly in the Cut Flower Industry©

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Impacts of *Plasmopara obducens* on *Impatiens* and *Peronospora chlorea* on *Eustoma* (syn. *Lisianthus*). The last few years this fungus disease has created havoc amongst the nurserymen, growers, and flower growers. Those engaged in the wholesale and retail nursery business as well as cut flower growers can tell you horror stories because of big losses in plant material and sales.

In the first instance with the *Impatiens walleriana* the fungus *Plasmopara obducens* created chaos the last few seasons. The plants are attacked by downy as soon as weather conditions were getting colder and wet. Downy mildew thrives under these conditions. Downy mildews are not true fungi but they are more closely related to algae and are also related to *Phytophthora* and *Pythium*.

It was about 2006 when I first saw downy mildew on a batch of impatiens in South Africa. These were already fully grown plants. The symptoms were a few speckled leaves, here and there. At first we thought it was insect damage or spray damage, but actually we could not pinpoint the cause of this. Just for the sake of safety, the infected plants were removed and destroyed; the rest of the plants still looked very good and healthy.

The following season in 2007 we saw a big outbreak of downy and growers and nurserymen lost a lot of plants and money, as well as customers. Gardeners would plant healthy looking seedlings which initially would grow well and suddenly the signs of curling, yellowing, and dropping leaves would appear.

In no time the whole batch of planted seedlings disappeared and the gardeners started to complain to their nurseryman who supplied these. The nurseryman in turn went to the seedling growers and claimed refunds for these diseased plants. The following year 2008 was not much better although some nurseries did not sell too many *Impatiens* fearing a repetition of the previous year's problem. One wonders how many *I. walleriana* will be sold this year. I have heard that many wholesale growers are not going to touch these *Impatiens* this year.

It appears that this strain of downy does not attack the New Guinea impatiens (*I.* ×*hawkeri*) although there are some indications in the literature that downy was also spotted on New Guineas. How true that is I do not know.

But where does this outbreak of the disease come from? Nobody knows. Some people in South Africa claim that it was imported with a vegetative selection. There is no proof of this. Is the disease seed-borne?

The latest outbreak of this disease was first spotted in 2003 in the U.K. in both seed grown and vegetative-grown *I. walleriana*. Also Australia, Europe, and the U.S.A. have had, and still have, their share of downy over the past few years in both vegetative and seed-grown taxa.

Even intense spraying programs do not seem to work very well. However, I read that Syngenta Seeds together with UR Wageningen in Holland have been doing

trials on this disease. They mention that the downy spores can be spread by water (swimming spores) zoospores as well as by "resting spores," oospores, in the soil. The trials showed success with a chemical called "Chemical A" (not yet registered on *Impatiens*), apparently this is a plant booster but gives a reduction in flowers at the rates applied. Fenomenal and Ridomil Gold also gave success.

Another crop which is also affected by downy mildew, starting last year in South Africa, is *E. grandiflorum* or better known as lisianthus. The mildew strain we are looking at is *P. chlorea*.

Downy mildew strains are crop related and each strain infects different types of plants such as roses, grapes, etc. In any case, *P. chlorea* is giving the seedling growers, as well as the cut flower growers who have planted infected lisianthus seedlings, big headaches and losses. Virtually millions of seedlings have had to be destroyed due to downy this year.

In lisianthus, small seedlings in the plug trays are attacked already. Showing curling down and yellowing of the leaves eventually showing a grey mould on the underside of the leaves. When planted out in the greenhouses, the infected plants do not perform well and show yellow leaves and stunted growth. It started in Gauteng in Nov./Dec. 2008 when we experienced some weeks of cool, overcast, and damp weather — ideal for downy mildews! About 5 years ago there was a similar outbreak but not as severe as this year.

Could an outbreak be prevented? In my opinion, to a certain extent, yes, these disesases could be prevented. When weather conditions, as described above occur, the growers should immediately take the necessary preventative steps, including:

- Intensify the preventative spraying program against the disease using mainly systemic fungicides. Downy mildew becomes systemic and the growing spores enter from the leaf surface into the leaves. Once inside the plant they are almost impossible to kill.
- Control the watering sequence — reduce watering and keep the plants as dry as possible.
- Water early in the morning!
- When normal watering is continued under the damp conditions, algae will form on the surface of the tray, forming a thin crust which will hinder water and fertilizer penetration into the soil.
- Increase the fertilizing concentration because less frequent waterings are given. If the soil stays too wet for too long and feeding cannot be done, supplement with a foliar feed.
- Never let the plants go into the night with wet leaves.
- Try and keep day and night temperatures as close together as possible; fluctuating temperatures will cause condensation on the leaf surface and increase the risk of mildew spores to germinate.
- Provide good ventilation so that the leaves dry off quickly after watering or foliar feeding.
- Keep the growing area clean and prevent unauthorised persons from entering the growing area.
- Scout on a daily basis and remove infected plants immediately from the growing area — downy spores do spread very easily through the air.
- Isolate a separate growing area for lisianthus.

The above preventative measures should, where possible, also be applied when growing *Impatiens* seedlings. Also, good temperature control is important — do not start growing *Impatiens* too early!

A big problem arises when infected *Impatiens* are planted into flowerbeds and also lisianthus seedlings planted in a greenhouse, the soil may be infected and needs sterilisation. In the greenhouse this is done more easily but it is not practical to sterilize flower beds in the garden. Crop rotation is an answer.

Growing plants is a 24/7 job; scouting, spraying, correct watering, feeding, and providing optimum growing conditions is a must.

This looks worse than being married!