

Pestalotiopsis Crown Rot in Strawberry- Disease Characteristics and Suggested Management Strategies

Introduction

Pestalotiopsis (*P. clavispora*) is a disease causing crown and root rot in strawberries. It is often confused with *Phytophthora cactorum* due to similarity of symptoms.

The earliest available references to *Pestalotiopsis* in strawberry plants are from the Netherlands in 2013 where the disease was detected in propagation material by BASF (Rob van den Oever, Vlamings), and from commercial plantations in Huelva province Spain in the cropping year 2013-14 (Chamorro et al. 2015). A closely related species, *P. longisetula*, was previously identified as the cause of a strawberry fruit rot in Egypt (Embaby 2007).

P. clavispora has previously been identified as the cause of stem canker and dieback in Chilean blueberry plantations (Espinoza et al. 2008), and other *Pestalotiopsis* diseases are recognised as weak pathogens in a variety of container grown Ericaceous nursery stock from the UK, causing leaf, stem and root browning (McQuilken and Hopkins 2004).

Disease Characteristics

- *Pestalotiopsis* is an ascomycete and is considered a weak pathogen which gains entry to the plant via wounds and natural orifices (Vlamings).
- It is more likely to attack plants previously weakened by other stress factors (e.g. poor growing conditions, physical damage, pests or disease).
- It is thought that the disease can be spread by crop operations, tools, rain or irrigation splash, and possibly via airborne spores.
- The optimum temperature for development is 19-23 C and it is likely that free water aids development and spread of the disease. Poor weather has been observed to have a large effect upon the incidence of *Pestalotiopsis*.
- Infected plants show symptoms of slow development, lack of growth, poor rooting, sometimes wilting and collapse. Difficult to differentiate visually from *P. cactorum*!
- Varietal differences- Malling Centenary more susceptible? Very early infection after cutting runner tips appears to be possible in this cultivar. Infected plant numbers appear higher than average for 2016/17.
- Experiments in Ericaceous nursery stock showed that overhead watering promoted *Pestalotiopsis* more than sub-irrigation. A fungicide programme consisting of 5 applications and pot and floor disinfection reduced disease incidence.



Fig 1: *P. cactorum* crown rot



Fig 2: Pestalotiopsis pictures from “Nieuwe schimmelziekte aardbeien!”, Rob van den Oever, Vlamings

Suggested Management Strategies for Propagators

- Minimization of stress factors and avoidance of disease risk factors are likely to be the most important steps in managing Pestalotiopsis during propagation.
- Begin by taking good runner tips from healthy well fed Mother Plants at the correct time. Don't take immature or over mature tips.
- Aim for earlier tip taking in better weather and avoid the temptation to keep planting too late into the year. Earlier establishment maximises growth in good conditions and avoids unnecessary stress.

- Plant in cool shady conditions to avoid water stress. Refrigerate any runner tips not being used immediately.
- Avoid extremes of temperature during growing if possible, aim for even conditions and avoid unnecessary heat or cold stress.
- Avoid under or over watering during propagation. Over watering is probably the largest risk factor in the spread of Pestalotiopsis once in the field. “Playing safe” with water by applying too much directly increases the risk from crown rot pathogens like Pestalotiopsis.
- Avoid rough handling and plant damage during planting, leaf trimming or other production operations. As a weaker pathogen, Pestalotiopsis benefits from physically damaged plant tissue allowing disease entry.
- Control pests such as sciarid fly which can cause physical damage to roots and entry points for disease. Pest damage can provide an entry point for disease.
- Provide adequate nutrition. Adequately fertilised plants are more robust and able to handle stresses more effectively than undernourished plants.
- Maintain clean propagation conditions; clear and disinfect tray plant fields, irrigation lines (e.g. using peracetic acid products like Jet 5); change mypex often, use clean trays (e.g. jet washed then steam sterilised). Dirty conditions provide places for pathogens to persist and re-infect clean plant stock.
- Don’t use dirty water, make sure water runs effectively off the tray plant field, doesn’t accumulate at low points, and goes somewhere safe. Monitor irrigation water for pathogens and consider sterilisation if problems arise. Poor control of water and lack of awareness of risk is a major factor in the spread of Pestalotiopsis.
- Monitor fields and quickly remove any plants showing symptoms.
- Use an effective fungicide programme but do not rely on fungicides to solve the problem alone. Good growing, hygiene, and minimization of stress should be the focus before fungicides. See Table 1 for a summary of potentially useful fungicides available in the UK and a suggested programme of application.

Table 1: Example Fungicide Programme for Pestalotiopsis and P. cactorum Control in Propagation

Plant stage	Suggested Chemical	Suggested rate	Comment
Tips harvest	Signum + Hortiphyte	1.5 kg/ha + 4.0 lt/ha	Apply in dull conditions in 1000L of water per Ha just before tips harvest
Pre planting	Paraat	3.0 kg/ha	Spray onto pot tops and water in using overhead irrigation
Post planting	Fenomenal	4.5 kg/ha	Apply in dull conditions as a high volume spray, aim 2000L water per Ha (spray application)
Rooting tips	Switch	1.0 kg/ha	Apply in 1000L of water in dull conditions
Rooting tips	Luna sensation	0.8 lt/ha	Apply in dull conditions as a high volume spray to soak crowns and root, aim 2000L water per Ha. Protected only
Rooted tips	Fenomenal	3.0 kg/ha	Apply in 2000L of water in dull conditions and briefly apply irrigation to water in (drench application)
5-7d later	Switch	1.0 kg/ha	Apply in 1000L of water in dull conditions

5-7d later	Luna sensation	0.8 lt/ha	Apply in dull conditions as a high volume spray to soak crowns and root, aim 2000L water per Ha. Protected only
5-7d later	Amistar + Hortiphyte	1.0 kg/ha + 4.0 lt/ha	Apply in 2000L of water in dull conditions
5-7d later	Rovral + Frupica	1.0 kg/ha + 0.9 lt/ha	Apply in 1000L of water in dull conditions
5-7d later	Signum	1.5 kg/ha	Apply in 1000L of water in dull conditions
5-7d later	Amistar + Hortiphyte	1.0 kg/ha + 4.0 lt/ha	Apply in 2000L of water in dull conditions
5-7d later	Rovral + Frupica	1.0 kg/ha + 0.9 lt/ha	Apply in 1000L of water in dull conditions
5-7d later	Corbel	0.75 ml/lt	Apply in 1000L of water in dull conditions. Outdoor only
7-10d later	Amistar + Hortiphyte	1.0 kg/ha + 4.0 lt/ha	Apply in 2000L of water in dull conditions
7-10d later	Rovral + Scala	1.0 kg/ha + 1.5 lt/ha	Apply in 1000L of water in dull conditions
7-10d later	Corbel	0.75 lt/ha	Apply in 1000L of water in dull conditions. Outdoor only
7-10d later	Amistar + Hortiphyte	1.0 kg/ha + 4.0 lt/ha	Apply in 2000L of water in dull conditions
7-10d later	Rovral + Scala	1.0 kg/ha + 1.5 lt/ha	Apply in 1000L of water in dull conditions
7-10d later	Corbel	0.75 lt/ha	Apply in 1000L of water in dull conditions. Outdoor only
7-10d later	Bravo + Hortiphyte	1.0 lt/ha + 4.0 lt/ha	Apply in 1000L of water in dull conditions. Outdoor only
7-10d later	Serenade + Prolectus	10.0 lt/ha + 1.2 kg/ha	Apply in 1000L of water in dull conditions
7-10d later	Bravo + Hortiphyte	1.0 lt/ha + 4.0 lt/ha	Apply in 1000L of water in dull conditions. Outdoor only
7-10d later	Serenade + Prolectus	10.0 ml/lt + 1.2 g/lt	Apply in 1000L of water in dull conditions

Suggested Management Practices for Growers

- For growers with Pestalotiopsis infected plants, minimization of stress factors and avoidance of disease risk factors are likely to be important steps in managing Pestalotiopsis, in conjunction with an effective spray programme aimed at minimising the expression of disease symptoms.
- Pestalotiopsis is likely to be exacerbated by stressful growing conditions, for example strongly forcing plants, or planting into stressful conditions (e.g. Autumn planting). Aim for less stressful timings where Pestalotiopsis is suspected or confirmed and grow plants as slowly as possible to minimise plant stress.
- Eliminate or drain low spots in fields where water may gather. Wash gutters post-planting if coir/substrate gets into them causing blockages.
- Maintain rigorous pre-plant field hygiene on sites where disease was known or suspected before including removal of old trash, sterilisation of gutters/troughs/Mypex, and steaming/sterilisation/replacement of dripper spikes.
- Minimise the use of overhead irrigation during establishment. For Tray plants it should not be necessary except in extreme dry/hot conditions and then only for 2-3 days.

- Control humidity where Pestalotiopsis is suspected- high humidity and especially free water is conducive to the spread of disease.
- Be careful when performing jobs like truss teasing, de-leafing, crown thinning, de-runnering and harvesting. Pestalotiopsis is a weak pathogen that takes advantage of plant damage to infect crowns.
- Where Pestalotiopsis is suspected or confirmed then initiate an effective spray programme in order to maximise control. An example programme focused on Pestalotiopsis is shown in Table 2.
- A pre-plant dip with Fenomenal is probably the best control method, but time consuming on a large scale.

Table 2: Example Fungicide Programme for Pestalotiopsis Control in Junebearer Production

Plant stage	Suggested Chemical	Suggested rate	Comment
Immediately before planting	Fenomenal	150g per 100L	Dip tray plants before planting. Immerse for 15-20 minutes. Change dip solution regularly, refer to label for guidance
Immediately after planting	Paraat	Do not exceed 3.0 kg/ha	Apply as a drench application via drip
5-7d later	Luna sensation	0.8 lt/ha	Apply in dull conditions as a high volume spray to soak crowns and root, aim 2000L water per Ha. Protected only
After planting, rooted out	Fenomenal	Do not exceed 4.5 kg/ha	Apply in dull conditions as a high volume spray to soak crowns and root, aim 2000L water per Ha
5-10d later	Switch	1.0 kg/ha	Apply in 1000L of water in dull conditions
3-5d later	Fortress	0.25 lt/ha	Apply in 1000L of water in dull conditions
5-10d later	Luna sensation	0.8 lt/ha	Apply in 1000L of water in dull conditions. Protected only
5-10d later	Switch	1.0 kg/ha	Apply as a high water volume spray in dull conditions
5-10d later	Signum	1.8 kg/ha	Apply in 1000L of water in dull conditions
5-10d later	Frupica + Topas	0.9 lt/ha + 0.5 lt/ha	Apply in 1000L of water in dull conditions
5-10d later	Signum	1.8 kg/ha	Apply in 1000L of water in dull conditions
5-10d later	Frupica + Topas	0.9 lt/ha + 0.5 lt/ha	Apply in 1000L of water in dull conditions
5-10d later	Rovral + Amistar	1.0 kg/ha + 1.0 lt/ha	Apply in 1000L of water in dull conditions

Produced by:
Ron Marshall, Delphy UK