

## Update on *Neopestalotiopsis* sp. in Ontario field strawberries

Erica Pate, Fruit Crop Specialist, OMAFA

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A fungal pathogen in the *Neopestalotiopsis* genus has been causing severe disease outbreaks in Florida strawberry fields since 2017. Following the first detection, reports from several regions in North America have identified this disease as causing leaf blighting, fruit rot and crown rot on strawberries, including Ontario, Quebec, Ohio, New Jersey, and North Carolina.

In the fall of 2020, *Neopestalotiopsis* symptoms were seen at a single location in Ontario on crowns and foliage of the cultivar ‘Albion’. DNA sequencing performed at the University of Guelph confirmed that the isolates were the more aggressive *Neopestalotiopsis* species, previously identified in Florida (McNally et al., 2023). A provincial survey of symptomatic strawberry plants from 2020 to 2022 in collaboration with Dr. Melanie Kalischuk and Justin McNally, University of Guelph, confirmed this new *Neopestalotiopsis* sp. causing disease in main growing regions in Ontario. Approximately 31% of symptomatic samples were positive for *Neopestalotiopsis* sp. (agr), one sample was identified as *N. rosae*, and two for unknown isolates of *Neopestalotiopsis* spp.

Observations from the field indicate that anthracnose and Botrytis grey mould are still the predominate fungal issues in Ontario field strawberries as severe leaf blighting and fruit rot is not common on our cultivars. Figure 2 shows observations of *Neopestalotiopsis* leaf spot in Ontario field strawberries cv. ‘Albion’.



Figure 2. *Neopestalotiopsis* leaf spot on ‘Albion’ field grown strawberries

*Neopestalotiopsis* species can infect all parts of the strawberry plant – fruit, leaves, crown, and roots. On leaves, we have seen small leaf spots with a light centre and slightly darker border that expands and becomes irregular in shape. Under ideal conditions, fruiting bodies (dark black structures) of the fungus can be seen on the upper leaf. Fruit lesions are initially small (2-4mm), light brown and irregular. In Ontario, we have not been able to identify the early lesions in the field as they can be easily confused with other issues. *Neopestalotiopsis* fruit rot lesions enlarge and become orange then form a black coating which are black fruiting bodies of the fungus (Figure 3). Eventually, the whole fruit may be rotted and mummified. Fruit rot has only been shown where leaf

spots have been identified. Crown and root rot symptoms are similar to what would be seen from *Colletotrichum* or *Phytophthora* species and can only be differentiated at a diagnostic clinic.



Figure 3. *Neopestalotiopsis* fruit rot on ‘Albion’ field grown strawberries

The leaf blighting phase of this disease has been often confused with common leaf spot (*Mycosphaerella fragariae*); the difference is common leaf spot will have a tan centre with a darker/purple outer zone. Another commonly confused disease is leaf scorch (*Diplocarpon earlianum*, *Marssonina fragariae*) but leaf scorch lesions are mainly dark without a tan centre. *Phomopsis* leaf blight (*Phomopsis obscurans*) can often be confused especially when the lesions are larger, but *Phomopsis* lesions are more reddish-purple lesions with a dark outer zone. Of these diseases, only the new *Neopestalotiopsis* sp. can cause fruit rot if infection is severe. Sending samples to a plant pathology diagnostic lab can confirm which pathogen is causing leaf spots.

Pathogens in the *Neopestalotiopsis* genus are not necessarily new to strawberry production, as a closely related pathogen, *Neopestalotiopsis rosae*, has been identified on strawberry crowns and roots in many strawberry production regions including Ontario and Quebec. Reports of this pathogen often considered it weak or secondary as it was found mainly in plants under stress (poor growing conditions, other pests, physical damage, etc.). Severe outbreaks on leaves and fruit are caused by this new, currently unnamed species in the *Neopestalotiopsis* genus.

For disease to occur, the environment needs to be favourable for infection from the pathogen. *Neopestalotiopsis* sp. prefer warm and humid conditions like anthracnose. Ideal temperature for growth is 25°C, but temperatures that range from 15 to 30°C are still favourable for growth and sporulation. Leaf wetness from high humidity and/or rain are favourable for infection. Spores from *Neopestalotiopsis* sp. are not spread easily by air and are primarily spread via water splashing from overhead irrigation/rain and people/equipment working when plants are wet.

A recent paper out of the Peres lab in Florida (Zuniga et al., 2024) showed there was survival of *Neopestalotiopsis* sp. in the plant debris remaining in the field over the summer season, where longer survival was seen in infected crown material vs foliage. While the “oversummering” is not applicable to Ontario growing conditions, it does show that the pathogen is able to survive in the soil on plant debris. After production, growers should move away from strawberries for at least 2 seasons to allow for the plant debris to decompose (during hot conditions in the summer) to reduce the inoculum pressure. If planting in a field nearby an infested old planting, soil movement containing plant debris (ex. flooding, wind, equipment) could introduce

*Neopestalotiopsis* sp. into the field. Spreading out plantings from year to year will help reduce the chance of introduction into a new field.

Research conducted at Purdue University (Guan et al., 2023) on cultivars grown in greenhouse trials showed that June-bearing/short day cultivars are less susceptible to *Neopestalotiopsis* leaf spot than day-neutrals. Specifically, ‘Albion’ and ‘San Andreas’ were more susceptible followed by ‘Evie 2’, compared to many June-bearing varieties which did not show any leaf spot symptoms including ‘AC Valley Sunset’, ‘Flavorfest’, and ‘Galletta’. The Florida varieties including, ‘Brilliance’ & ‘Radiance’ are more susceptible than ‘Albion’.

No fungicides are registered in Canada for this disease. In Florida, fungicide efficacy studies on fruit and leaf infection show partial suppression from few products including captan, fluazinam and cyprodinil/fludioxonil (Baggio et al., 2023). In a greenhouse trial at Purdue University, researchers showed reduced leaf spot from foliar applications of captan, propiconazole, thiram and cyprodinil/fludioxonil followed by copper oxychloride/copper hydroxide and QST 713 strain of *Bacillus subtilis*. Again, none of these are registered for *Neopestalotiopsis* fruit rot, leaf spot or crown rot of strawberries in the field. There is an on-going minor use project to register fluazinam for control of *Neopestalotiopsis* fruit rot in Canada.

#### References & more info

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