Virginia Cooperative Extension
Virginia Tech • Virginia State University
www.ext.vt.edu

Neopestalotiopsis disease in strawberry starter material

Authored by Yuan Zeng, Assistant Professor of Plant Pathology, Southern Piedmont AREC; and Jayesh Samtani, Associate Professor and Small Fruit Extension Specialist, Hampton Roads AREC, School of Plant and Environmental Sciences, Virginia Tech

Introduction

Some of you may be aware of the Neopestalotiopsis (Neo-P) outbreak reported this season in the strawberry nursery plant material (Figure 1).

Figure 1. Disease outbreak seen at a strawberry plant supplier site caused by an aggressive strain of *Neopestalotiopsis* sp. (A) overall appearance of the diseased plug plants in flats; (B) light to dark brown spots of different sizes developing from the margins or the tips of the leaves.

All starter plugs that are raised from tips coming from Canada are affected. These strawberry plugs will be shipped from the nursery growers to strawberry fruit growers come September. Some growers who raise their own plugs are also seeing symptoms of Neo-P. Due to the reported outbreak, several strawberry plug suppliers have either canceled orders or advised growers to buy plug plants from them at their own risk. We would like to share the current knowledge on the biology of *Neopestalotiopsis* spp. and management practices that could partially suppress Neopestalotiopsis fruit rot in strawberries.

What do we know about Neo-P?

Background

In 2019, a new species of *Neopestalotiopsis* was reported to cause significant damage in strawberry fields in Florida. Since then, this disease has been found in most southeastern states, including Virginia and Delaware. Molecular identification has revealed that more than one *Neopestalotiopsis* species is pathogenic to strawberry plants and can cause symptoms on leaves (leaf spot), fruit (fruit rot), and crown (crown rot) of strawberry plants. These are *Neopestalotiopsis* sp. (a new population that caused the Florida outbreak), *Neopestalotiopsis rosae* VB3-1 (an aggressive strain isolated from VA farms), and *Neopestalotiopsis vaccinii* DE2-1 (aggressive strain isolated from a farm in DE).

Culturing the isolates

Once the pathogen is isolated from symptomatic plants, they are grown in culture for identification by morphological characteristics (Fig. 2). The

ellipsoidal conidia of isolate VB3-1 contains five cells with three light to dark brown median cells, 2-4 clear filament-like tubular apical appendages and 1 basal appendage (Fig. 2C). Isolate DE2-1 conidia contains five cells with three light tan to light brown median cells, 2-4 filament-like tubular apical appendages and 1 basal appendage (Fig 2F).

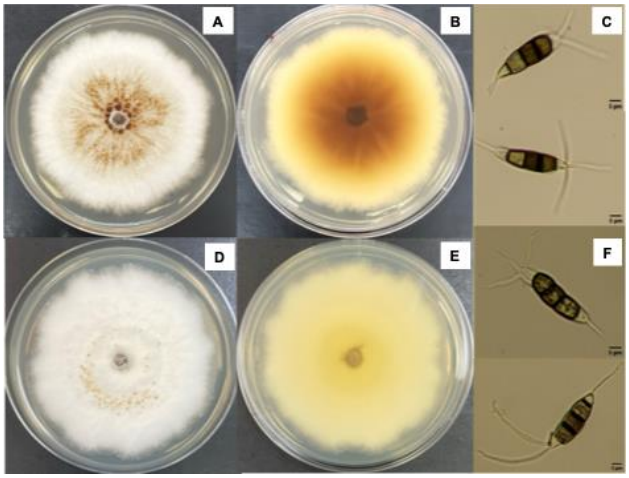

Figure 2. Colony morphology (A, B) and conidia (C) of isolate VB3-1 and colony morphology (D, E) and conidia (F) of isolate DE2-1. Conidia were observed under a light microscope at 800× magnification.

Pathogenicity test

Conidia from these isolates are used to inoculate healthy plants for symptom expression to confirm the causal agent.

Irregularly shaped, light to dark brown lesions developed on leaves of two-month-old 'Sweet Charlie' after inoculating with 100 µl conidial suspension (10^4 conidia) of VB3-1 (*i.e.*, *Neopestalotiopsis rosae*) three to five days post-inoculation. The initial symptoms developed 24 hours post-inoculation (Fig 3A).

Dry, sunken, and irregularly shaped dark brown to black lesions were observed on 'Sweet Charlie' fruit inoculated with VB3-1 five days post-inoculation (Fig 3B).

Irregularly shaped, dark brown lesions developed on the crown of three- to four-month-old 'Sweet Charlie' after inoculating with 50 µl conidial suspension (10^4 conidia) of VB3-1 16 days after inoculation (Fig 3C).

Figure 3. Post-inoculation symptoms on leaves (A), fruit (B), and crown (C) of 'Sweet Charlie'.

Neopestalotiopsis spp. is commonly introduced via infected strawberry plant plugs from nurseries. Infected plants often appear healthy (*i.e.*, asymptomatic) at planting, and initial leaf symptoms occur days or weeks after planting. Additional photos of this disease can be seen here: Neopestalotiopsis disease in strawberry: what do we know? | Southern Region Small Fruit Consortium (smallfruits.org). How fast the disease progresses depend on environmental conditions, particularly wet conditions (*e.g.*, rain events and/or infection

occurs during periods of extended leaf wetness). **Once *Neopestalotiopsis* spp. is introduced to your field, it can persist in soil on plant debris, so the pathogen will likely carry over from one year to the next in a field, posing potential risks if strawberries are planted in the second year.**

Are there resistant strawberry cultivars to Neo-P?

According to current knowledge, there are no known resistant cultivars. Popular cultivars in Virginia, including Sweet Charlie, Chandler, Camino Real, and Ruby June, are susceptible to *Neopestalotiopsis* infection. Studies done in Florida have shown that 'Florida Beauty', 'Florida Radiance', and Sensation® 'Florida 127', are more susceptible than 'Florida Brilliance', Strawberry Festival, and Winterstar™ (Baggio et al., 2020).

What is the host range of the aggressive Neo-P strains?

Neo-P species, the strain that caused the Florida outbreak and the aggressive strain of *N. rosae*, are pathogenic to rhododendrons, roses, or pomegranates in addition to strawberry.

Which fungicides can we use to suppress Neo-P?

Fungicides, including thiram and Switch 6.25 WG, are reported to reduce Neo-P fruit rot by approximately 50% compared to the control. For additional information on how to use these products please refer to the following article written by Dr. Phil Brennan, Professor of Plant Pathology at University of Georgia https://site.extension.uga.edu/strawberry/2024/08/dramatic-neopestalotiopsis-disease-in-strawberry-tips-and-plug-plant-production-nurseries/.

What is the best cultural practice to manage Neo-P for fruit producers?

Planting disease-free transplants is the rule of thumb for managing Neopestalotiopsis diseases in strawberries due to the biology of the pathogen and the fact that no known strawberry cultivars are resistant. A grower must follow additional practices including destroying any unhealthy and symptomatic plants, avoiding movement of clothing, shoes and mechanical equipment from infected field to non-infested fields, and following sanitation practices on equipment and clothing after contact with diseased plants.

Should a grower fumigate the soil prior to planting?

Fumigation with Pic-Clor60 and Vapam will help but it will not eliminate the problem completely.

What practice can a nursery propagator adopt besides using fungicides?

A study at University of Florida shows that steam treatment can help reduce plant mortality from diseased plants including Neo-P. This would be a promising treatment to consider for nursery growers. Standard thermotherapy recommended would include pre-heat treatment of plant material at 99 °F (37 °C) for 1 hour, followed by 1 hour of cool down at room temperature, and then heating at 111 °F (44 °C) for 4 hours. Additional details on the recommendations can be found at: https://member.floridastrawberry.org/wp-content/uploads/2020/08/FSREF-2019-20-Peres-Heat-Treatment.pdf

Additional reading:

https://strawberries.ces.ncsu.edu/2024/08/update-neopestalotiopsis-neo-p/ Dr. Mark Hoffmann, NCSU

References

Baggio, J. S., Marin, M. V., Mertely, J. C., & Peres, N. A. (2020). Chemical and cultivar trials to manage the new Neopestalotiopsis disease in Florida strawberry. https://site.extension.uga.edu/strawberry/files/2021/04/Peres_2020-1.pdf

Visit Virginia Cooperative Extension: ext.vt.edu

2024 SPES-627NP