Update on strawberry diseases caused by *Neopestalotiopsis* and other pathogens

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Outline:

- Strawberry sample processing at the PDIC
- How to diagnose *Neopestalotiopsis* from other common strawberry pathogens
- How *Neopestalotiopsis* differs from *Pestalotiopsis*
- Summary of strawberry samples submitted to the PDIC

Field to Lab: Sample processing

Photos: Swarna Moparthi, PDIC

Sample type 1: Whole plant with crown, roots, and soil

Sample type 2: Leaves and fruit

Sample type 3: Fruit only

Field to Lab: Sample processing

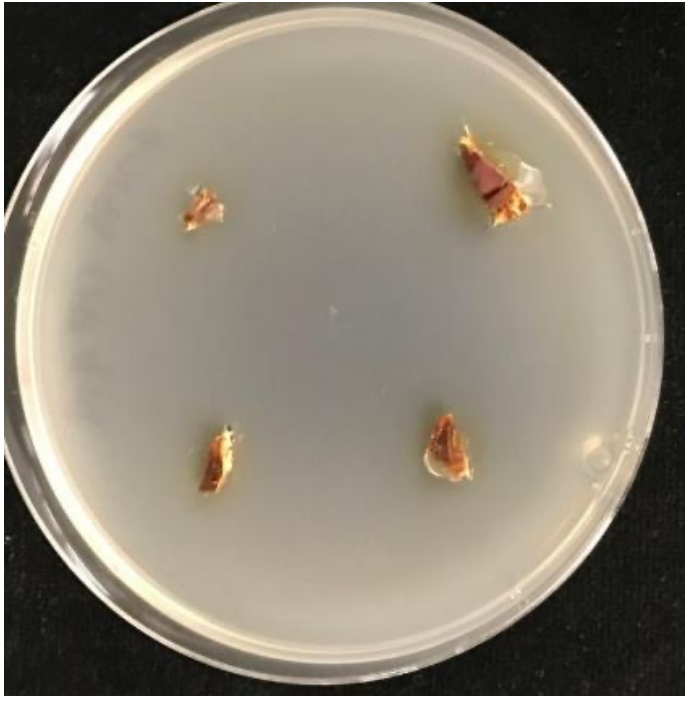
Photos: Swarna Moparthi, PDIC

Test soil pH and soluble salts

General visual observations made

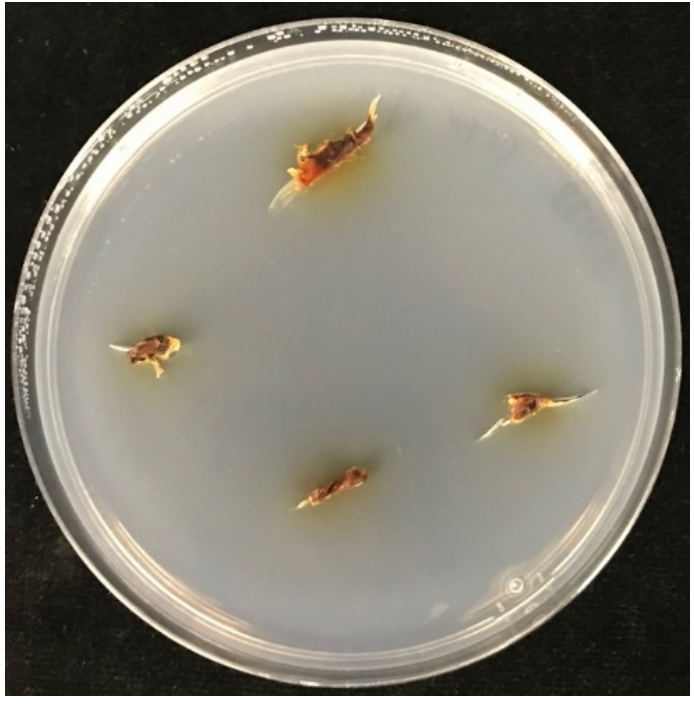
Sample processing

Pathogen Isolation



Photos: Swarna Moparthi, PDIC

Acidified Potato Dextrose Agar (aPDA)



Selective Medium (PPP)

Moist chamber incubation

Photos: Swarna Moparthi, PDIC

Symptoms = the plant's response to an infection

Signs = any structures of the actual pathogen

Neopestalotiopsis fruit symptoms (before incubation)

Neopestalotiopsis signs on fruit (after incubation)

Neopestalotiopsis signs on fruit surface before incubation

Neopestalotiopsis signs on fruit surface after incubation

Photo: Matt Bertone, PDIC

Colletotrichum before incubation

Colletotrichum after incubation


Colletotrichum signs on fruit surface after incubation
Photo: Matt Bertone, PDIC

stem end rot
(*Gnomonia/Zythia*)
(before incubation)

stem end rot (*Gnomonia/Zythia*)
(after incubation)


Gnomonia signs on fruit surface after incubation
Photo: Matt Bertone, PDIC

Photo: Swarna Moparthi, PDIC

leather rot (*Phytophthora*)
(before incubation)

Photo: Matt Bertone, PDIC

leather rot (*Phytophthora*)
(after incubation)


Phytophthora signs on fruit surface after incubation
Photo: Matt Bertone, PDIC

gray mold (*Botrytis*)
(before incubation)

gray mold (*Botrytis*)
(after incubation)

Photo: Swarna Moparthi, PDIC

Photos: Matt Bertone, PDIC

unknown fruit damage
(before incubation)

unknown fruit damage
(after incubation)

Photos: Kory Yarbrough, PDIC

leaf blotch (*Gnomonia/Zythia*)
(before incubation)

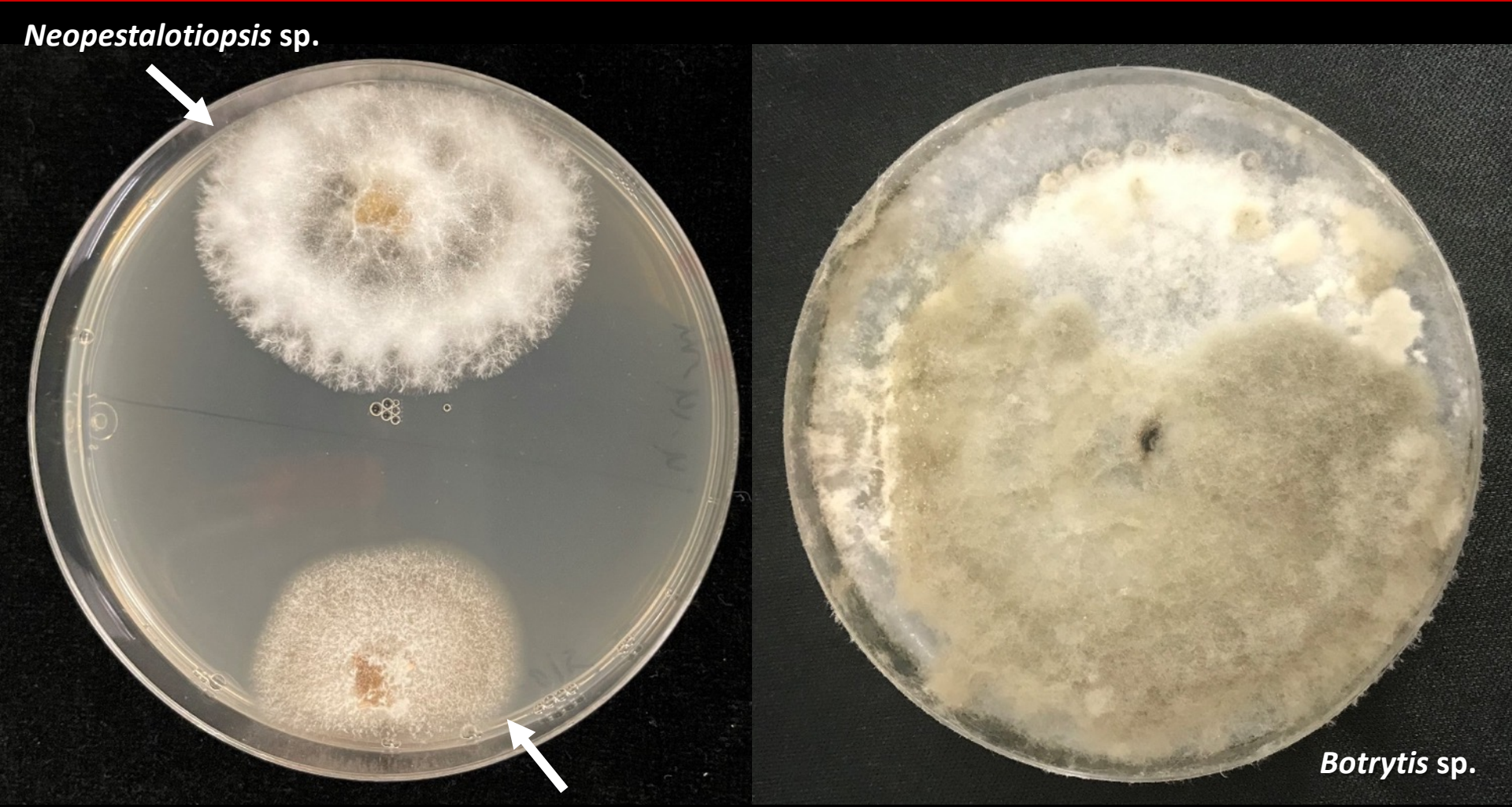
Photo: Matt Bertone, PDIC

leaf blotch (*Gnomonia/Zythia*)
(after incubation)


Gnomonia/Zythia signs on leaf surface after incubation
Note gelatinous amber oozing
Photo: Matt Bertone, PDIC

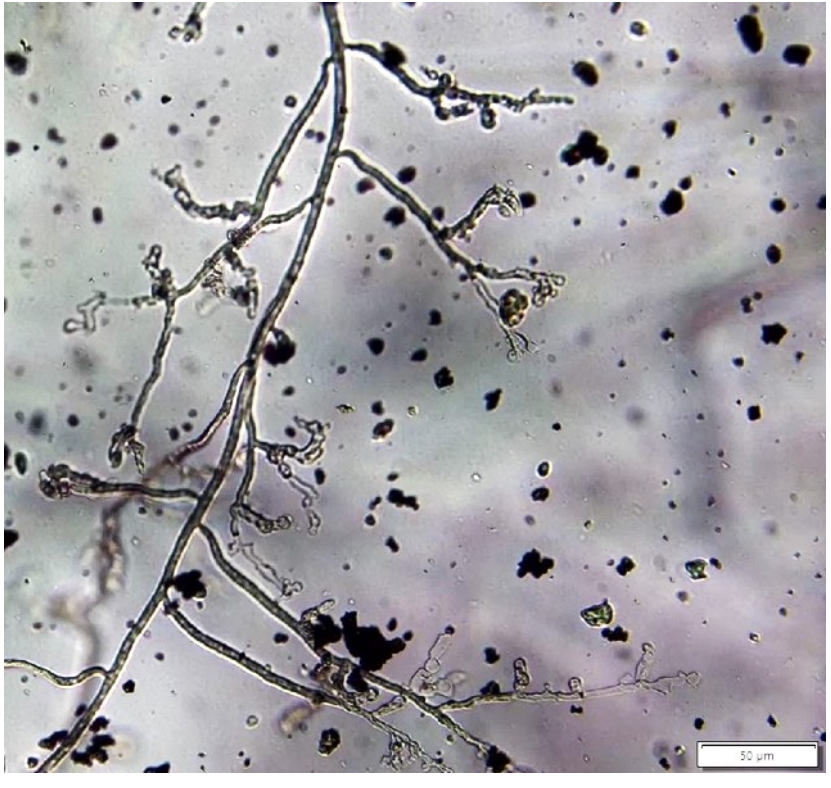
Neopestalotiopsis leaf spot
(before incubation)

Neopestalotiopsis leaf spot
(close up; after incubation)



Photos: Swarna Moparthi, PDIC

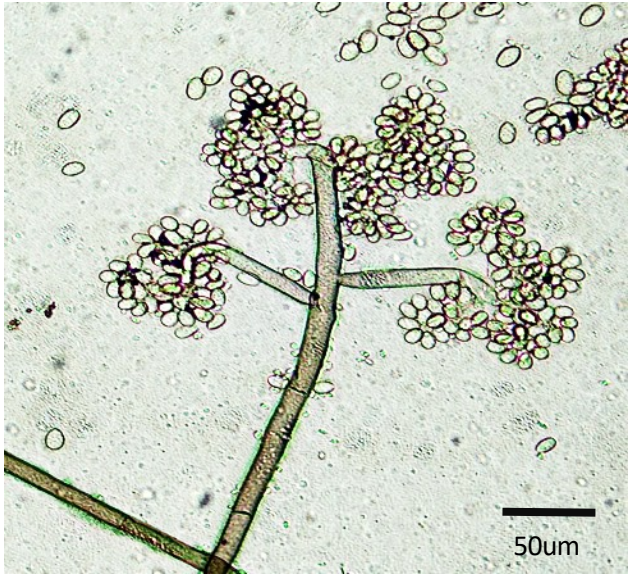
Phytophthora on PARPH



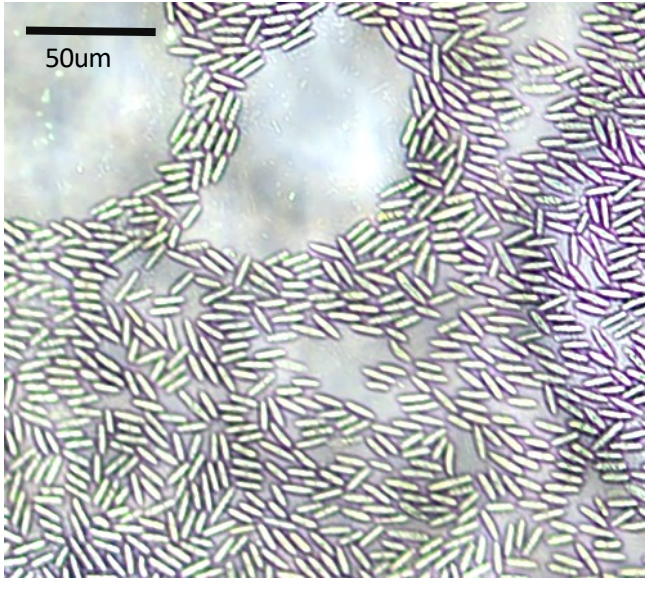
Photos: Swarna Moparthi, PDIC

Microscopic observations

***Neopestalotiopsis* sp. spores**



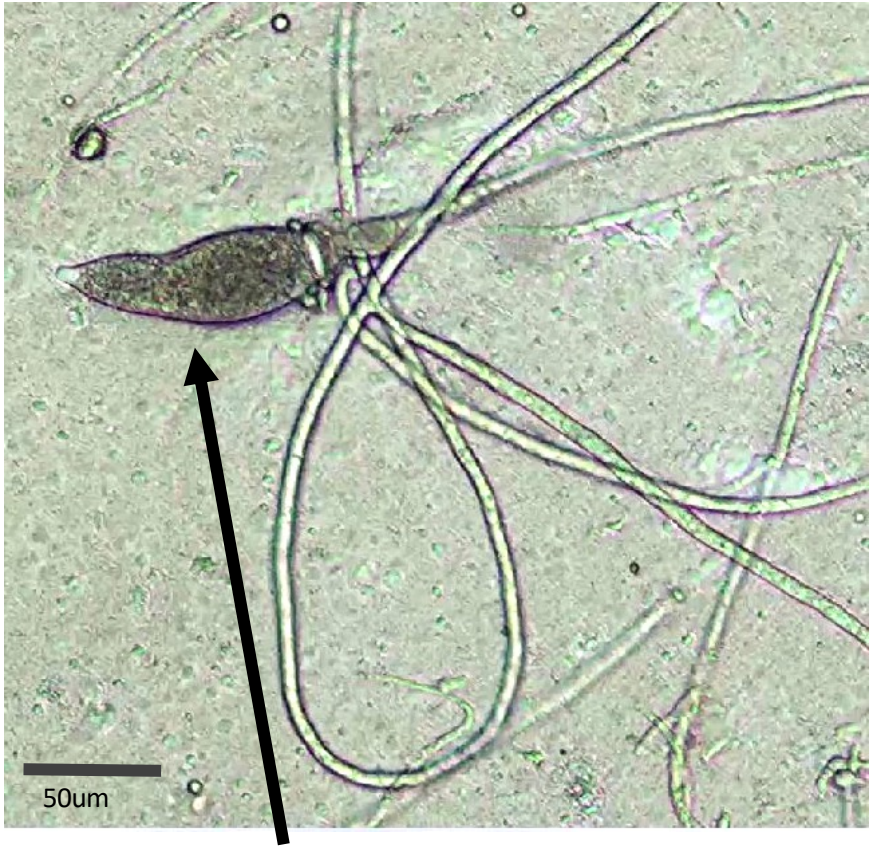
***Botrytis* sp. spores**



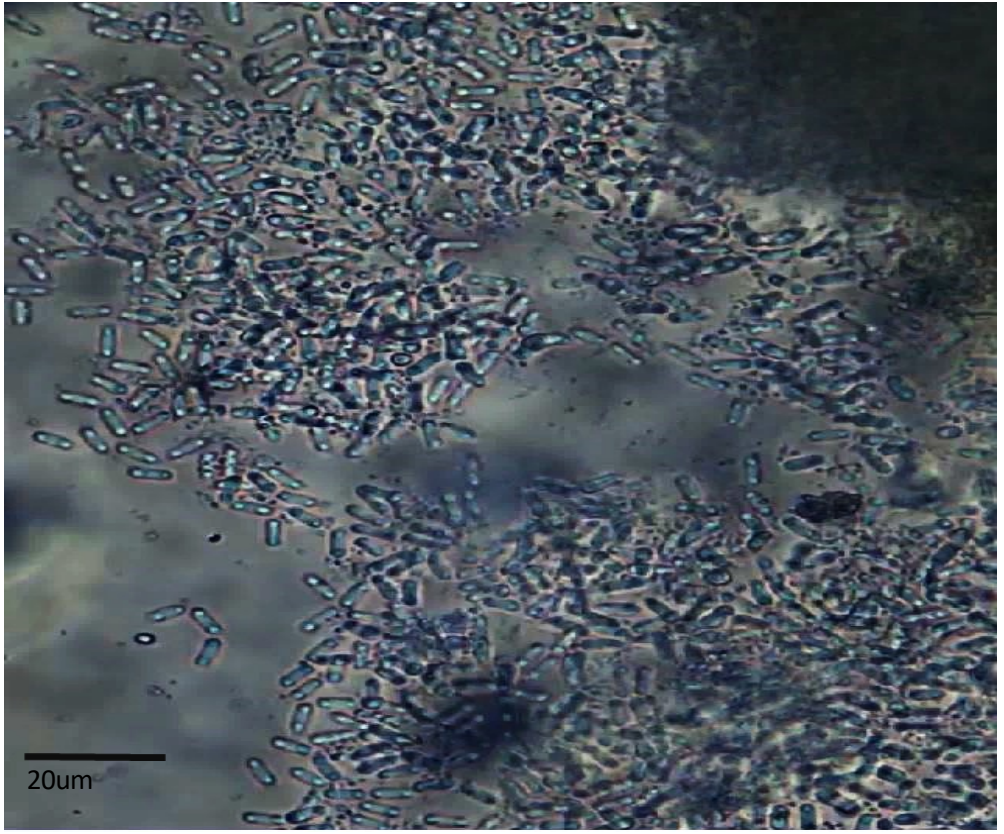
***Colletotrichum* sp. spores**

Photos: Swarna Moparthi, PDIC

Microscopic observations



***Phytophthora* sp. sporangium**



***Gnomonia* sp. spores**

Photos: Swarna Moparthi, PDIC

Microscopic observations

Neopestalotiopsis spores have their median cells darker than the other cells (compared to *Pestalotiopsis* where cells are all the same color)

Year 2021: Strawberries #7

Host	# Samples
Tomato	151
Dwelling	134
Cucurbits (e.g. watermelon, squash, cucumber)	128
Tobacco	100
Insect ID	88
Boxwood	81
Strawberry	81
Soybean	81
Oaks	54
Home & Garden	50
Kale crops	46
Arborvitae	46
Sweetpotato	41
Maples	40
Azalea and Rhododendron	40
Holly	36
Cherry, plum, & peach (ornamental and for fruit)	34
Dogwood	33
Pepper	31
Corn	31

Host	# Samples
Blackberry and raspberry	30
Juniper	27
Apple/crabapple	24
Wheat	24
Leyland cypress	24
Rose	23
Grape	22
Blueberry	22
Industrial hemp	20
Magnolia	20
No site specified	19
Fraser fir	17
Chrysanthemum	17
Fungus ID request	17
Crape Myrtle	17
Redbud	15
Hydrangea	13
Pine	13
Pecan	12
Buddleia	12

Year 2022: Strawberries #7

Host	# Samples
Tobacco	241
Tomato	172
Cucurbits (watermelon, cucumber, squash, pumpki	104
Soybean	102
Dwelling	97
Boxwood	85
Strawberry	68
Home and Garden	56
Cole crops (incl. radish)	46
Azalea and Rhododendron	45
Maple	43
Hollies	42
Cherry, plum, and peach (ornamental and for fruit)	42
Arthropod ID	42
Peppers	40
Oaks	38
Arborvitae	35
Sweetpotato	34
Wheat	32
Fir	30

Host	# Samples
Corn	30
Caneberries	25
Redbud	21
Petunia	21
Camellia	20
Hickory and Pecan	19
Juniper	19
Magnolia	19
Grape	18
Dogwood	17
Apple and Crabapple	16
Bean	16
Pine	16
Rose	16
Cotton	13
Human	13
Crape myrtle	13
Blueberry	13
Leyland Cypress	13
Fungus ID Request	13

Year 2023: Strawberries #4

Host	# Samples
Tobacco	198
Tomato	153
Boxwood	125
Strawberry	105
Cucurbits	105
Soybean	103
Household	82
Home and Garden	51
Hollies	48
Oaks	45
Crucifers (veg. & field crops)	45
Wheat	38
Fir	37
Arborvitae	35
Corn	30
Insect/Arthropod ID	29
Maple	28
Azalea/Rhododendron	26
Apple	25
Pepper	24
Redbud	23

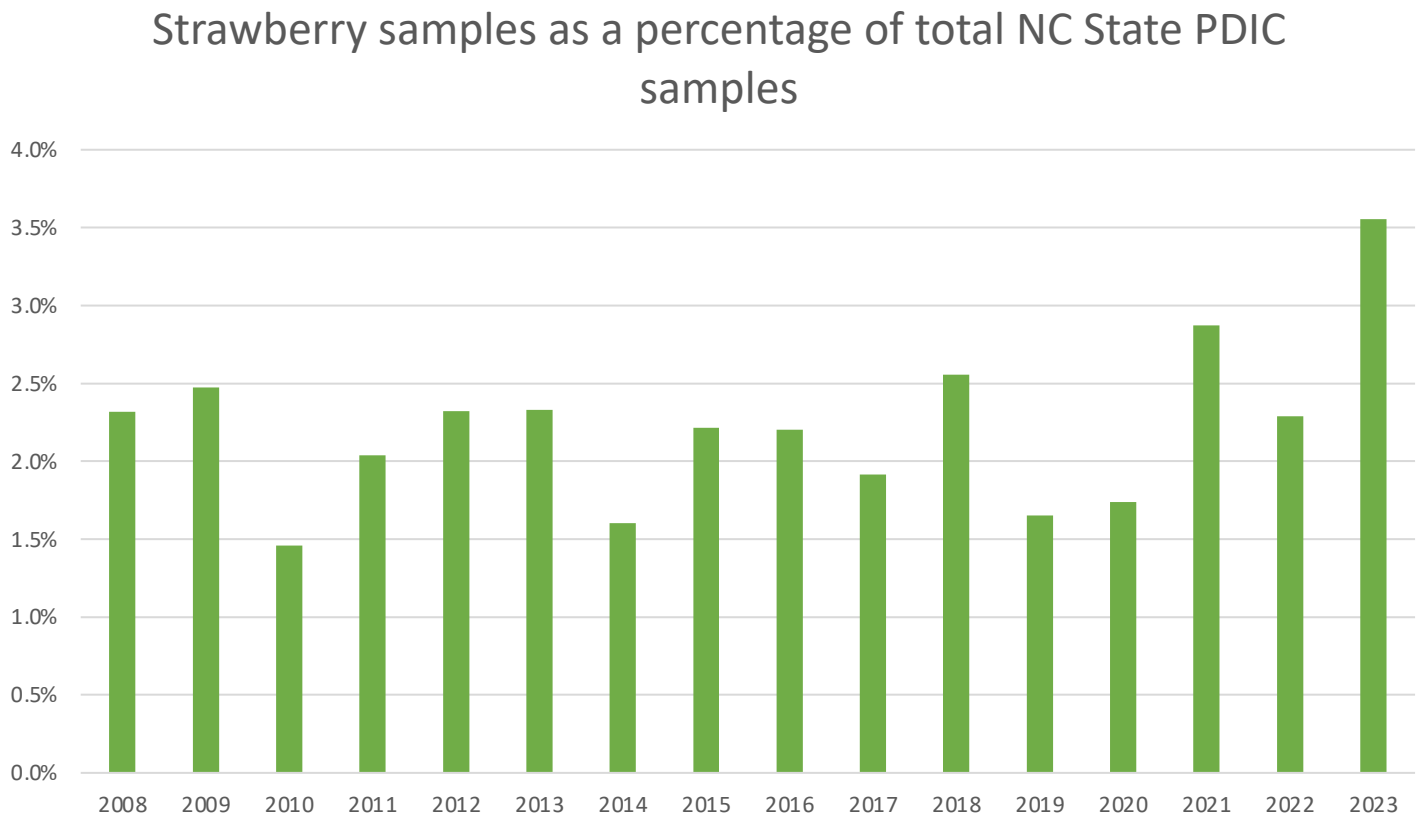
Host	# Samples
Dogwood	23
Sweetpotato	22
Magnolia	22
Ligustrum	21
Rose	21
Blueberry	21
Grape	21
Blackberry	18
Leyland Cypress	18
Potato	17
Hosta	17
Camellia	16
Crape Myrtle	16
Ornamental cherry/plum	16
Lettuce	15
Peach	14
Hydrangea	14
Chrysanthemum	13
Commercial Building	13
Cotton	13
Juniper	13

Year 2023: Strawberries #4

Host	# Samples
Tobacco	198
Tomato	153
Arborvitae	35
Corn	30
Insect/Arthropod ID	29
Maple	28
Azalea/Rhododendron	26
Apple	25
Pepper	24
Redbud	23

Host	# Samples
Dogwood	23
Sweetpotato	22
Ornamental cherry/plum	16
Lettuce	15
Peach	14
Hydrangea	14
Chrysanthemum	13
Commercial Building	13
Cotton	13
Juniper	13

So far in 2024 (April 26th) the PDIC has received *70* strawberry samples



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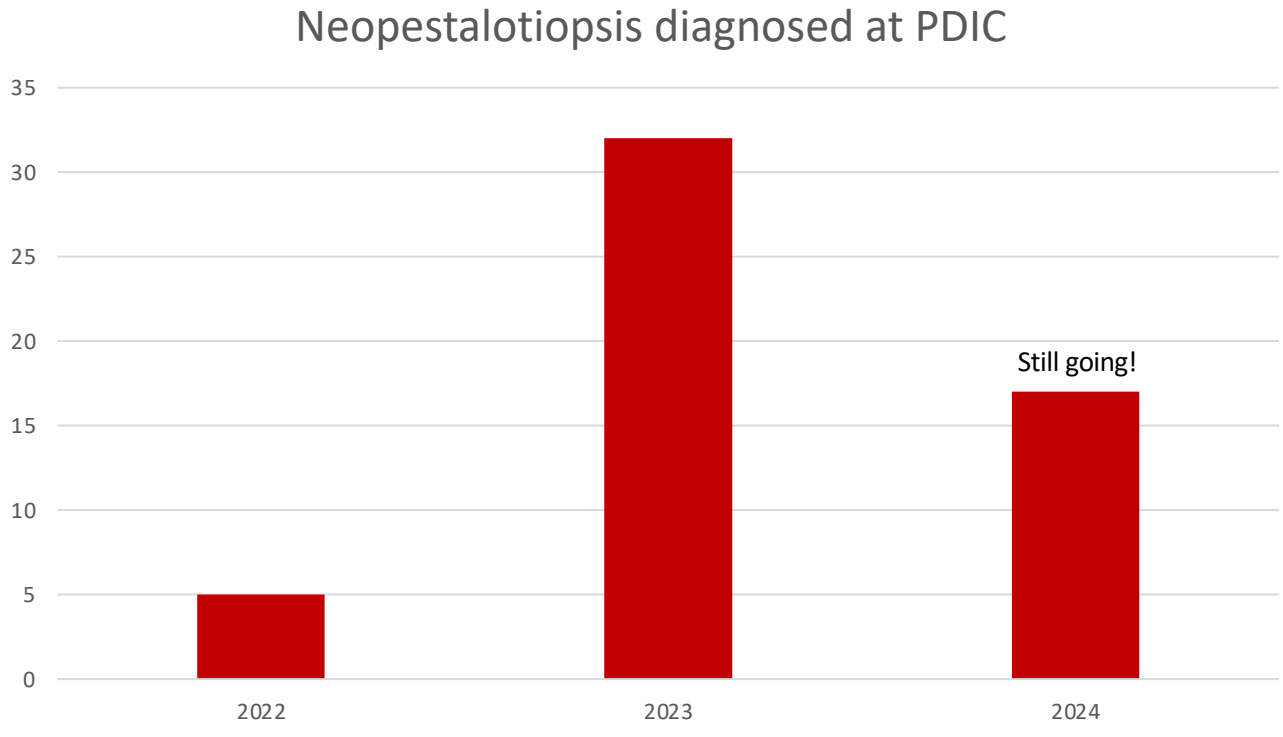
Neopestalotiopsis reported on March 22nd 2022



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Conclusions

Leaf and fruit infections by *Neopestalotiopsis:*

- Easily diagnosed with minimum equipment

Crown rot:

- Requires artificial media.

Helpful Links

NC State Plant Disease and Insect Clinic

NCSU Strawberry Disease Fact Sheets

Acknowledgements

- Strawberry growers
- Mr. Michael Munster
- Dr. Mark Hoffman
- NC Strawberry Growers Association
- NCDA Agronomists
- NC Cooperative Extension Agents
- Consultants

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