

TOWARDS UNDERSTANDING THE FOLIAR DISEASE COMPLEX OF ONION IN NEW YORK

Sarah J. Pethybridge, Frank Hay, Elizabeth Maloney and Christy Hoepting
20 January 2016

Objective:

Quantify the **prevalence** and **incidence** of foliar diseases affecting high input, conventional onion production in New York

Concern over increasing severity of dieback and symptom confusion




Fungal foliar diseases:

- **Downy mildew**
 - *Peronospora destructor*
- **Stemphylium leaf blight**
 - *Stemphylium vesicarium*
- **Purple blotch**
 - *Alternaria porri*
- **Botrytis leaf blight**
 - *Botrytis squamosa*

Reduced green leaf area duration

Flow of carbohydrates to bulb

Size and quality



Regular application of fungicides for disease management

SURVEY-BASED APPROACH

- **Diseased leaves collected from 16 July to 28 August**
 - Conventional (*n* = 846 from 22 fields)
 - Low input (*n* = 283 from 10 fields)
- 8 to 73 plants/field
- Multiple locations/field
- Returned to laboratory for further testing and isolations


SYMPTOMS



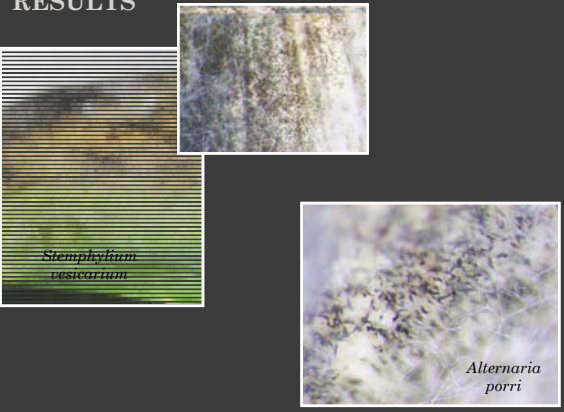
METHODS

Diseased leaves

- Incubated at high humidity in laboratory
- Emerging mycelia identified and transferred to artificial media
- Prevalence (number of fields where a species was detected/total number of fields; %)
- Incidence (number of diseased leaves from which a species was isolated compared to total number of leaves; %)



RESULTS



Stemphylium vesicarium

Alternaria porri

PREVALENCE

Fungi (Disease)	Low input (n = 10)	Conventional (n = 22)
<i>Stemphylium vesicarium</i> (Stemphylium leaf blight)	100	100
<i>Pleospora allii</i> *	80	95.5
<i>Alternaria porri</i> (Purple blotch)	50	0
<i>Alternaria alternata</i>	80	59.1
<i>Peronospora destructor</i> (Downy mildew)	60	4.5
<i>Botrytis</i> spp. (Leaf blight/neck rot)	30	9.1
<i>Colletotrichum</i> spp. (Anthracnose)	30	4.5
<i>Empellium allii</i> (Skin blotch and bulb canker of garlic)	30	0
<i>Humicola</i> spp.	40	4.5
<i>Fusarium</i> spp.	50	18.2
<i>Cladosporium</i> spp.	70	40.9
<i>Ulocladium atrum</i>	50	36.4
No fungi (sterile)	10	36.4

Pathogens

Saprophytic/secondary

**Pleospora allii* is another form ('teleomorph') of *S. vesicarium*

INCIDENCE

Effect of production practice

Fungi	Low input (%) (283 leaves)	Conventional (%) (846 leaves)	t (P =)
<i>Stemphylium vesicarium</i>	85.5	86.4	-0.16 (0.436)
<i>Alternaria porri</i>	14.5	0	2.33 (0.022)
<i>Alternaria alternata</i>	49.5	6.0	3.85 (0.001)
<i>Peronospora destructor</i>	11.1	0.1	2.13 (0.031)
<i>Botrytis</i> spp.	2.1	0.5	1.42 (0.091)

INCIDENCE

Effect of location

Location (number of fields)	Isolation frequency (%) <i>Stemphylium vesicarium</i>	<i>Pleospora allii</i>
Elba (6)	95.7	35.0
Orange (3)	78.2	63.3
Potter (3)	82.2	73.0
Sodus (3)	100.0	69.4
Df	14	14
P =	0.143 (ns)	0.194 (ns)

KEY FINDINGS

Stemphylium leaf blight**

- Found in all fields at high incidence
Incidence was not significantly different between low input and conventional fields;

Purple blotch

- Higher prevalence in low input fields
Incidence was significantly lower in conventional fields;

Downy mildew and Botrytis spp.

- Low prevalence and incidence but more prevalent in low input fields;

Fungicides used in conventional production may be highly efficacious for the control of purple blotch and other foliar diseases.

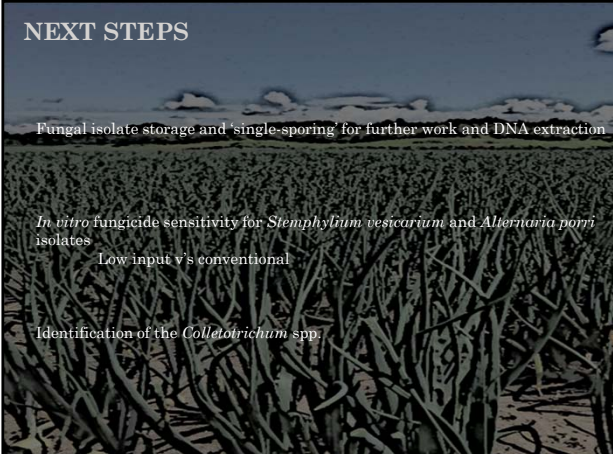
Results in context of the survey returned to all participating growers.

NEXT STEPS

Fungal isolate storage and 'single-sporing' for further work and DNA extraction

In vitro fungicide sensitivity for *Stemphylium vesicarium* and *Alternaria porri* isolates
Low input v's conventional

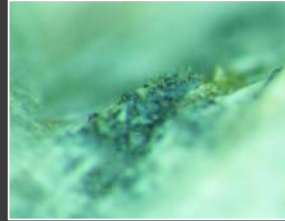
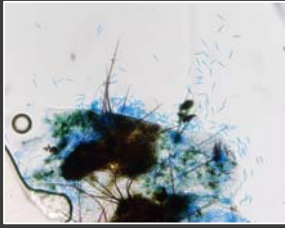
Identification of the *Colletotrichum* spp.



RESULTS: OTHER FUNGI

Anthracnose (*Colletotrichum* spp.)

3.2 to 36% incidence



Onion smudge (*C. circinans*)
Twister (*C. gleosporoides*) – Georgia and other tropical locations
Anthracnose (*C. coccodes*) – MI and OH*

ACKNOWLEDGMENTS

Cornell Cooperative Extension personnel
Elizabeth Buck
Cordelia Hall
Melissa Call
Kevin Besler

Growers and industry

ORDP

Nault program for onion advice!

