

Vascular wilts: Fusarium, Verticillium, Ralstonia and Xanthomonas

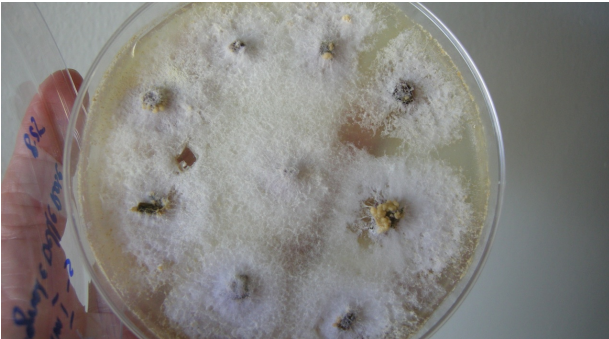
Margery Daughtrey  Cornell University



Vascular wilts

- Vascular wilt diseases (affecting xylem or phloem) may be caused by bacteria or fungi
- The two most common fungal vascular wilts are caused by *Fusarium* and *Verticillium* species.
- The many different *Fusarium* wilt diseases are very host-specific; *Verticillium* wilt is not

e-GRO Electronic Grower Resources Online *Fusarium oxysporum*



Fusarium oxysporum f. sp. *chrysanthemi*

e-GRO Electronic Grower Resources Online *Fusarium oxysporum*

- *Fusarium oxysporum* f. sp. *cyclaminis* on cyclamen
- *Fusarium oxysporum* f. sp. *chrysanthemi* on mums
- *Fusarium foetens* on begonia
- *Fusarium oxysporum* f. sp. *basilicum* on basil

e-GRO Electronic Grower Resources Online *Fusarium* wilt of cyclamen



e-GRO Electronic Grower Resources Online *Fusarium* wilt



Cyclamen corm discoloration caused by *Fusarium oxysporum* f. sp. *cyclaminis*

Fusarium wilt



Fusarium wilt



Fusarium wilt

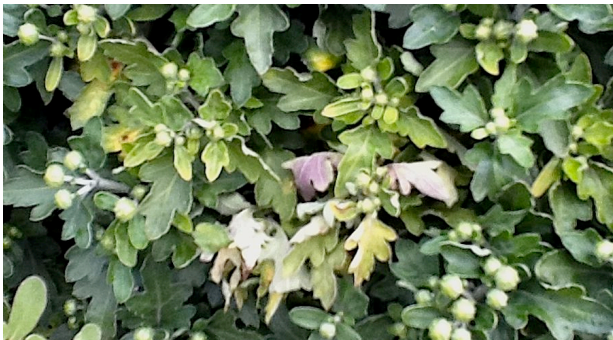


Caused by *Fusarium oxysporum* f. sp. *chrysanthemi*

Fusarium wilt



Fusarium wilt



Fusarium wilt



Stunting, yellowing, scorching, wilt, death

e-GRO Electronic Grower Resources Online **Fusarium wilt of mum**



Vascular discoloration is visible in cross-section

e-GRO Electronic Grower Resources Online **Fusarium wilt of basil**



Note black streaking on stem. . .

e-GRO Electronic Grower Resources Online **Fusarium wilt of begonia**



Caused by *Fusarium foetens*, a close relative of *Fusarium oxysporum*

e-GRO Electronic Grower Resources Online **Fusarium wilt**

Integrated management of Fusarium wilt:

- Resistant cultivars
- High pH (pH 6.2 and above)
- Avoid ammonium nitrogen fertilizer
- Thiophanate-methyl drenches

e-GRO Electronic Grower Resources Online **Fusarium stem and root rot**

Other species of *Fusarium* cause stem rots and root rots of ornamentals



Fusarium stem rot on marigold

e-GRO Electronic Grower Resources Online **Fusarium stem and root rot**

Vascular wilts are not controlled by fungicides, but fungicides with azoxystrobin, thiophanate methyl etc. may help against stem rots

Verticillium wilt



Verticillium albo-atrum and *Verticillium dahliae*

Verticillium wilt



Verticillium wilt



Black vascular discoloration

Verticillium wilt



On coleus

Verticillium wilt



On geranium

Wilting Geranium

Verticillium wilt

Verticillium dahliae

Is controlled by culture-indexing, but can blow into the greenhouse on dust particles



- The two most common bacterial vascular wilts are caused by *Ralstonia solanacearum* and *Xanthomonas* species.
- *Ralstonia solanacearum* is not very host-specific; *Xanthomonas* bacterial species and pathovars are often very host-specific



Xanthomonas pelargonii

Ralstonia solanacearum

Only in a laboratory can these two bacterial pathogens be told apart

Ralstonia solanacearum



Cause of Southern wilt of geranium (and other plants)

Wilting Geranium

Southern wilt

Ralstonia solanacearum
(Race 3,
Biovar 2)

is a Select Agent
quarantined by
the Federal Gov't

....because this bacterium is
not established in the U.S.
and it can also attack
potatoes (causing brown
rot disease)



Ralstonia solanacearum Race 3, Biovar 2



Xanthomonas hortorum pv. *pelargonii*



Cause of bacterial blight of geranium



Xanthomonas

Bacterial blight

Xanthomonas hortorum pv. *pelargonii*



Bacterial Blight - *Xanthomonas*

- Small, round spots 1/16-1/8 inch diam.
- Wedges
- Yellow haloes
- Progresses to wilt, often



Prevention of Vascular Wilts

Culture indexing for

- Mums
- Geraniums
- Carnations

Protects against

Bacteria & Fungi

that are systemic = inside the xylem (latent infections)



Prevention of Vascular Wilts

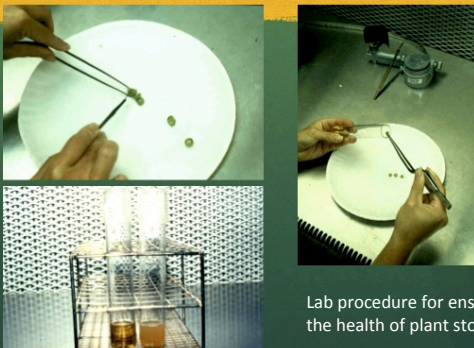
Culture indexing

Does NOT protect against viruses – which are also systemic pathogens

(virus indexing needed for that)



Culture Indexing



Lab procedure for ensuring the health of plant stock



Please Note:

Mention of specific products is for educational purposes only, and is not an endorsement, nor is it a criticism of a product not mentioned.

Pesticide registrations vary across states and regions. Always follow label instructions for all pesticides.



T H E
Fred C. Gloeckner
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