

Demystifying Fusarium Diseases of Tomato



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Macroconidia
Microconidia
Chlamydospores



<http://fr.wikipedia.org/wiki/Fusarium>

Fusarium Foot Rot

Fusarium solani f. sp. *eumartii*

Fusarium Crown and Stem Rot

Fusarium striatum

Fusarium Crown and Root Rot

Fusarium oxysporum f. sp. *radicis-lycopersici*

Fusarium Wilt

Fusarium oxysporum f. sp. *lycopersici*

Race 1

Race 2

Race 3

Fusarium Foot Rot

Fusarium solani f. sp. *eumartii*

Fusarium Crown and Stem Rot

Fusarium striatum

Fusarium Crown and Root Rot

Fusarium oxysporum f. sp. *radicis-lycopersici*

Fusarium Wilt

Fusarium oxysporum f. sp. *lycopersici*

Race 1

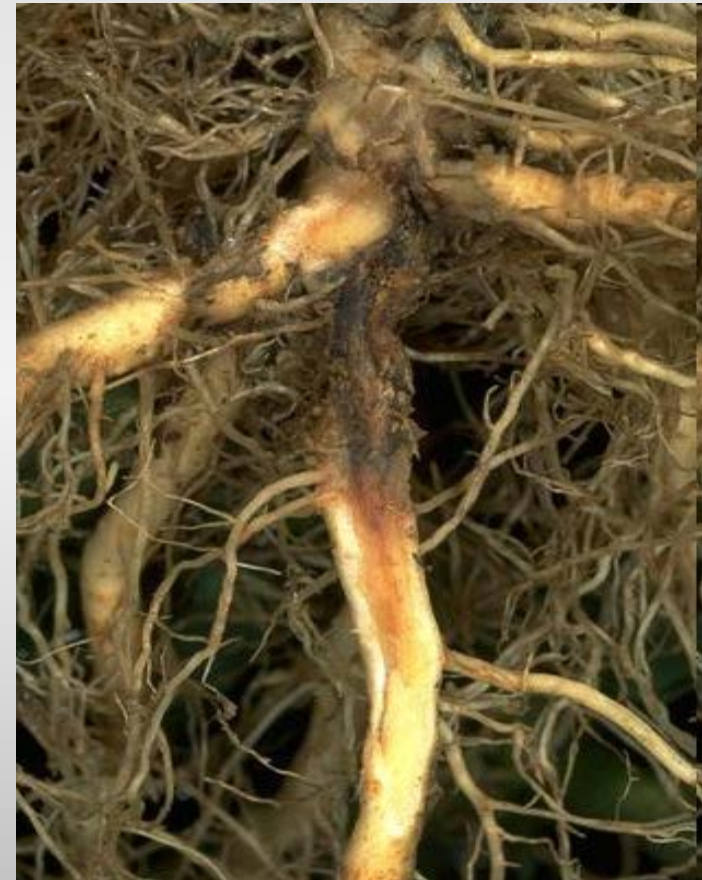
Race 2

Race 3

Fusarium Foot Rot

Fusarium solani f. sp. *eumartii*

Hosts: Tomato, potato, eggplant







Fusarium foot rot vs. Corky Root





Fusarium Foot Rot

Fusarium solani f. sp. *eumartii*

Fusarium Crown and Stem Rot

Fusarium striatum

Fusarium Crown and Root Rot

Fusarium oxysporum f. sp. *radicis-lycopersici*

Fusarium Wilt

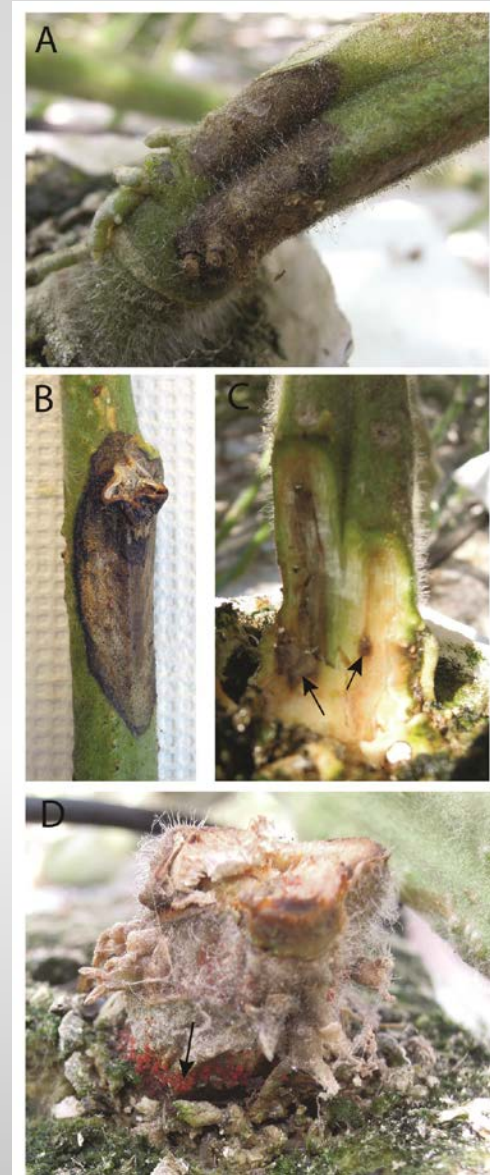
Fusarium oxysporum f. sp. *lycopersici*

Race 1

Race 2

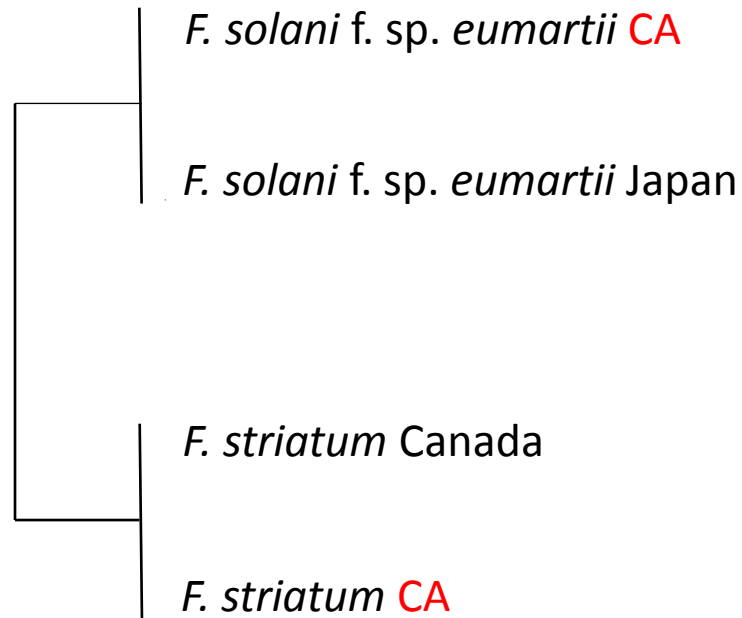
Race 3

Fusarium Crown and Stem Rot
Fusarium striatum



Plant Disease 98:292-298 Moine et al.

Fusarium solani f. sp. *eumartii* and *F. striatum*
from tomato



EF and ITS sequences

Fusarium Foot Rot

Fusarium solani f. sp. *eumartii*

Fusarium Crown and Stem Rot

Fusarium striatum

Fusarium Crown and Root Rot

Fusarium oxysporum f. sp. *radicis-lycopersici*

Fusarium Wilt

Fusarium oxysporum f. sp. *lycopersici*

Race 1

Race 2

Race 3

Fusarium Crown and Root Rot

Fusarium oxysporum f. sp. *radicis-lycopersici*

Hosts: some legumes, cucurbits, other solanaceous plants, and more



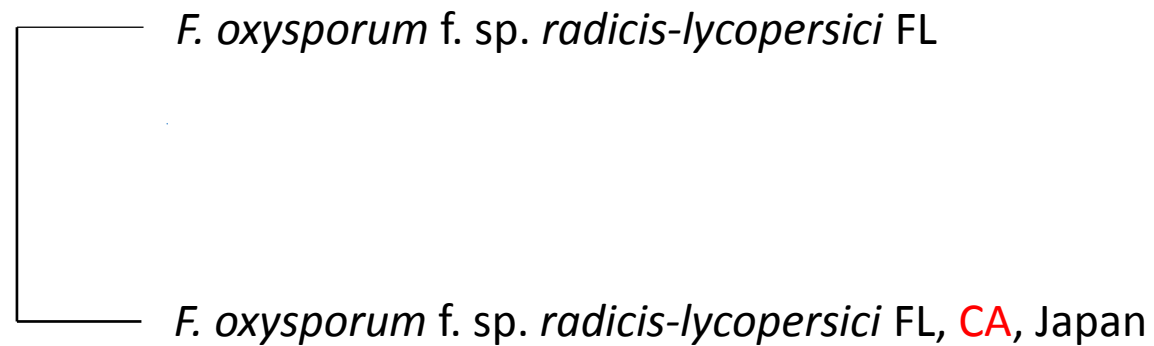


Knight's Landing





Fusarium oxysporum f. sp. *radicis-lycopersici*



IGS and EF sequences

Fusarium Foot Rot

Fusarium solani f. sp. *eumartii*

Fusarium Crown and Stem Rot

Fusarium striatum

Fusarium Crown and Root Rot

Fusarium oxysporum f. sp. *radicis-lycopersici*

Fusarium Wilt

Fusarium oxysporum f. sp. *lycopersici*

Race 1

Race 2

Race 3

Fusarium Wilt

F. o. lycopersici

1. Wilt
2. Moves rapidly in vascular tissue
3. Optimum temperature: 27 C (80 F)
4. Limited host range: tomato
5. Genetics

Fusarium Crown and Root Rot

F. o. radicis-lycopersici

1. Crown and root rot
2. No movement in vascular tissue
3. Optimum temperature: 18 C (64 F)
4. Wide host range: beans, beets, cucumber, barley, onion, asparagus
5. Genetics

Fusarium Wilt

Fusarium oxysporum f. sp. *lycopersici*

3 races, 1, 2, and 3





Fusarium

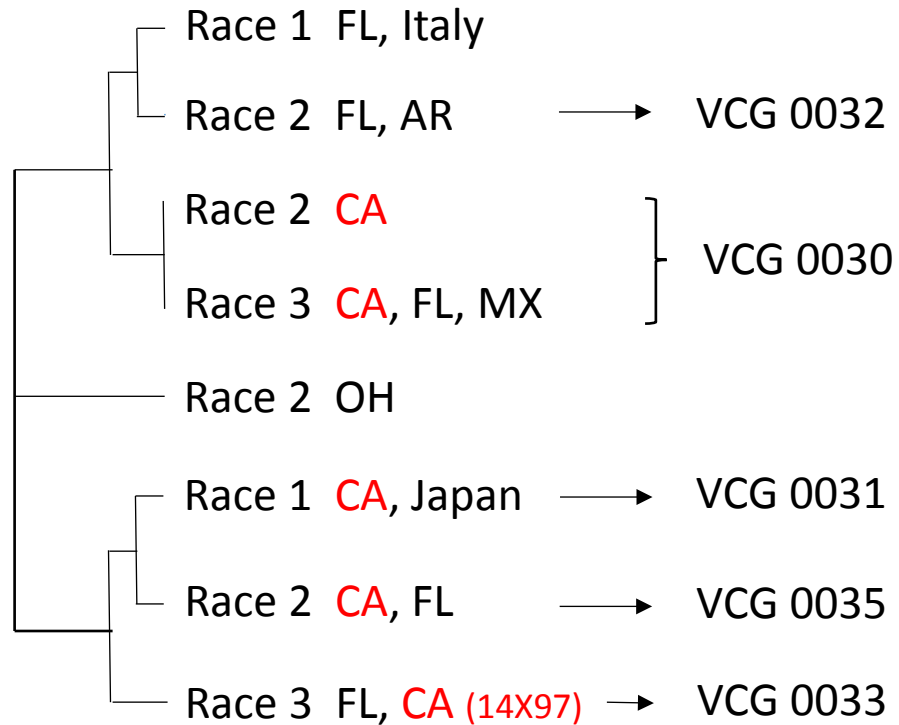


Verticillium





Fusarium oxysporum f. sp. *lycopersici*



IGS sequences and VCGs

Cai et al Phytopathol 93:1014-1022

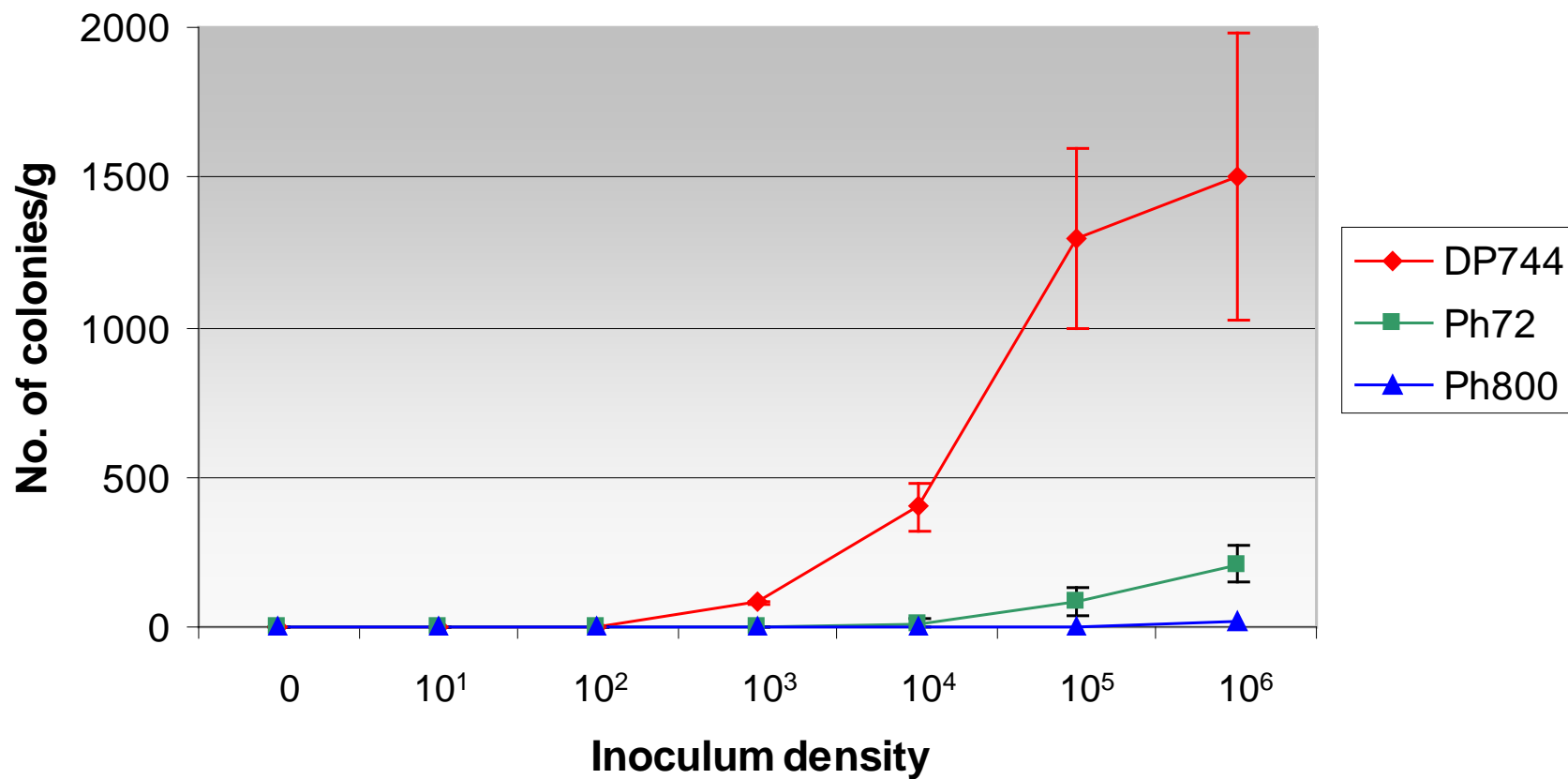
✓ Race does not correlate with VCG or genetic similarity

| | Race of <i>F. o. lycopersici</i> | Tomato plant | | | |
|---|-------------------------------------|--------------|---------|---------|---------|
| | | i i2 i3 | I i2 i3 | I I2 i3 | I I2 I3 |
| 1 | AVR1, AVR2, AVR3 | S | R | R | R |
| 2 | --- , AVR2, AVR3 | S | S | R | R |
| 3 | --- , avr2, AVR3 | S | S | S | R |

Race 2 from Race 1 by transposon insertion into AVR1

Race 3 from Race 2 by point mutation in AVR2

Propagules of FOV in Stem Tissue





Low P = foliage necrosis
Low K = and dieback

Movement

- Seed
- Any way soil and infected crop debris is moved

Management

- Containment
- Clean seed
- Soil fumigation
- Rotation
- Resistance