Major and Minor Diseases of Strawberry in California

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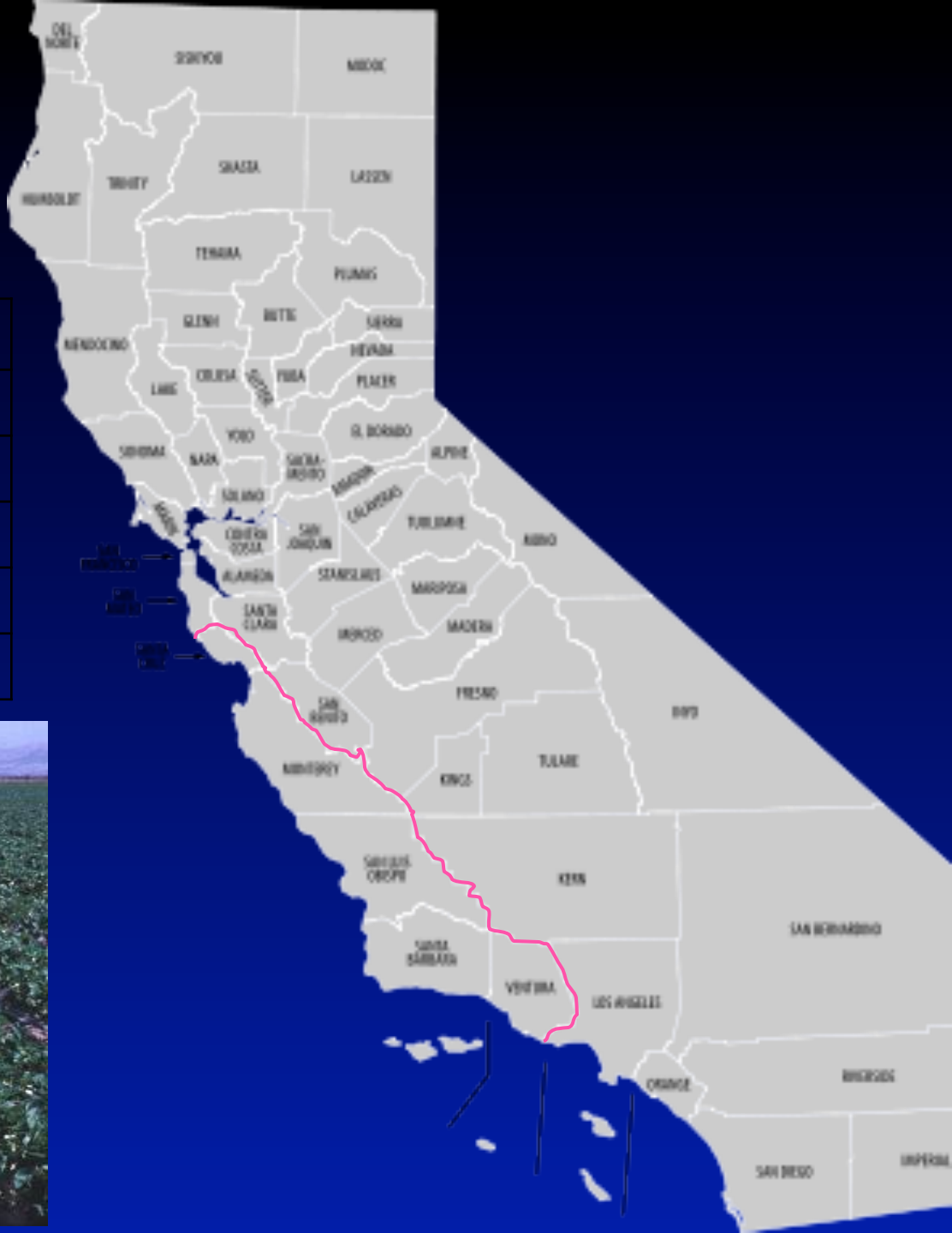
2013 Strawberry production

- USA total acres
  - 58,190
- CA total acres
  - 41,500 (= 71%)
- USA total value
  - 2.54 billion $
- CA total value
  - 2.20 billion $ (= 87%)

USDA-NASS

County	Acres	Billion $
Ventura	13,555	0.6
Monterey	10,980	0.9
Santa Barbara	7,313	0.4
Santa Cruz	3,324	0.2
Total	35,172	2.1



Botrytis

Botrytis fruit rot fungicides

- 2013 trials: no significant differences in percent rot:
  - Botector, Fontelis, Fracture, Merivon, Pristine, Quadris Top, Switch, Tavano, experimentals, untreated
- Recent field surveys (Monterey/Santa Cruz): some indication of resistance to Cabrio, Elevate, and Endura (but not to Rovral) [A. D. Pokorny]

Zygomycetes

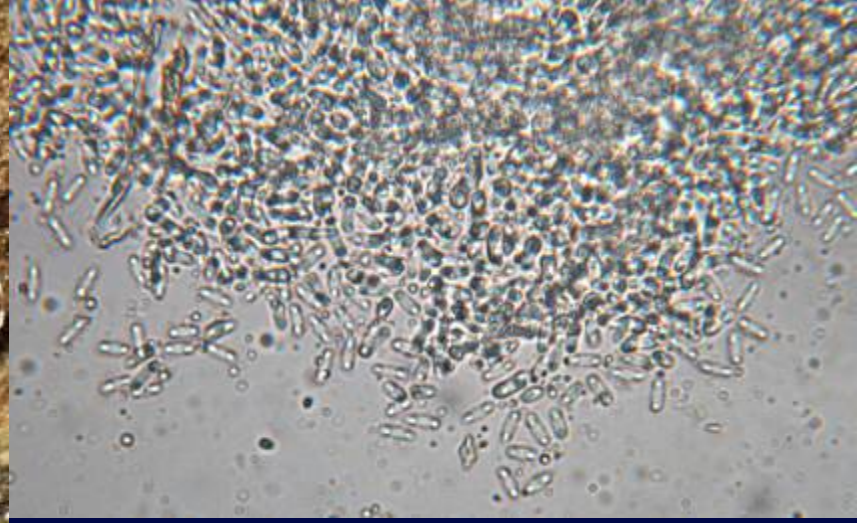
Rhizopus

Mucor

Phytophthora cactorum

Leaf blotch

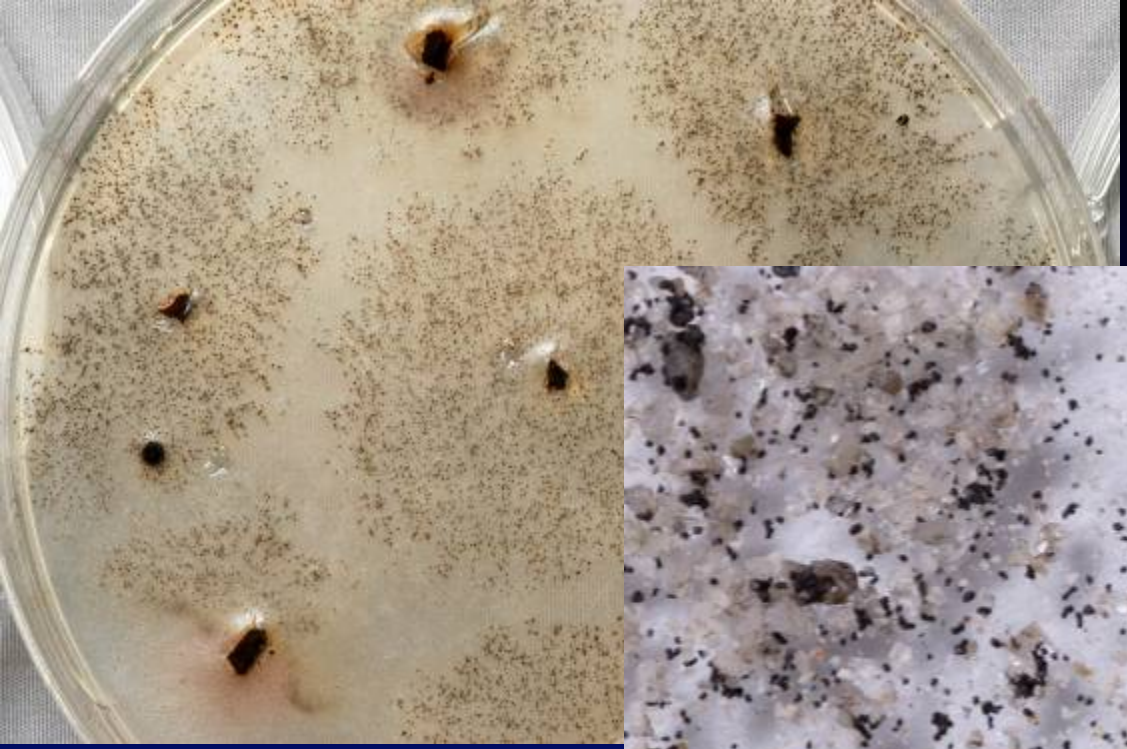
Zythia on fruit calyx tissues



Xanthomonas

Charcoal rot

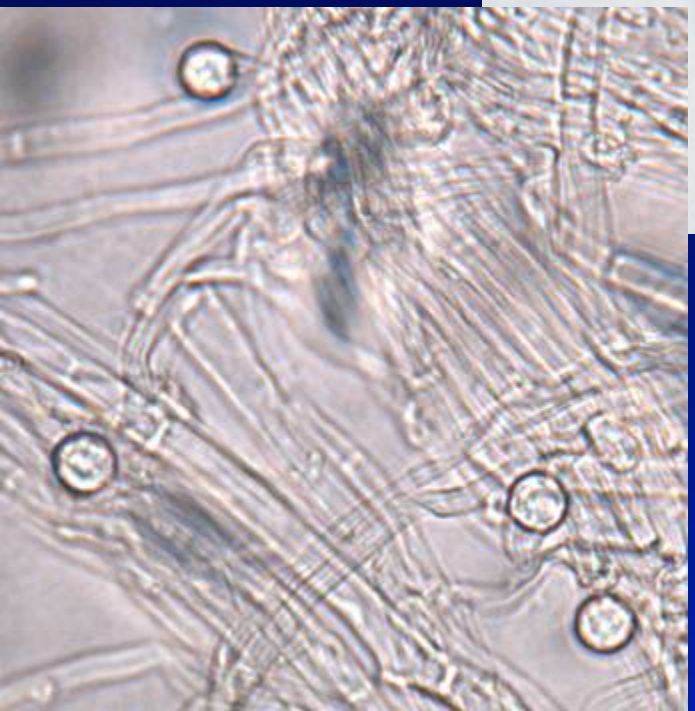
Macrophomina



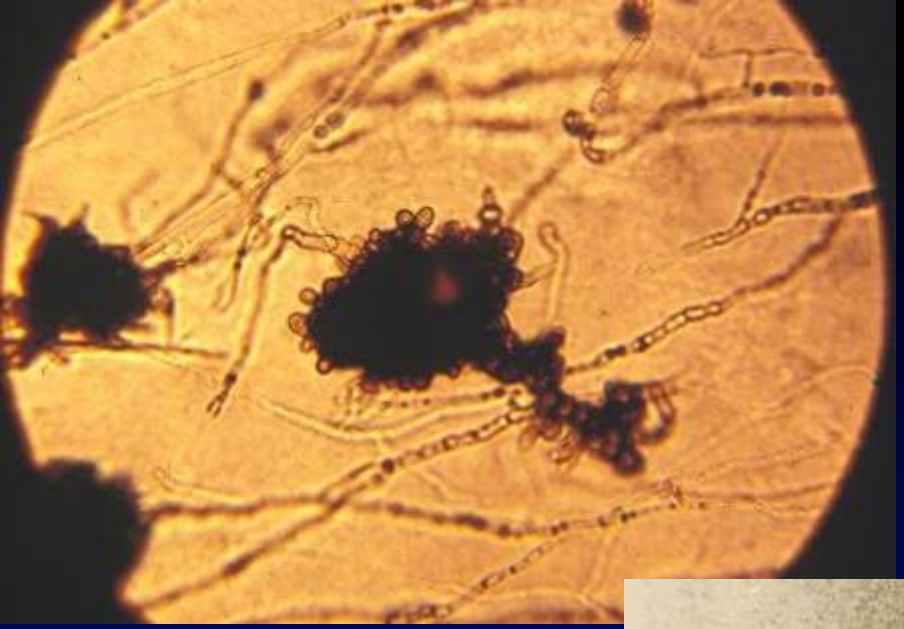

WST

Fusarium wilt


Fusarium oxysporum
f. sp. fragariae
2006
2014



Verticillium wilt



Diagnosis:

Macrophomina

Fusarium

Verticillium

? Other

?

Diagnostic challenge: Similar symptoms

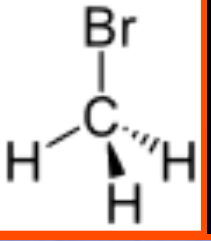
Symptoms	*Mac.*	*Fus.*	*Verticillium*	*Phytoph.*
Poor growth	yes	yes	yes	yes
Stunting	yes	yes	yes	yes
Dieback	yes	yes	yes	yes
Pl. collapse	yes	yes	yes	yes
Crown discolor	yes	yes	no	yes
Stress factor	yes	yes	yes	no
Assoc. w/ H_2O	no	no	no	yes

Macrophomina: May 23

Macrophomina: June 21

Macrophomina: July 5

Macrophomina: July 26



Association with changes in IPM

Inoculations: *Macrophomina* isolate 3

Albion Ventana Seascape

Cultivar comparisons

Cultivar	*Macroph.*	*Fusarium*
Chandler	"resistant"	susceptible
Seascape	"resistant"	susceptible
Monterey	susceptible	"resistant"
San Andreas	susceptible	"resistant"
Ventana	susceptible	"resistant"

* Resistant ≠ Immune

Macrophomina / Fusarium: The bad news for CA strawberry growers

- *Macrophomina* and *Fusarium* both very damaging.
- Spreading in fields, counties, state.
- No truly resistant strawberry cultivars.
- Alternative fumigants not completely effective.
- Bed fumigations not sufficient.
- Post-plant fungicides do not work.

Macrophomina / Fusarium: The good news for CA strawberry growers

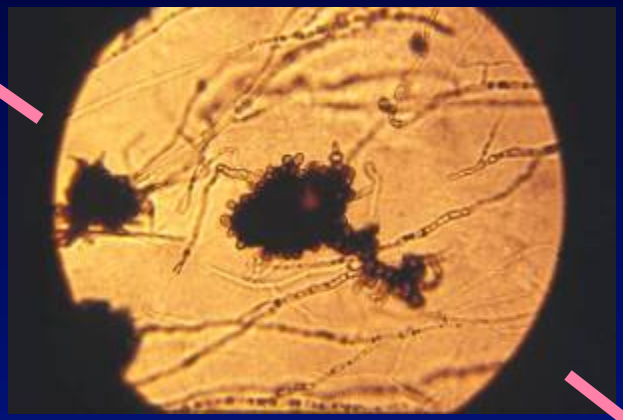
Macrophomina / Fusarium: The good news for <u>everyone else</u>

- *Fusarium* is host-specific to strawberry.
- *Macrophomina* has not been found causing disease on vegetable crops in coastal counties where strawberry dieback has been a problem.
- *Macrophomina* from strawberry may have strawberry as a preferred host.

Verticillium wilt: Future concerns

Verticillium wilt

Strawberry



Lettuce

Management: soilborne diseases

- **Site selection:** avoid infested fields.
- **Crop rotation:** plant non-hosts.
- **Pre-plant fumigation:** still useful.
  - Prefer flat fume, tarpped
- **Sanitation:** don't move infested mud, contaminated equipment.
- **"Resistance":** use tolerant (?) cultivars.
- **Production:** reduce plant stress.

Diagnosis

- Biotic diseases / Abiotic problems: symptoms may be similar.
- Factors to check:
  - Time of year
  - Field distribution
  - Environmental conditions

Transplant establishment problems

Transplant establishment problems