Growing healthy strawberry transplants for reduced pest and disease risk in fruit production fields

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California Strawberries

- Grown in about 40,000 acres and valued at $2.2 billion
- California is number 1 in the world for strawberry production
- Reasons for our success:
  - Ideal environmental conditions for nursery and fruit production
  - Research and development
  - Education and implementation

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Strawberry plants and transplants

- Plants are sensitive to temperature and photoperiod
  - Cooler conditions and short days favor flower production
  - Warmer conditions and long days favor runner production

- Transplants require 150-400 hours of chilling below 45^{o}F or 7.2^{o}C.

- October planting in Southern California with Macdoel area transplants, November planting in Central Coast with McArthur area transplants, and summer planting in multiple areas with low-elevation nurseries.

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Pests and diseases

- Viruses
- Nematodes
- Root and crown diseases
- Foliar diseases
- Spider mites
- Cyclamen mites
- Weeds

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Strawberry Registration & Certification Program –

Counties are local helpers

Applicant must perform pre-plant MeBR fumigation and start with qualified plants from first year propagation from registered or foundation stock

Foundation Plant Services

Applicant must keep varieties separate and rogue any off-types

Applicant tags plants

and keeps track of all paperwork

Applicant must perform extensive pest management to keep plants “commercially clean”

Requirement for certified nursery field to be at least 1 mile from commercial production is now waved, grower can produce fruit and nursery plants *in the same field*

Steps in the process:

Two Growing Season Inspections
One Inspection at Harvest

Blocks must be *free-from*
Off types, Diseases, Insect problems and Genetic disorders



Diseases

- Diseases that can be transmitted to production fields are
  - Angular leaf spot
  - Common leaf spot
  - Pallidosis-related decline
  - Powdery mildew
  - Red stele
  - Charcoal rot
  - Fusarium wilt
  - Phytophthora crown rot and Red Steele
  - Verticillium wilt
- Monitoring, control, and removal of infected material

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No visual symptoms of 3 common diseases:

***Colletotrichum* spp.**
***Phytophthora* spp.**
***Xanthomonas* spp.**

Suspects confirmed by the State Pathology Lab

Viruses

- Screening for viruses
- Tissue culturing
- Heat treatment (35-37^{o}C for 21-28 days)
- Screen/greenhouses to exclude vectors
- Strawberry Certification Program
  - Foundation (1st generation) – White tag
  - Registered (2nd generation) – Purple tag
  - Certified (3rd generation) – Blue tag
  - No tag for subsequent generations

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Viral Diseases

- Mottle
- Leafroll
- Veinbanding
- Witchesbroom
- Crinkle
- Latent "C"
- Pallidosis
- Feather leaf
- Necrotic shock
- Mild yellow edge
- Tomato Ringspot
- Pseudo mild yellow edge

- Indexed at the Foundation Stock stage

- Keep Certified nursery stock clean through vector control

Mites

- Important pests that can be transmitted to production fields are
  - Twospotted spider mite
  - Cyclamen mite
- Monitoring and control
- Hot water treatment
- Removal of infested material

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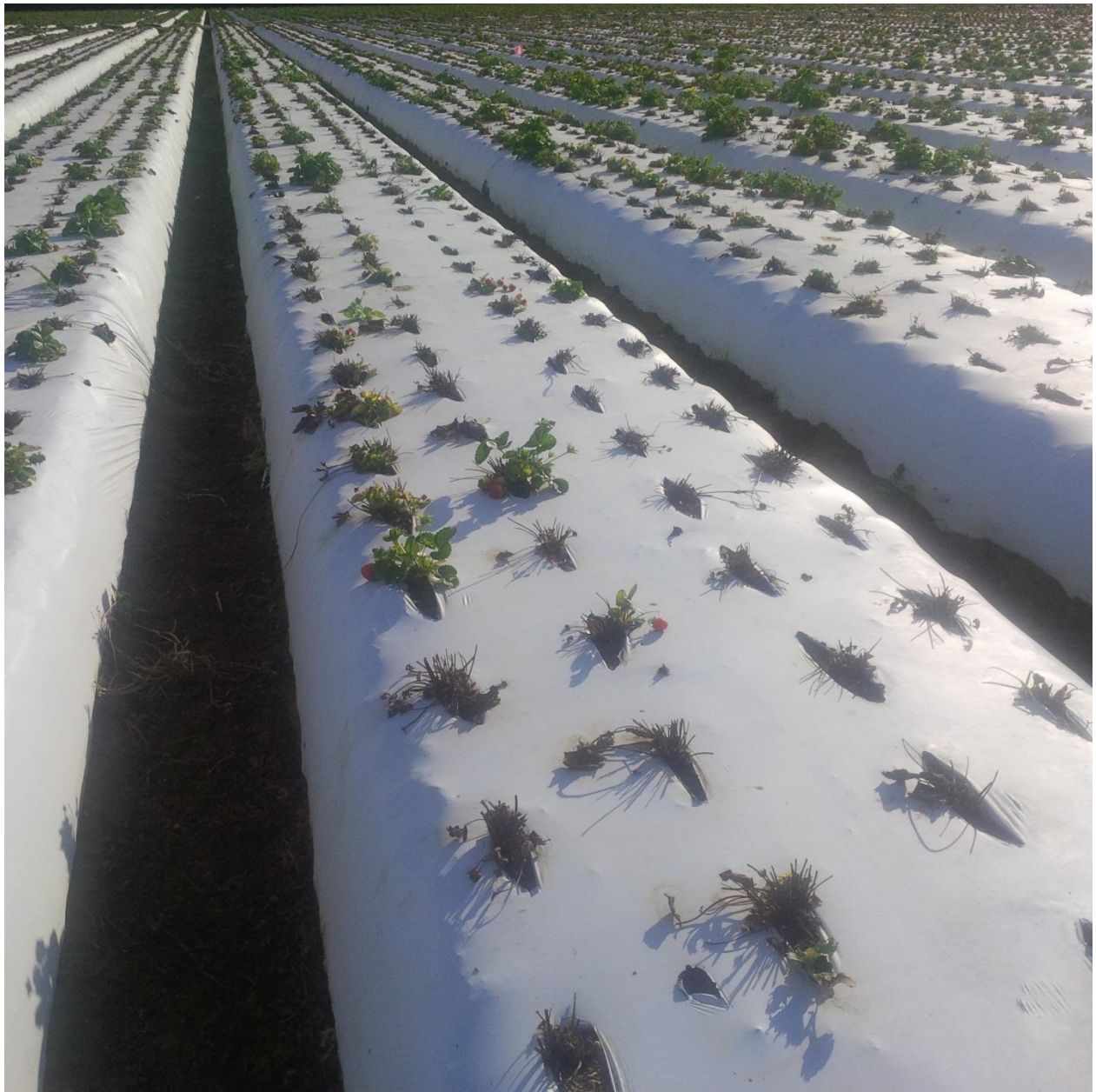
Nematode sampling:

Free-from foliar and soil-borne parasitic nematodes

Also No Mollusks Allowed

Challenges for Nurseries



- Meeting increasing demand for clean stock
- New diseases with unknown epidemiology or treatments
- Regulatory lag time

Thank you!

Presentations from this meeting can be downloaded from: http://ucanr.edu/meetingpresentations

Questions????