



Cornell University

Empire State Producers Expo
Are your trees clean? - Jan. 19, 2016

Viruses and Apple Propagation: Why Should I Worry?

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Viruses in Apple

- Who are the culprits?
- How are the culprits disseminated?
- What are optimal management strategies?

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Viruses in Apple in New York

Viruses	Name	Acronym
Major	apple chlorotic leaf spot virus	ACLSV
	apple stem grooving virus	ASGV
	apple stem pitting virus	ASPV
	apple mosaic virus	ApMV
	tomato ringspot virus	ToRSV
Minor	cherry leafroll virus	CLRV
	tobacco ringspot virus	TRSV

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Apple chlorotic leaf spot virus - ACLSV



B.C. Ministry of Agriculture and Lands



Howell W.E. & Eastwell K.C., WSU

Apple stem grooving virus - ASGV

Infected



Healthy



Howell W.E. & Eastwell K.C., WSU

Apple stem pitting virus - ASPV



Yanase H., Japan



Wilcox, W.F., Cornell

ASPV on Virginia Crab



ASPV on Virginia Crab



Doud D. & Rosenberger D.A



ASPV on Swee Tango/Bud.9

Breth D. I., CCE

ASPV + ACLSV



Red Delicious/G.935

Breth D.I. & Liz Tee, CCE

ASPV + ACLSV



Red Delicious/G.935

Breth D.I., CCE

A photograph of several green Granny Smith apples hanging from a tree branch. The apples exhibit characteristic symptoms of green crinkle disease, including distorted shapes and brown, necrotic lesions on their surfaces. The background shows green leaves and a clear blue sky.

Apple green crinkle disease

ASPV + ACLSV + ASGV on Granny Smith

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Apple mosaic virus - ApMV



Podleckis E. V., USDA-APHIS

Tomato ringspot virus - ToRSV



Red Delicious on MM. 106

Ogrodnick, J., Cornell



Red Delicious and Spartan on MM. 106

Ogrodnick, J., Cornell



Ogrodnick, J., Cornell

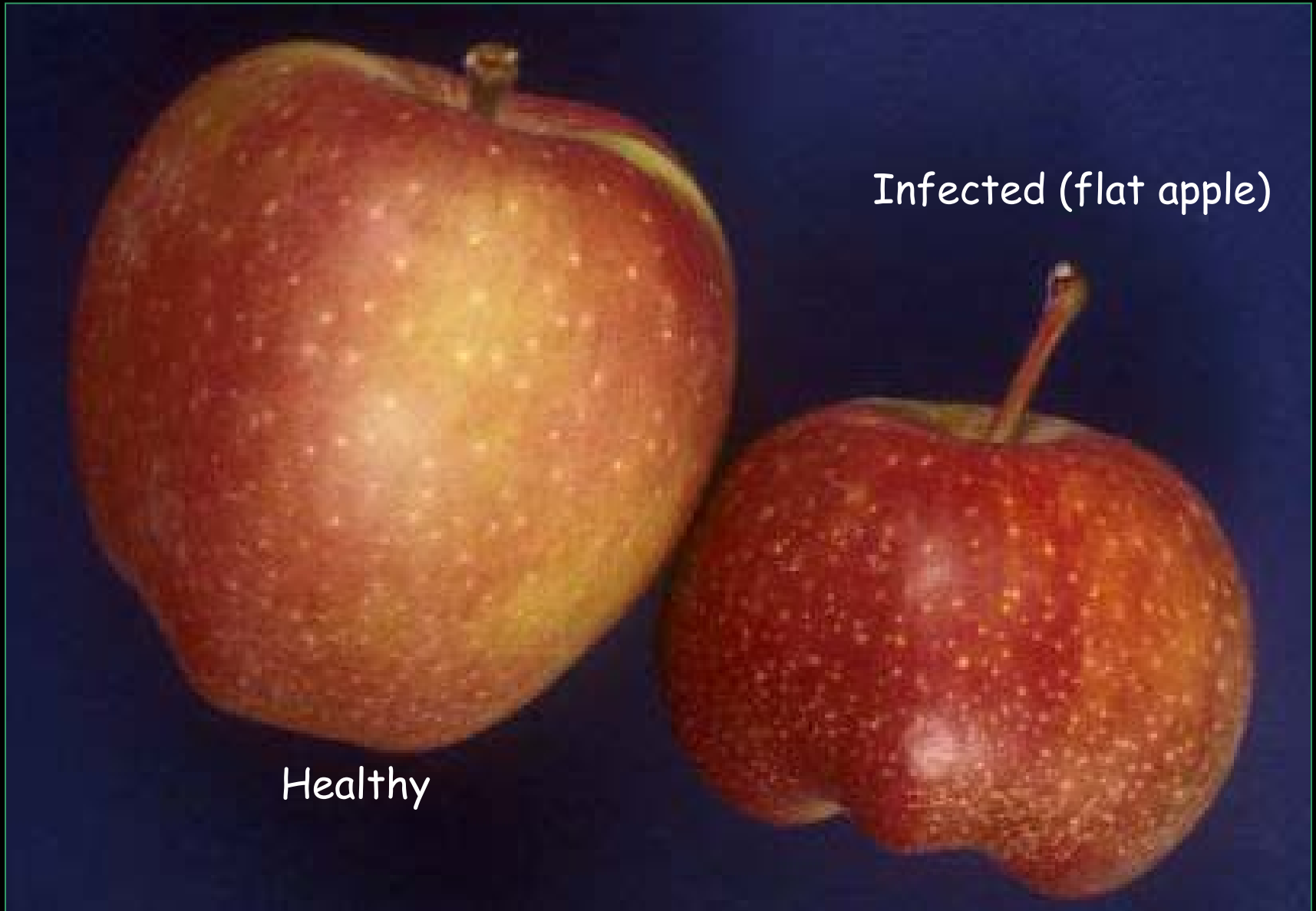
ToRSV on Gingergold/M26



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Cherry leafroll virus - CLRV



Tobacco ringspot virus- TRSV



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Transmission of ACLSV, ASGV, ASPV and ApMV

- No known insect vector
- No seed transmission
- Budding, grafting & top working

Transmission of ToRSV, CLRV and TRSV

- Dagger nematodes

A microscopic image of the nematode Xiphinema americanum. The worm is shown in a curved, C-shaped posture against a dark background. It has a long, slender body with a distinct head region at the top right and a tail region at the bottom right. The body is translucent, showing internal structures like the gut and reproductive organs.

Xiphinema americanum

Abawi G., Cornell

Transmission of ToRSV, CLRV and TRSV

- Dagger nematodes
- Weeds: Chickweed, dandelion, plantain
- No seed transmission
- Budding, grafting and top working

Viruses in Apple

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Management Strategies

- Carefully select new trees:
 - Avoid susceptible cultivar/rootstock combinations
 - Pick tolerant/resistant cultivars and rootstocks
 - Choose clean trees, buds and rootstock liners

Management Strategies

- Build strategic relationships with your nursery and ask questions:
 - Were virus test performed?
 - Which tissue was tested?
 - When were tests performed?
 - What virus or viruses were assayed for?
 - Who ran the assays?

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- Carefully select new trees
- Carefully select new planting sites
- Eliminate and manage weeds
- Rogue infected trees if growth and productivity as unsatisfactory
- Carefully select scion buds for top working

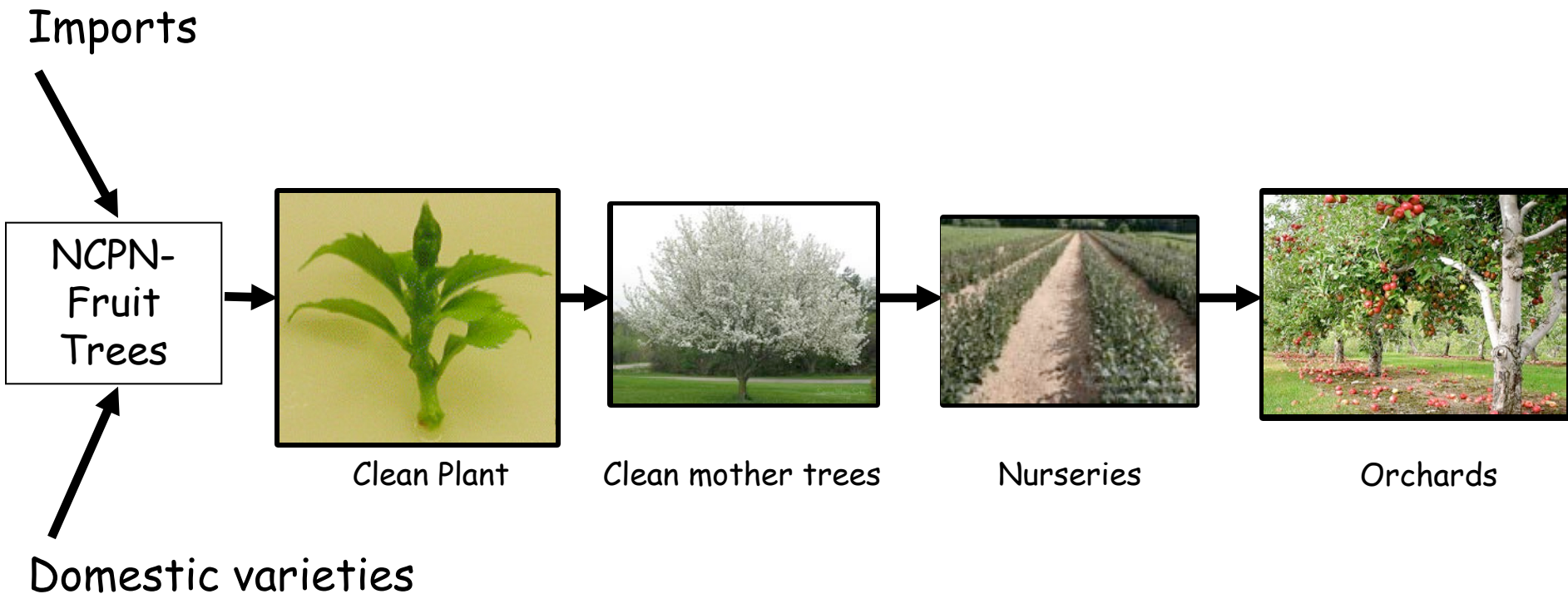
Management Strategies

- Be proactive, don't introduce a new disease problem close to your trees
- Scout for virus symptoms:
 - Foliar discoloration or deformity
 - Change in growth habit or maturity timeline
 - Stem pitting or union necrosis
 - Fruit deformation
 - Lack of vigor or decline
 - Inability to cope with other stressors
- OR, WA, and PA have active, voluntary certification programs; NY does not yet.

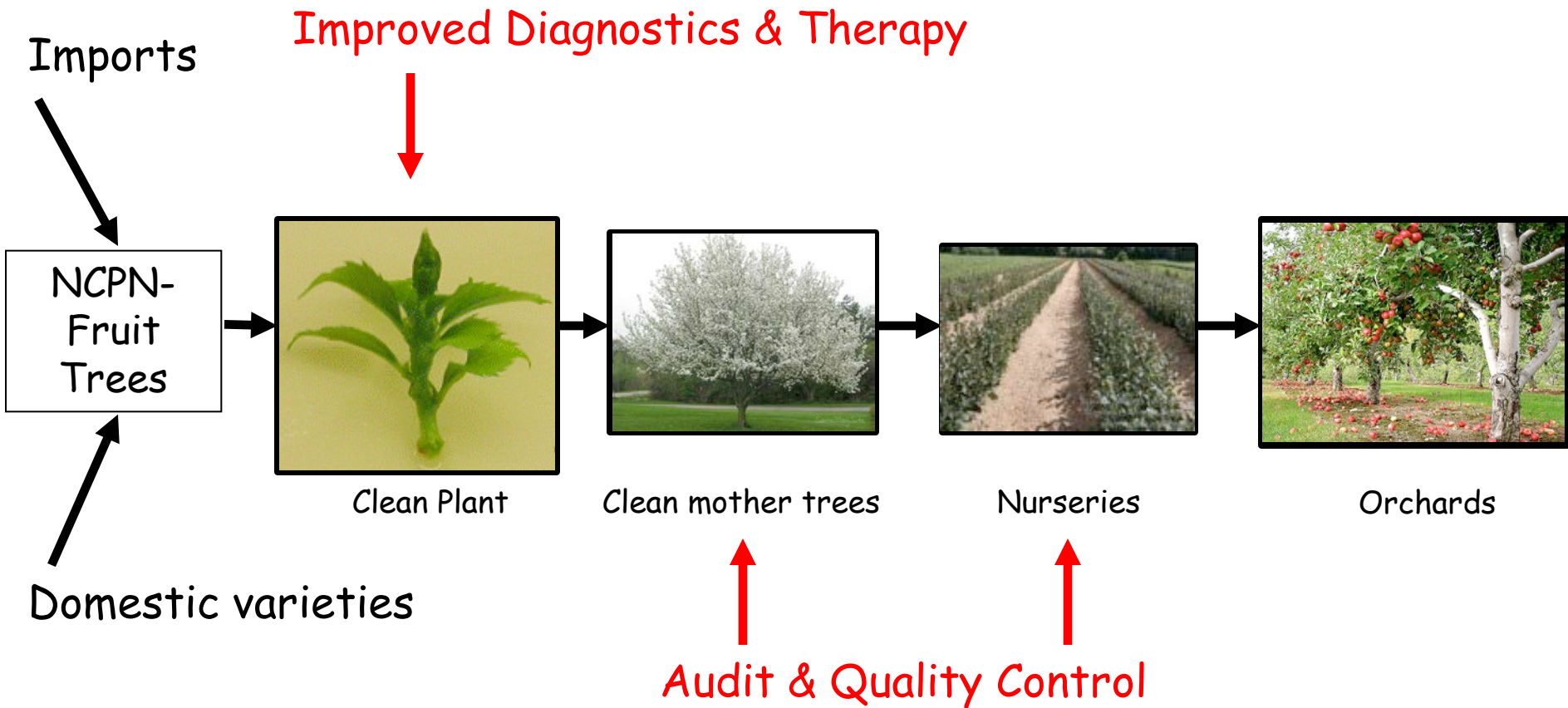
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Activities Associated with Apple Certification



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Improved Diagnostics & Therapy



Imports



NCPN-
Fruit
Trees



Clean Plant



Clean mother trees



Nurseries



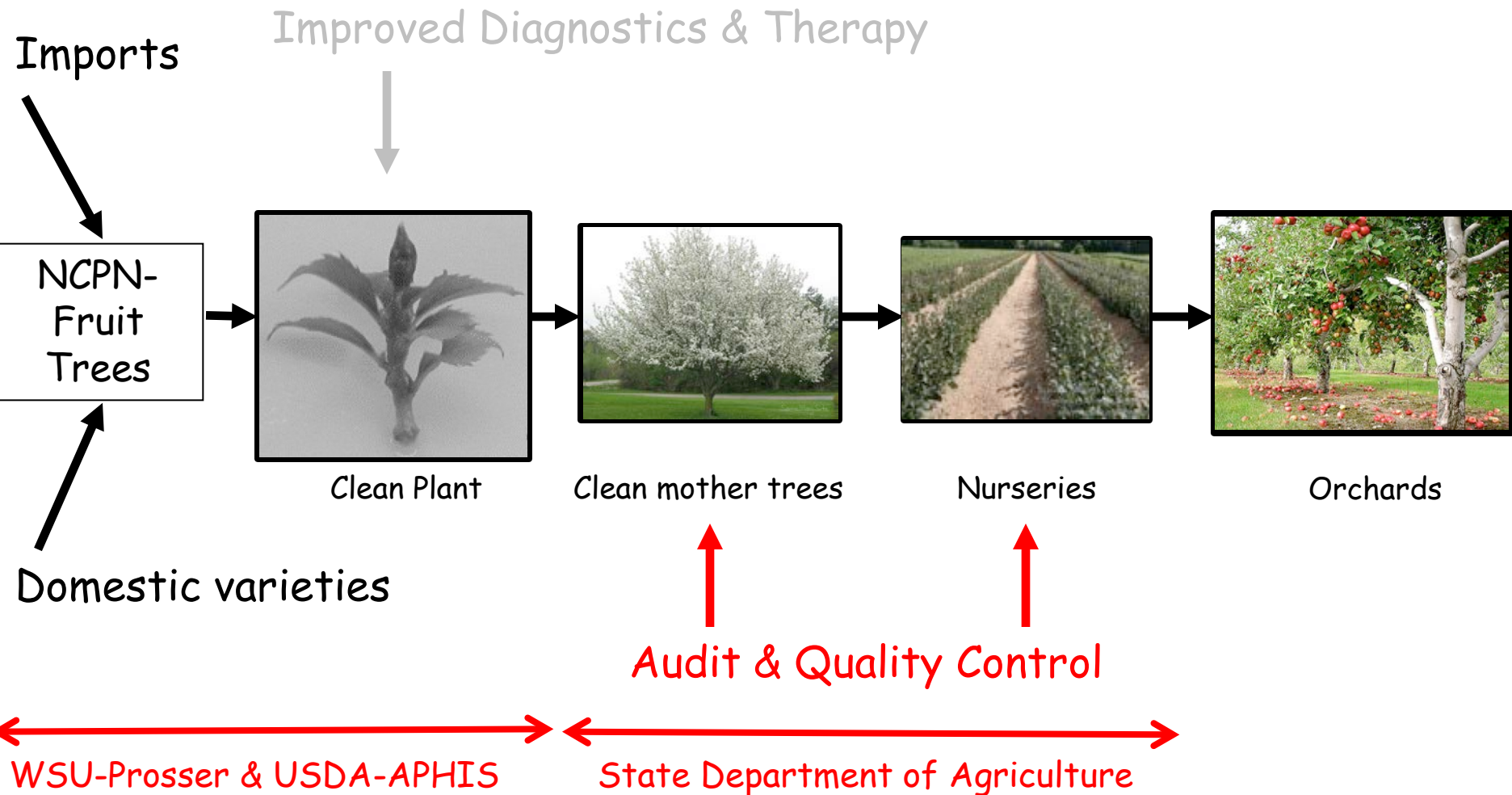
Orchards

Domestic varieties

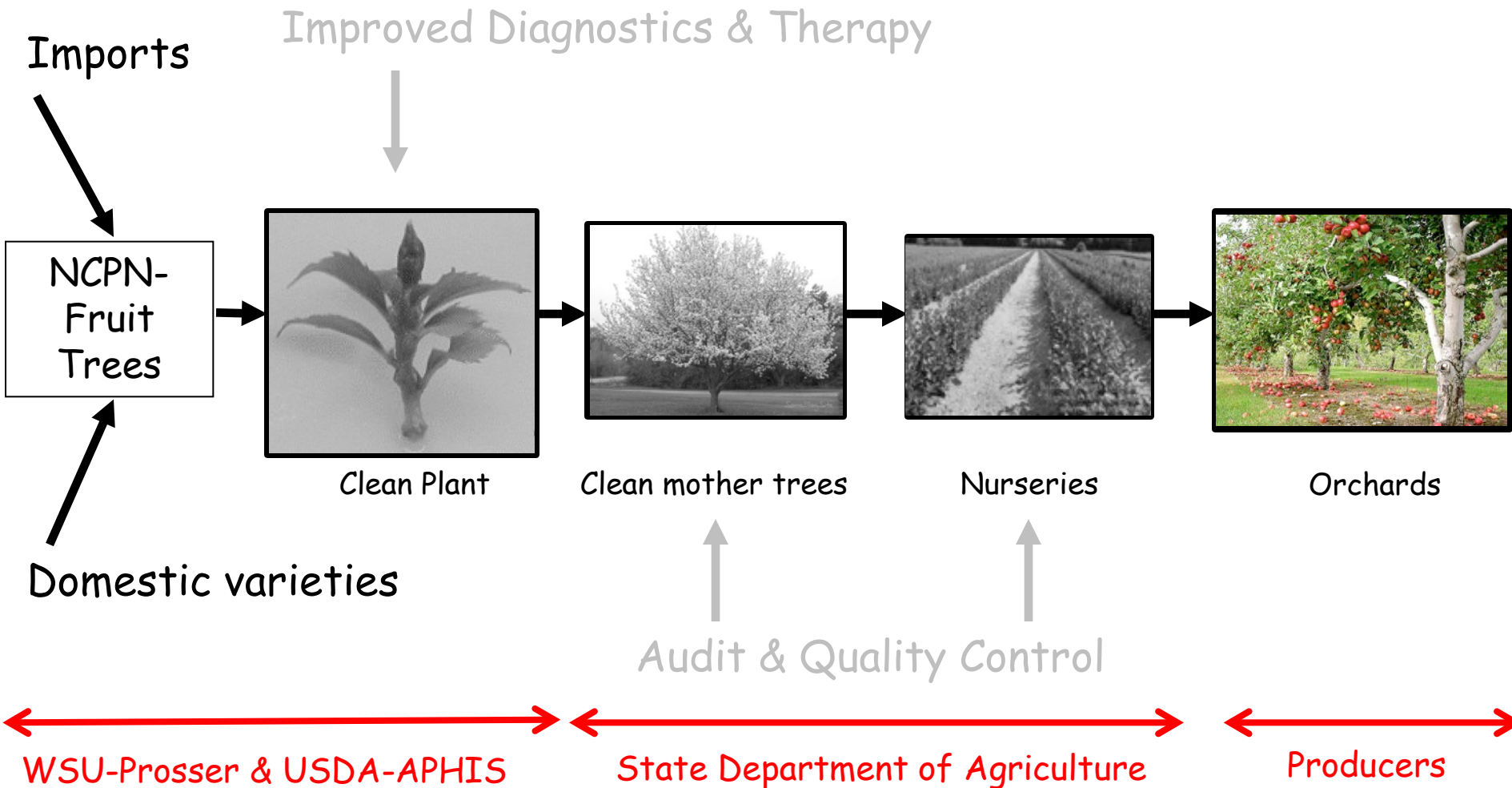


WSU-Prosser & USDA-APHIS

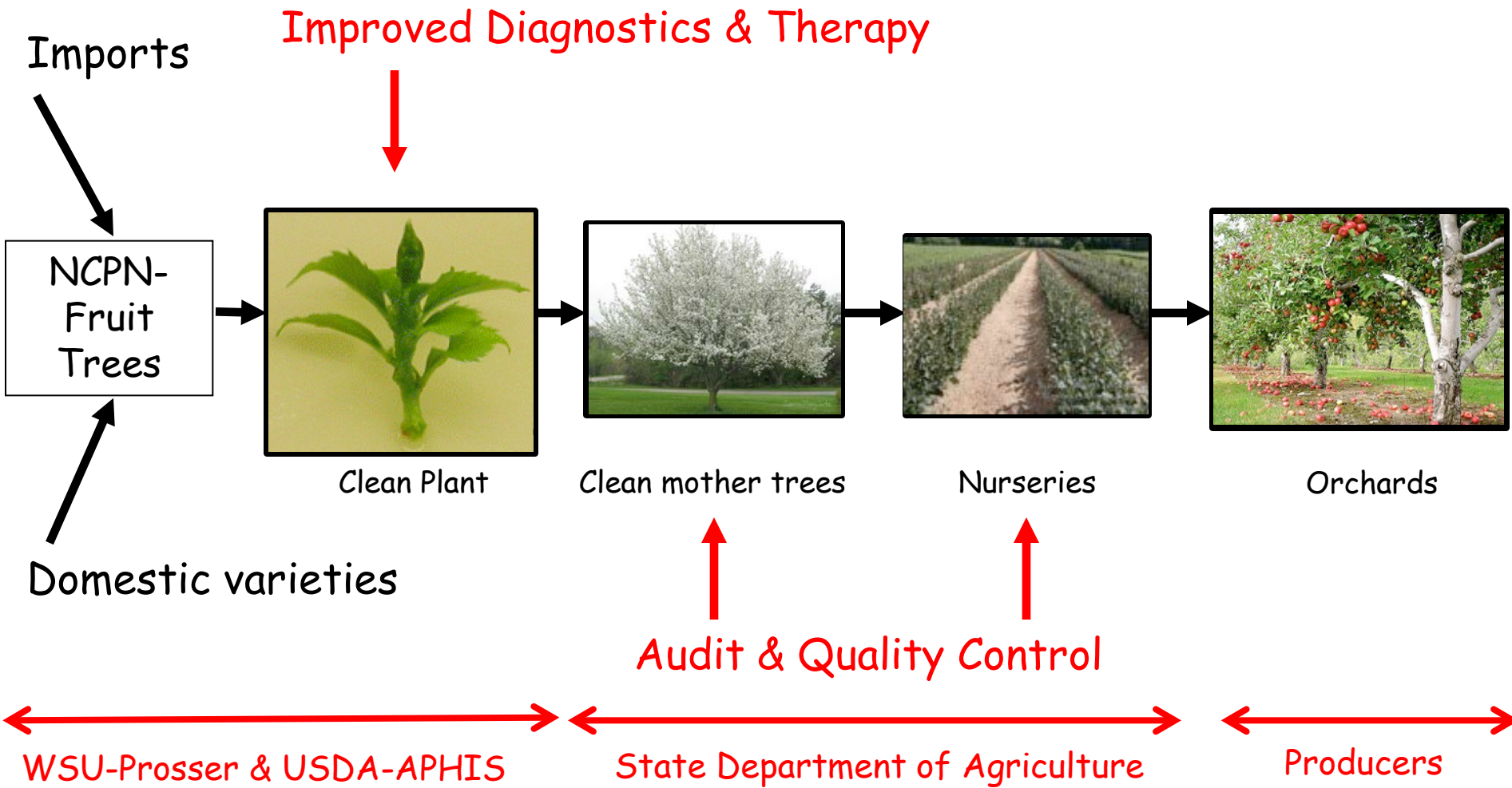
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High quality apples ...

Healthy orchards ...

Healthy trees!



We are all in it together ...

Acknowledgements

- Debbie Breth
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