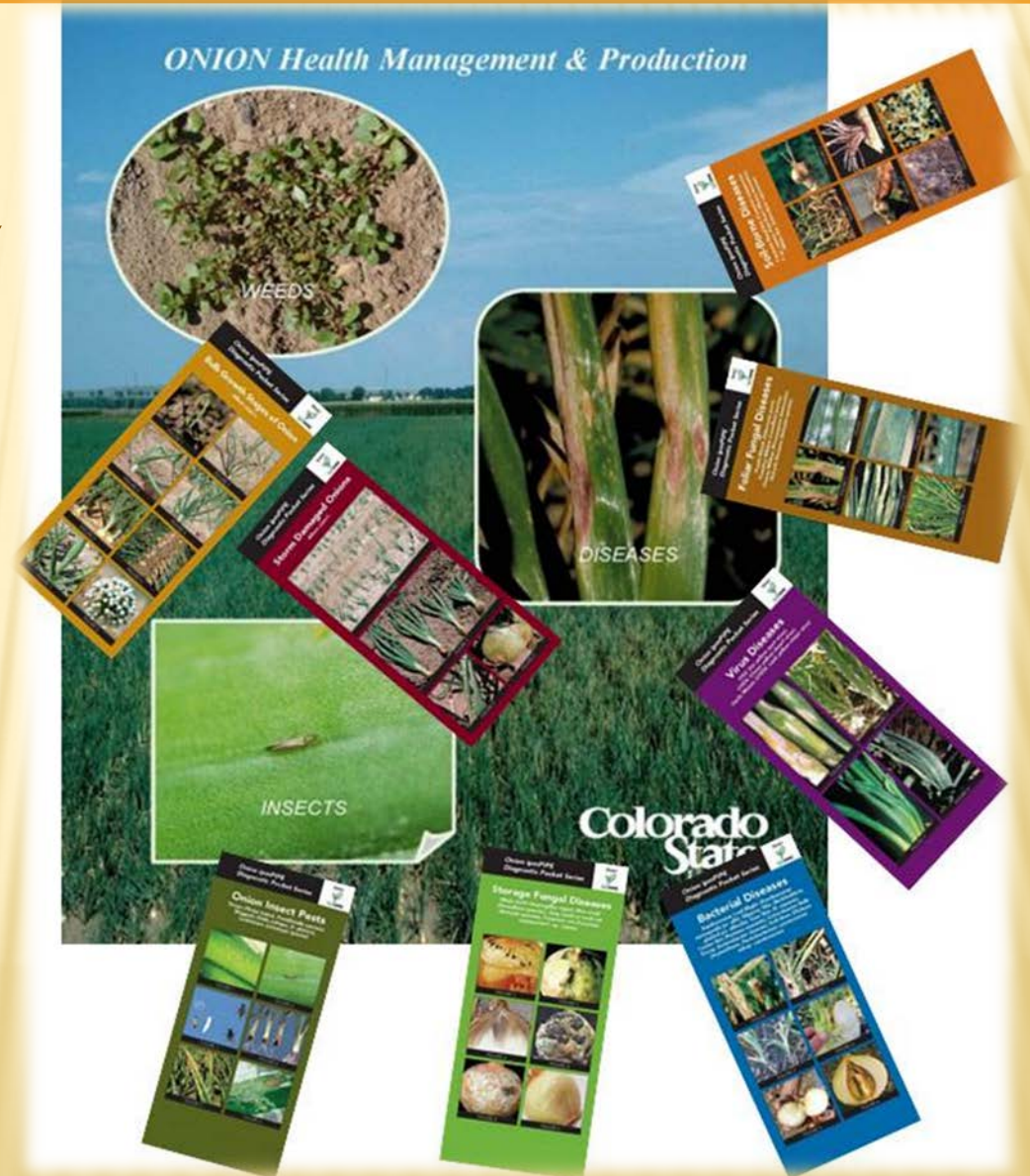


ONION DISEASE MANAGEMENT

HOWARD F. SCHWARTZ
PROFESSOR EMERITUS
COLORADO STATE UNIVERSITY



Monitor Pests and Diseases in Relation to Crop Growth Stages

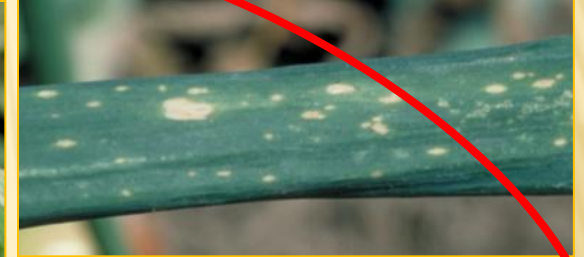
Priority 1 - IYSV & Thrips



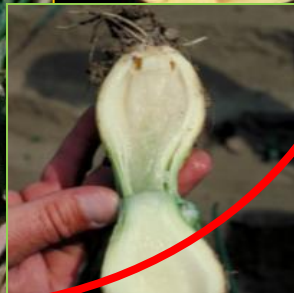
Monitor Pests and Diseases in Relation to Crop Growth Stages

Priority 2 - Other Diseases & Pests

Fungal



Bacterial

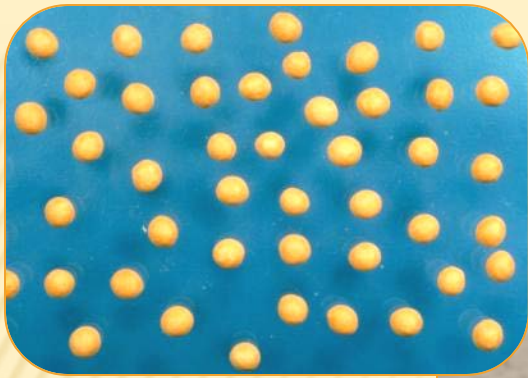


Insects



Post-Harvest





Soil-borne Threats: Planting to Harvest & Storage



PEST DIAGNOSTIC PROFILE

Common Name:

Pink Root

Scientific Name:

Phoma terrestris

Pathogen Type: fungus

Survival Means:

spores, pycnidia, crop debris, sets



PEST DIAGNOSTIC PROFILE

Common Name:

Fusarium Basal Rot

Scientific Name:

Fusarium oxysporum f. sp. cepae

Pathogen Type: fungus

Survival Means:

spores, crop debris, sets



Varietal Resistance – choose carefully



Raw Seed

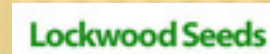


Transplants / Sets



Pelleted Seed

Varietal Resistance



Pesticides - preventive



**Onion Diseases
Fungal (soilborne)**

Options:

Preplant Treatments

Telone C-17, C-35

Vapam

Seed Treatments - damping off

Apron

Biopesticides

Captan

Maxim

Quadris

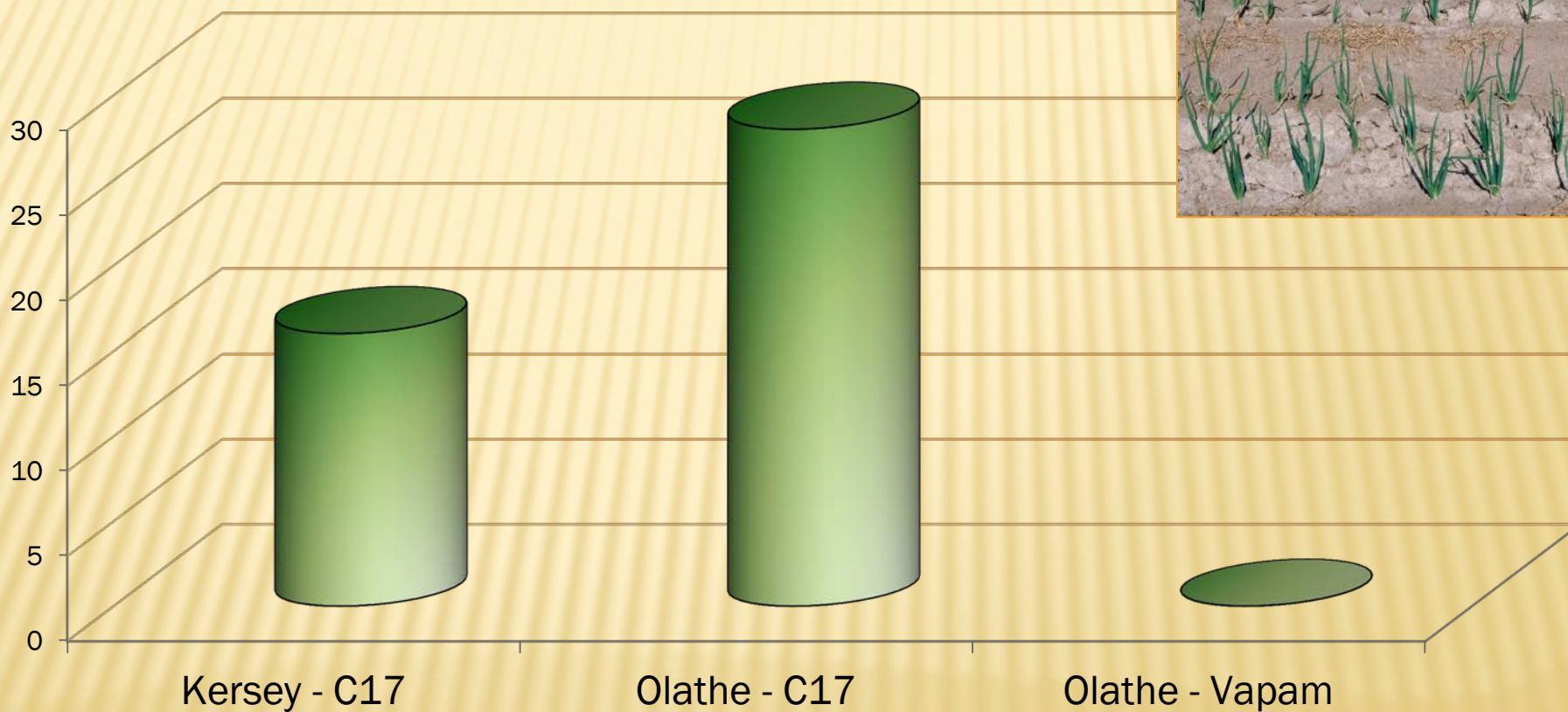
Thiram

Others

FUMIGATION EFFECT – % IMPROVEMENT OVER CONTROL

1984-85 at Olathe & Kersey, CO / [Schwartz 1986 F & N Tests 41:57]

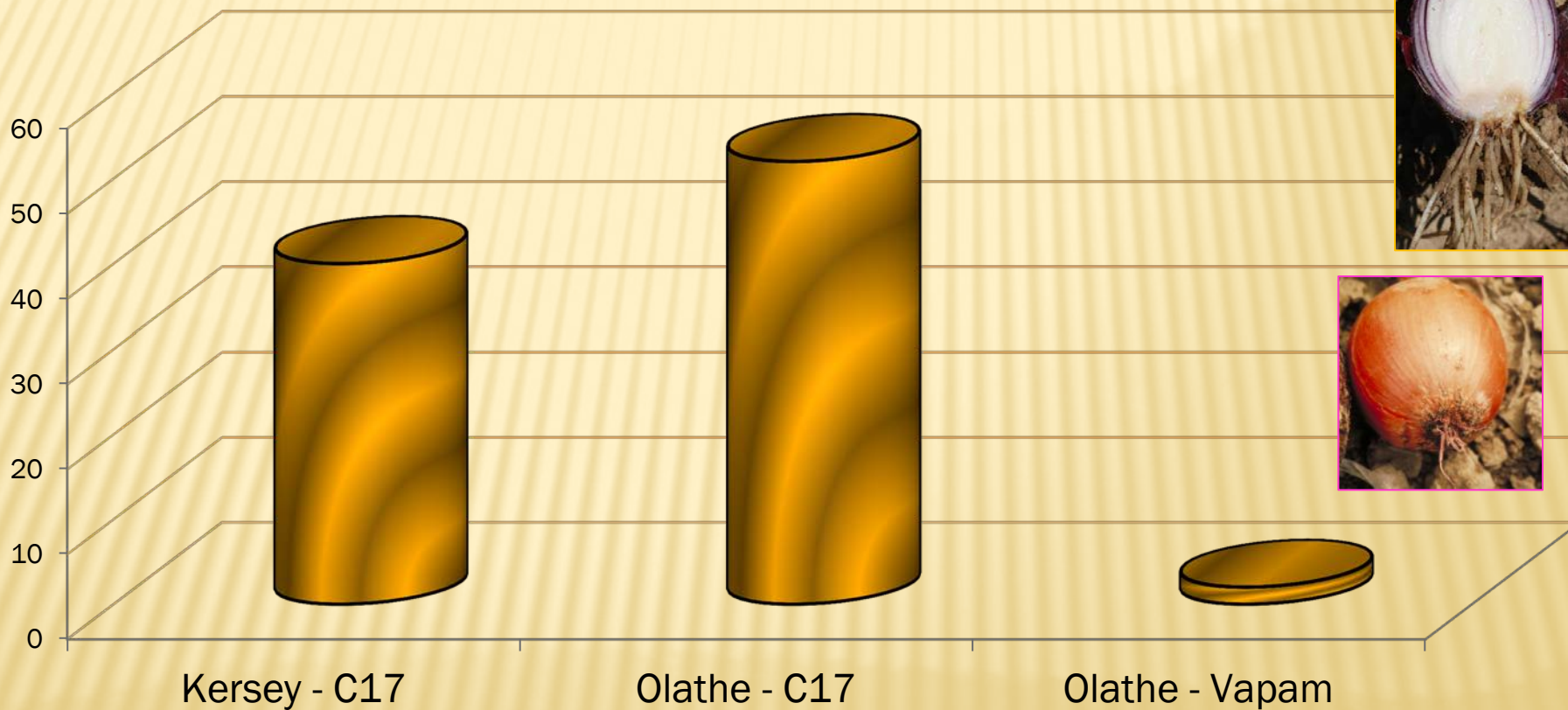
Plant Stand Improvement



FUMIGATION EFFECT – % IMPROVEMENT OVER CONTROL

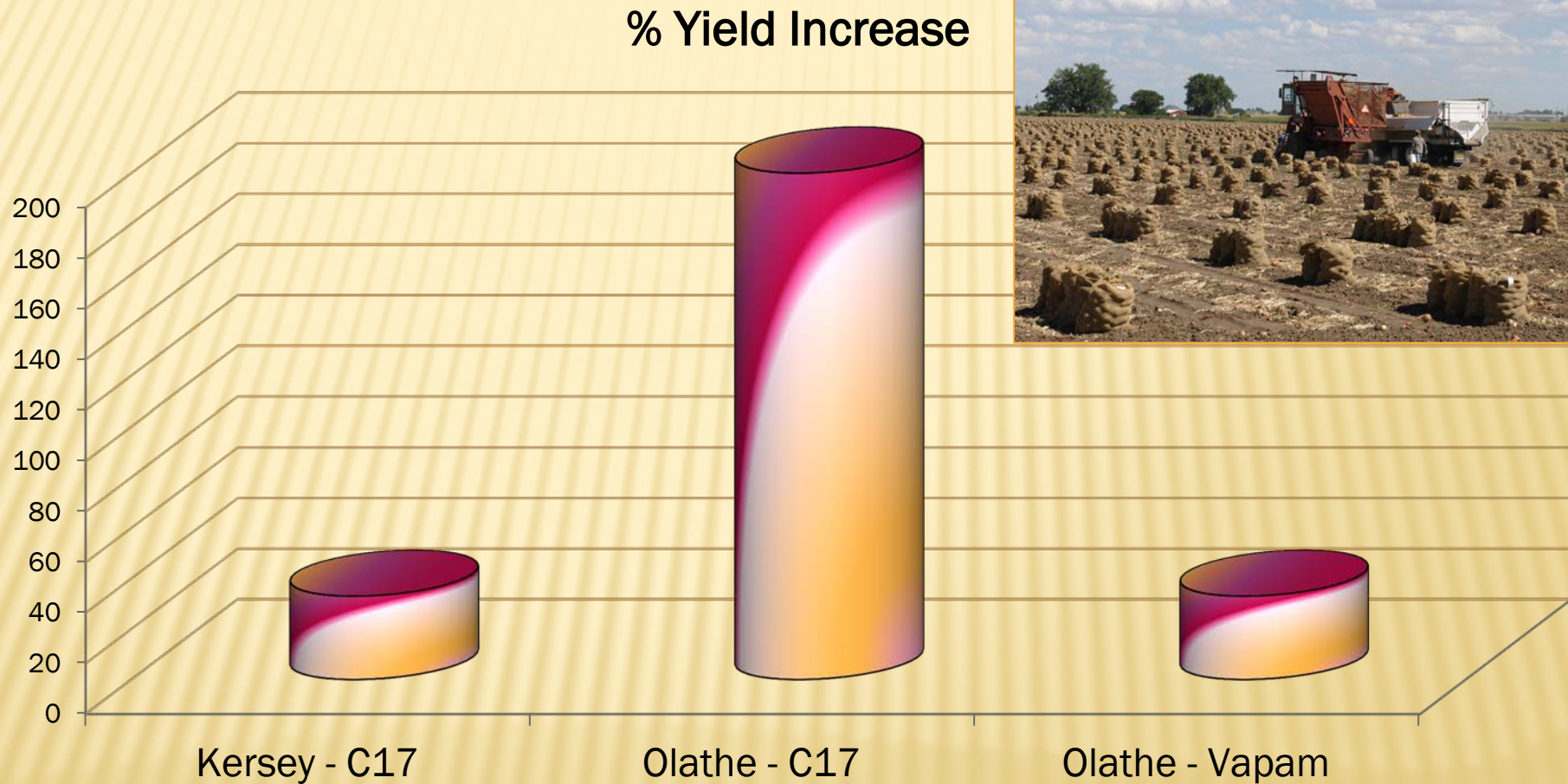
1984-85 at Olathe & Kersey, CO / [Schwartz 1986 F & N Tests 41:57]

% Fusarium (& PR) Reduction



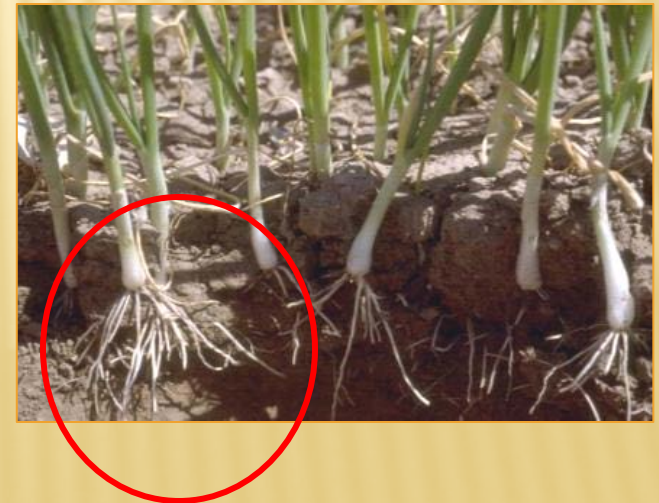
FUMIGATION EFFECT – % IMPROVEMENT OVER CONTROL

1984-85 at Olathe & Kersey, CO / [Schwartz 1986 F & N Tests 41:57]



Fumigation Cost = \$350/A; Net Return @ \$10/cwt = \$2850 for C17 & \$170 for Vapam at Olathe

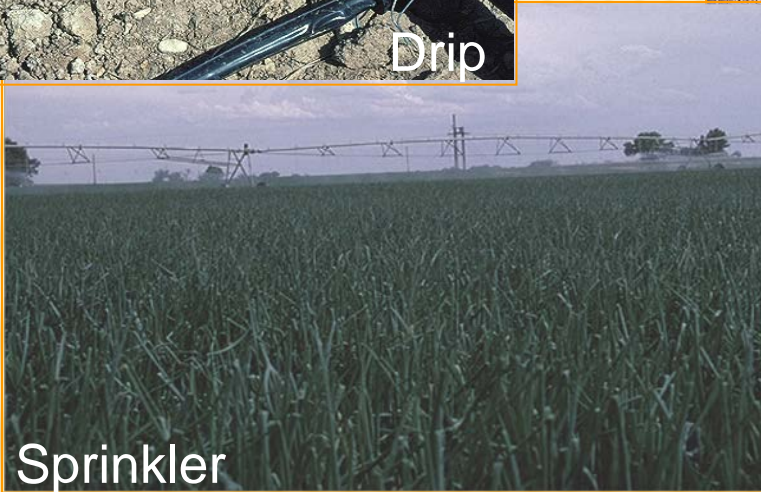
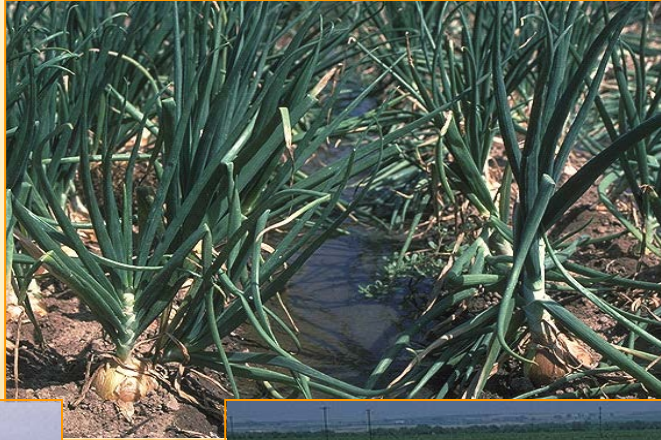
Cultivation – minimize wounds, compaction



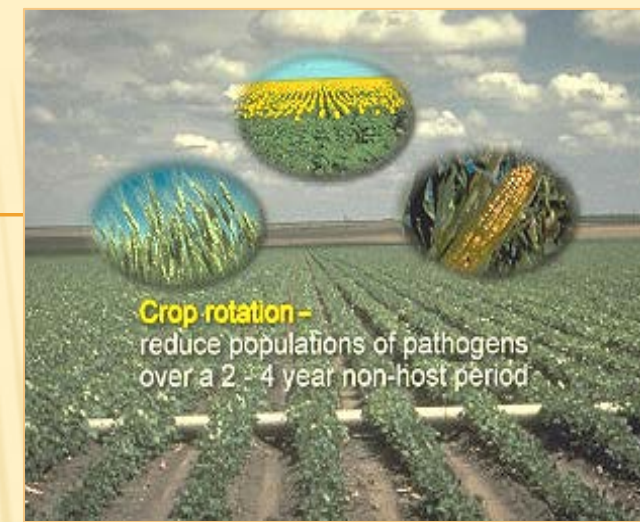
Fertilizing – moderate & balanced



Irrigating – avoid extremes



SOILBORNE DISEASE MANAGEMENT



Disease Management:

- rotate with non-susceptible crops for > 4 years
- plant Fusarium / Pink Root resistant varieties
- use moderate fertility + irrigation scheduling
- avoid root pruning and other stresses (salinity, herbicide damage, compaction)
- store cured bulbs at low temperature

ONION DISEASE MANAGEMENT

STORM DAMAGE



Onion ipmPIPE
Diagnostic Pocket Series



Storm Damaged Onions

Allium cepa L.



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

Bulb Growth Stages of Onion
Allium cepa L.



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6



FIGURE 7



FIGURE 8



Foliage Recovery



New Leaf Emergence



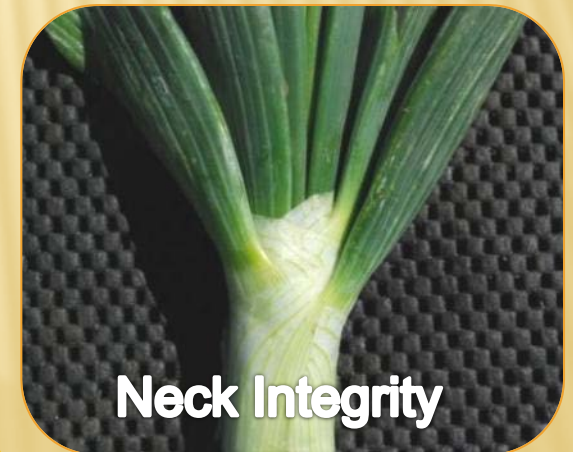
Leaf Integrity



Varietal Response



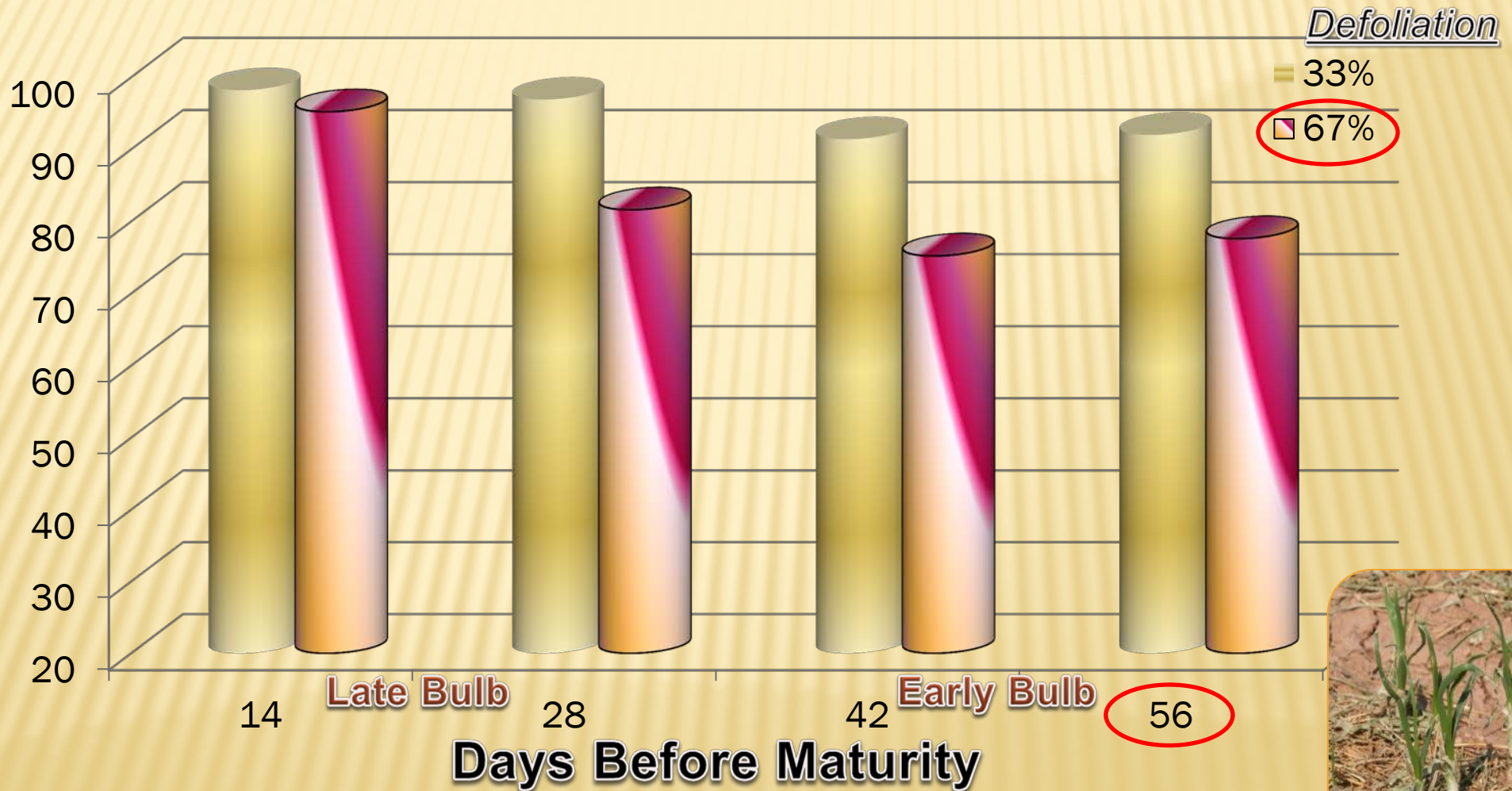
Disease



Neck Integrity

MARKETABLE YIELD - % OF UNDAMAGED CONTROL

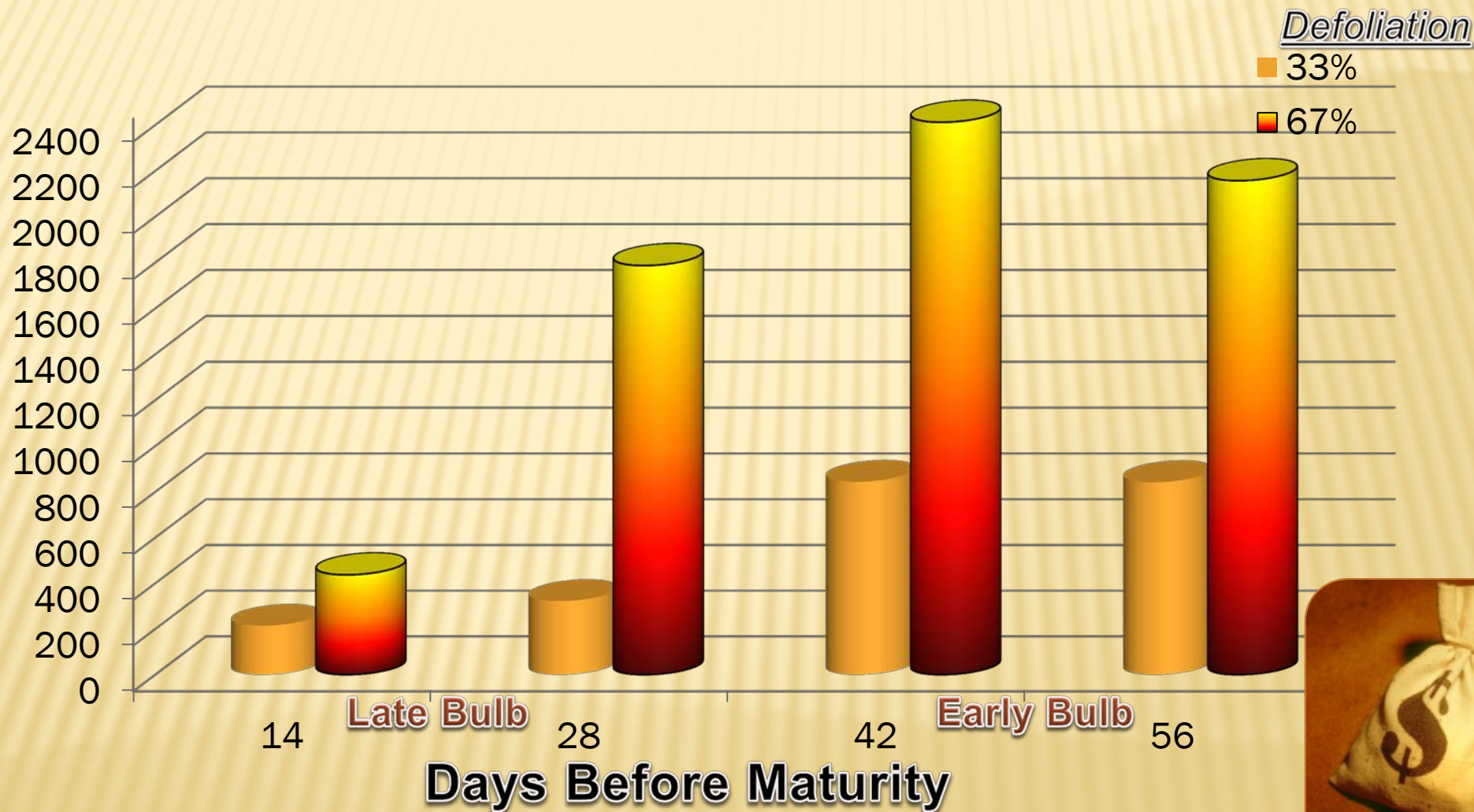
1991-92 at Rocky Ford, CO / [Bartolo et al. 1994 HortScience 29:1465-1467]



DOLLAR LOSS PER ACRE

(\$260 / MT - JUMBO & \$220 / MT - MEDIUM)

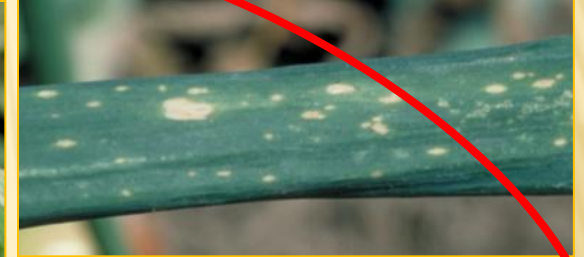
1991-92 at Rocky Ford, CO [Bartolo et al. 1994 HortScience 29:1465-1467]



Monitor Pests and Diseases in Relation to Crop Growth Stages

Priority 2 - Other Diseases & Pests

Fungal



Bacterial

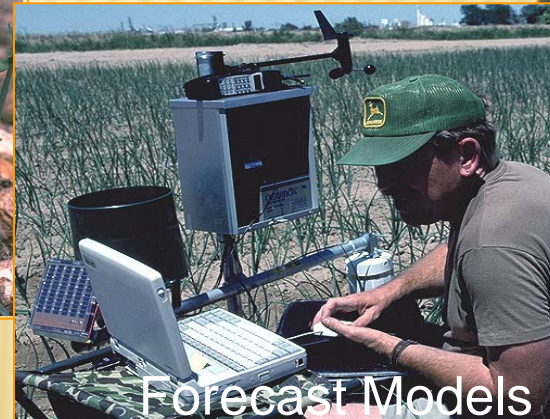
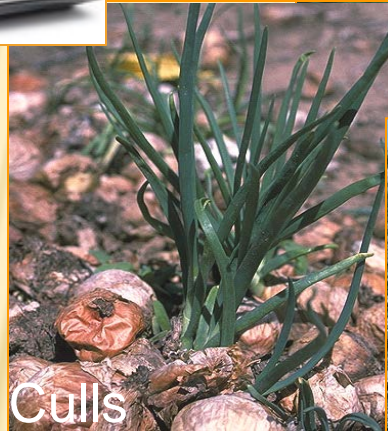


Insects

Post-Harvest



IPM Components



Pesticides – timely if needed



Herbicide
Insecticide
Fungicide
Bactericide



Aerial



Ground Rig



Chemigation

Onion Pesticide Summary

DRY BULB ONION PLANT DISEASE - Foliar Pesticide Options in Colorado

Pesticide	PHI	Bacterial/Viral Complex	Downy Mildew	Purple Blotch	Botrytis (Neck rot/blast)
Actigard (Acibenzolar)	7	Xanth/YYSV	Suppression	NO	NO
Acrobat (Dimethomorph)	1	NO	YES	NO	NO
Agri-Fos (Phosphorous Acid)	1	NO	YES	NO	NO
Aliette (Fosetyl-A)	7	NO	YES	NO	NO
Cabrio (Pyraclostrobin)	7	NO	YES	YES	NO
Chlorothalonil	7	NO	Suppression	YES	YES
Copper-based Bactericides ²	1	YES	Suppression	Suppression	NO
EBDCs ³	7	NO	YES	YES	YES
Endura (Boscalid)	7	NO	NO	YES	YES
Folicur (Tebuconazole)	7	NO	NO	YES	NO
Fontelis (Penthiopyrad)	3	NO	NO	YES	YES
Forum (Dimethomorph)	1	NO	YES	NO	NO
Iprodione ⁴ (Dicarboximide)	7	NO	NO	YES	YES
Pristine (Cabrio + Endura)	7	NO	Suppression	YES	YES
Quadris (Azoxystrobin)	1	NO	Suppression	YES	NO
Quilt (Propiconazole + Azoxystrobin)	14	NO	NO	YES	Suppression
Reason (Fenamidone)	7	NO	YES	YES	NO
Revus (Mandipropamid)	7	NO	YES	NO	NO
Ridomil Mix (Metalaxyl) ⁵	7	YES (+ copper)	YES (+ EBDC or Bravo)	YES (+ EBDC or Bravo)	YES (+ EBDC or Bravo)
Scala (Pyrimethanil)	7	NO	NO	YES	YES
Switch (Cyprodinil)	7	NO	NO	YES	YES
Tanos (Famoxadone + Cymoxanil)	3	NO	YES	YES	NO
Tilt / Propimax (Propiconazole)	14	NO	NO	YES	Suppression
Vanguard (Cyprodinil)	14	NO	NO	YES	Suppression

Updated pesticide information is available at: wiki.bugwood.org/HPIPM:Onion

Pesticide Options:

Actigard

Biopesticides

Cabrio

Chlorothalonils

Coppers (bacterial diseases)



EBDCs

Endura

Forum

Quadris

Quilt

Pristine

Reason

Ridomil Gold

Rovral

Scala

Switch

Tanos

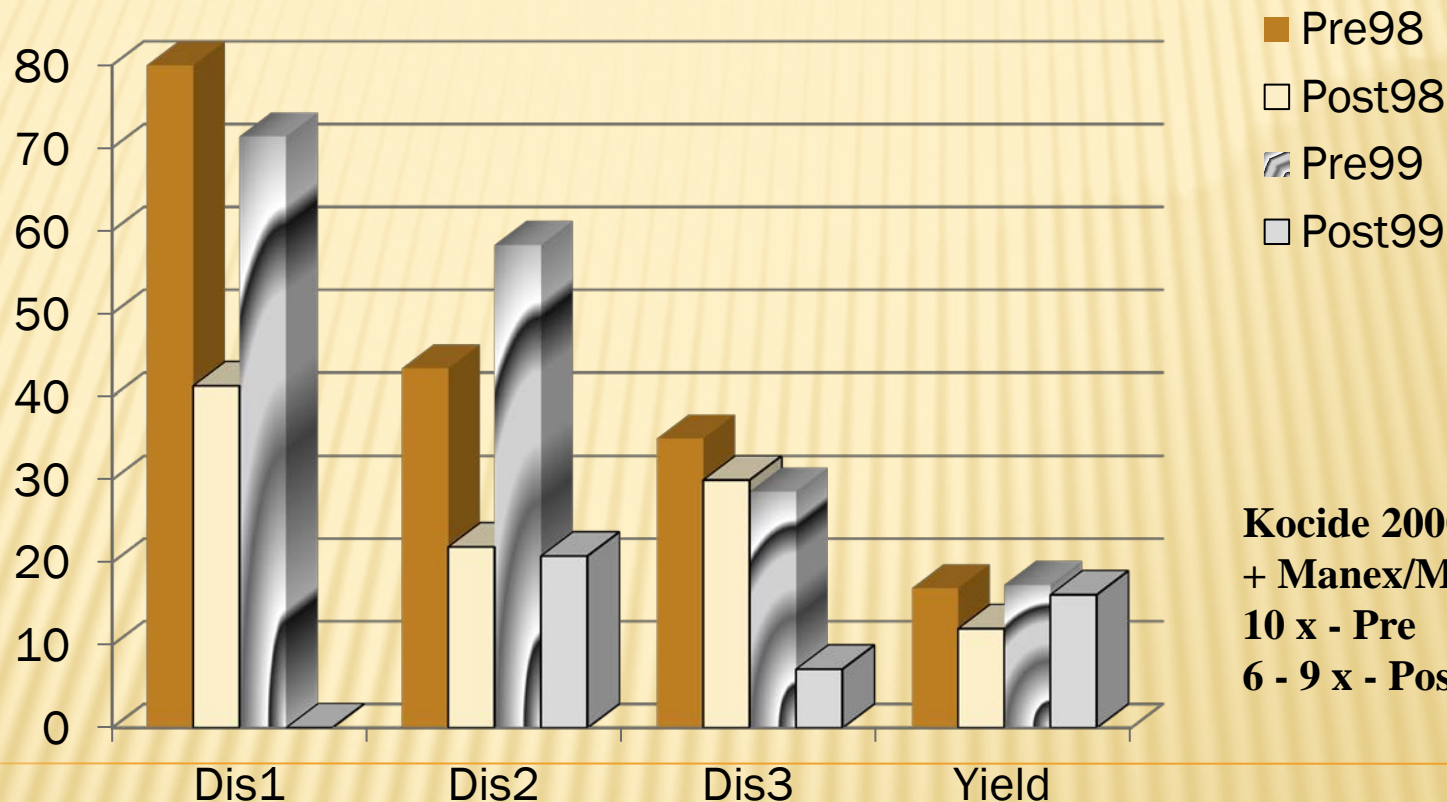
Etc. – check local & federal labels

ONION BACTERIAL DISEASES

DISEASE MANAGEMENT



Colorado State University, 1998/99



**Kocide 2000
+ Manex/Maneb:
10 x - Pre
6 - 9 x - Post**

----- % Disease Reduction -----

% Increase

[Untreated check: disease intensity = ratings during August to September, yield estimate taken mid September; Xanthomonas Leaf Blight + Pantoea Blight]

ONION DISEASE MANAGEMENT

RELATED TO STORM DAMAGE

- **Contaminated plant material, soil, water**
- **Timing/severity of damage – wind, rain, hail**
- **Mechanical wounds – storm, insects, cultivation**
- **Irrigation - runoff, excess, center pivot**
- **Over-fertility, especially post-bulb & post-damage**
- **Moderate to high temperatures (> 86°F)**
- **Topping, curing, storage practices**

Monitor Pests and Diseases in Relation to Crop Growth Stages

Priority 1 - IYSV & Thrips



IYSV-infected Onion Volunteers

Role & Source of Onion Thrips?



Symptomatic volunteers observed in field corn, alfalfa, carrot, fallow, winter wheat, and dry bean rotational crops

TRANSPLANT SEEDLING INFECTION

- ✘ During 2004 - 2007, transplants from southwestern states arrived with contamination before they were planted in Colorado fields:
 - + >50% of the sources were IYSV positive (0.4 to 5.0%)
 - + 18% (2004), 91% (2005) and 100% (2006 & 2007) carried thrips (up to 1 thrips per seedling/bundle); many were *Thrips tabaci*, *Frankliniella occidentalis*, *F. ewarti*, *F. schultzei*
 - + [L. Mahaffey & W. Cranshaw, entomologists]
- ✘ IYSV incidence varies among cultivars from a source
 - + Red market class cultivars were infected most often



ROLE OF WEED HOSTS?

Surveys in 2004 - 2007 of common weed species in and around onion fields with a history of IYSV in Colorado detected a variable incidence of the virus in asymptomatic plants of:

redroot pigweed (2%), Kochia (3%), common purslane (0-88%), flixweed (6%), sow thistle (100%), gray rabbit brush (56%), Buckhorn plantain (86%), red stem filaree (23%)



Variety Trials in CO (2003-05) & WA (2004-05):

Subset of 17 **yellow entries** common to the 3 tests with moderate to severe IYSV outbreaks:

- 8 yellow entries had **green leaf** color with
 - >10% lower incidence of IYSV
 - and 33% higher marketable yield
- than 9 yellow entries with **blue-green leaves**





BUGWOOD Wiki
wiki.bugwood.org

- Main Page
- Community portal
- Current projects
- Recent changes
- Help
- Projects
 - Legume and Onion PIPE
 - High Plains IPM Guide
 - Northern Plains IPM Guide
 - IPED Pest Protocol
 - First Detector
 - Entomology
 - NPDN First Detector Materials
 - Diagnostician's Cookbook
 - Invasipedia
- Participation
- Other Bugwood Resources
- Export Current Page
- Toolbox

Onion ipmPIPE

Onion



Integrated Pest Management - Pest Information Platform for Extension and Education



The Onion ipmPIPE Project is national team of onion experts, growers and industry representatives that created this unique resource to enhance the production, pest management, storage, and marketing of this vital food product for the consuming public in the United States and internationally. This multi-year project is funded in part by the USDA's Specialty Crop Research Initiative established by the 2008 Farm Bill, and has been endorsed by state and national onion organizations throughout all major onion-producing regions of the country. The project integrates field data input, weather resources, crop planning models, marketing information, image galleries, and wiki pages in relation to onion pathogens, insect pests and crop production.



Contents [hide]

- 1 Factsheets
 - 1.1 Rust Diseases
 - 1.2 Other Fungal Diseases
 - 1.3 Bacterial diseases
 - 1.4 Virus diseases
 - 1.5 Insect pests and vectors
 - 1.6 Other Damage Agents
- 2 Other Resources

Factsheets

Rust Diseases

- Rust

Other Fungal Diseases

Allium Net



NEWS

[Onion ipmPIPE: A Coordinated Effort to Improve the Management of Onion Thrips](#)

[Robert Sakata Wins Grower Achievement Award](#)



W2008 UPDATES

[Multi State Research Project](#)



SCRI PROJECTS

[IYSV and Thrips Tolerance](#)

[Post Harvest Handling](#)

[Onion ipmPIPE and Diagnostic Tools](#)



RESOURCES

[Student Post Doc Directory](#)

[Onion Researcher Directory](#)

[Links](#)



NARC

[Home Page](#)



Thank you

Colorado
State
University