

Effect of Botector® on Fruit Diseases

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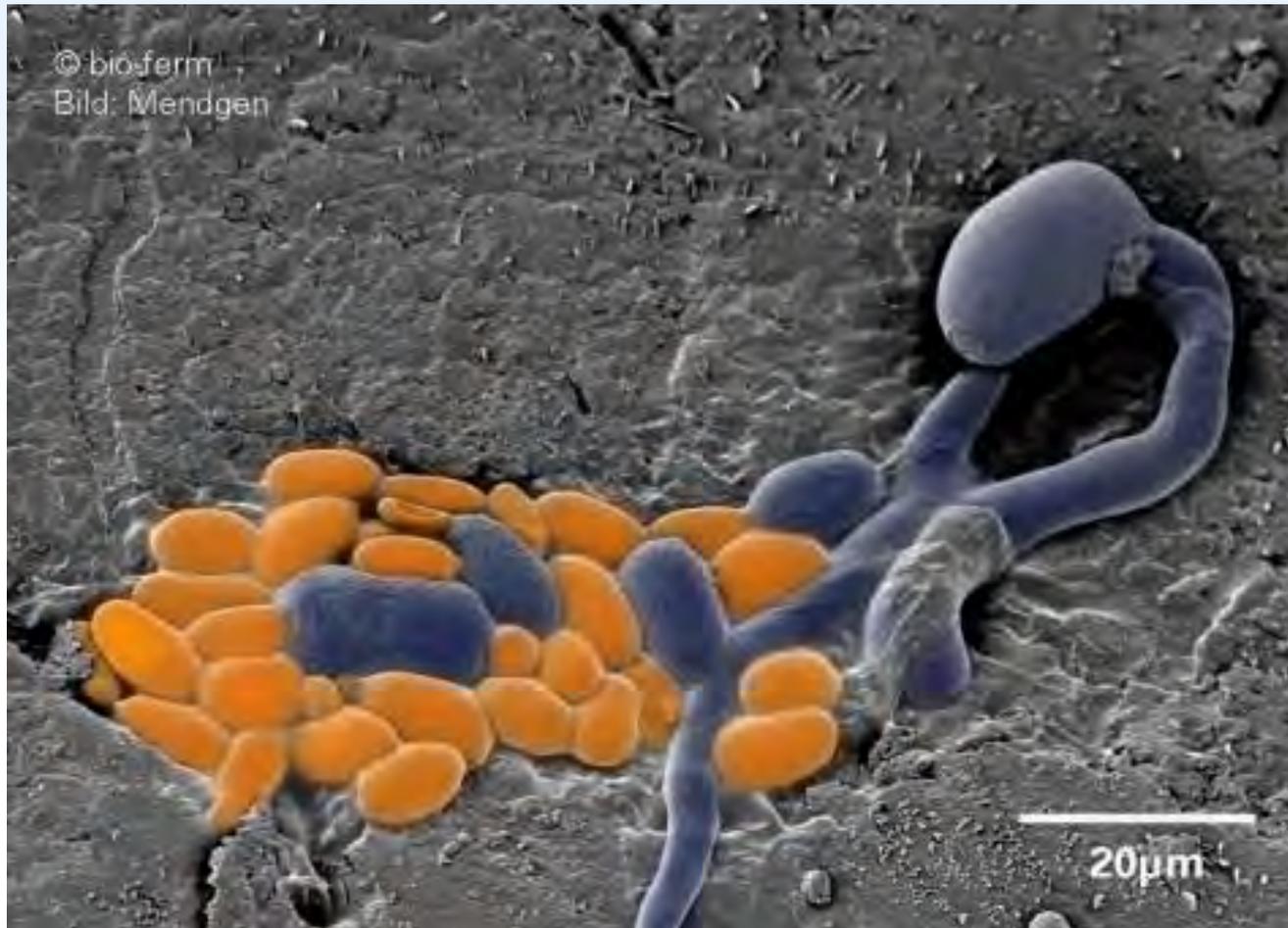
What is Botector®?

- Manufactured by



- Yeast –like organism (fungus)
 - Two strains of *Aureobasidium pullulans*
 - DSM 14940 and DSM 14941
- Mode of Action (MoA) is competitive exclusion
 - Competes for **nutrients** and **real estate**
 - Labeled for control of botrytis, brown rot, anthracnose, and blossom blight on stone fruit, strawberries, berries, and grapes
 - Labeled for control of post-harvest diseases on pome fruit when applied pre-harvest
 - Activity is mostly against fungi

Fruit Colonization by *Aureobasidium pullulans*



Botector[®] Labeled Crops and Diseases

Crop	Disease	Rate oz/acre	Application
GRAPE: American bunch grapes (Table Grapes, Wine Grapes and Raisin Grapes), Muscadine grape and Vinifera grape, Raisin	<i>Botrytis</i>	5-10	1-8 applications
BERRIES: Strawberry, Raspberry, Blueberry, Blackberry, Huckleberry, Red and Black currant, Loganberry	<i>Botrytis</i>	5-10	As needed at 5-7 day intervals
STONE FRUIT: Apricot, Cherry (including sweet and tart), Nectarine, Peach, Plum (including Chickasaw, Damson and Japanese), Plumcot, Prune (fresh), Almond	Blossom Blight Brown Rot	10	1-10 applications
POME FRUIT: Apple, Crabapple, Loquat, Mayhaw, Pear, Oriental pear, Quince	Storage Diseases	10	1-6 applications

Botector® Application Restrictions

- Zero hour PHI (Pre-Harvest Interval)
 - Can be applied up to day of harvest
- Four (4) hour REI (Re-entry Interval)
 - Unless PPE is used (coveralls, chemical resistant gloves, shoes and socks)
- 25 foot buffer around lakes, streams, and other groundwater areas

Botector®

Copper and Sulfur Compatibilities

Active Compound	Compatibility
Copper hydroxide	Yes
Copper sulfate	Yes
Bordeaux mix	Maybe (probably a function of composition)
Copper oxychloride	Yes
Copper chloride	Yes
Copper soap	No
Sulfur, elemental	No

- There are some inconsistencies in these, it often depends on the formulation inerts
- Bordeaux mix has lime at variable levels and therefore different compatibility results

Botector®

Compatible Fungicides/Antibiotics

Fungicide	Commodity	Diseases
Vangard WG	Pome, berries, grapes, caneberries, strawberries	Scab, powdery mildew, and others
Elite 45 DF	Pome, grape, stone fruit	Scab, rust, powdery mildew, others
Scala 400 SC	Pome, stone fruit, grape	Scab, and others
Luna Privilege	Apple, cherry, strawberry, wine grapes	Scab, powdery mildew., and others
Quintec	Grape, cherry, stone fruit, strawberry	Powdery mildew only

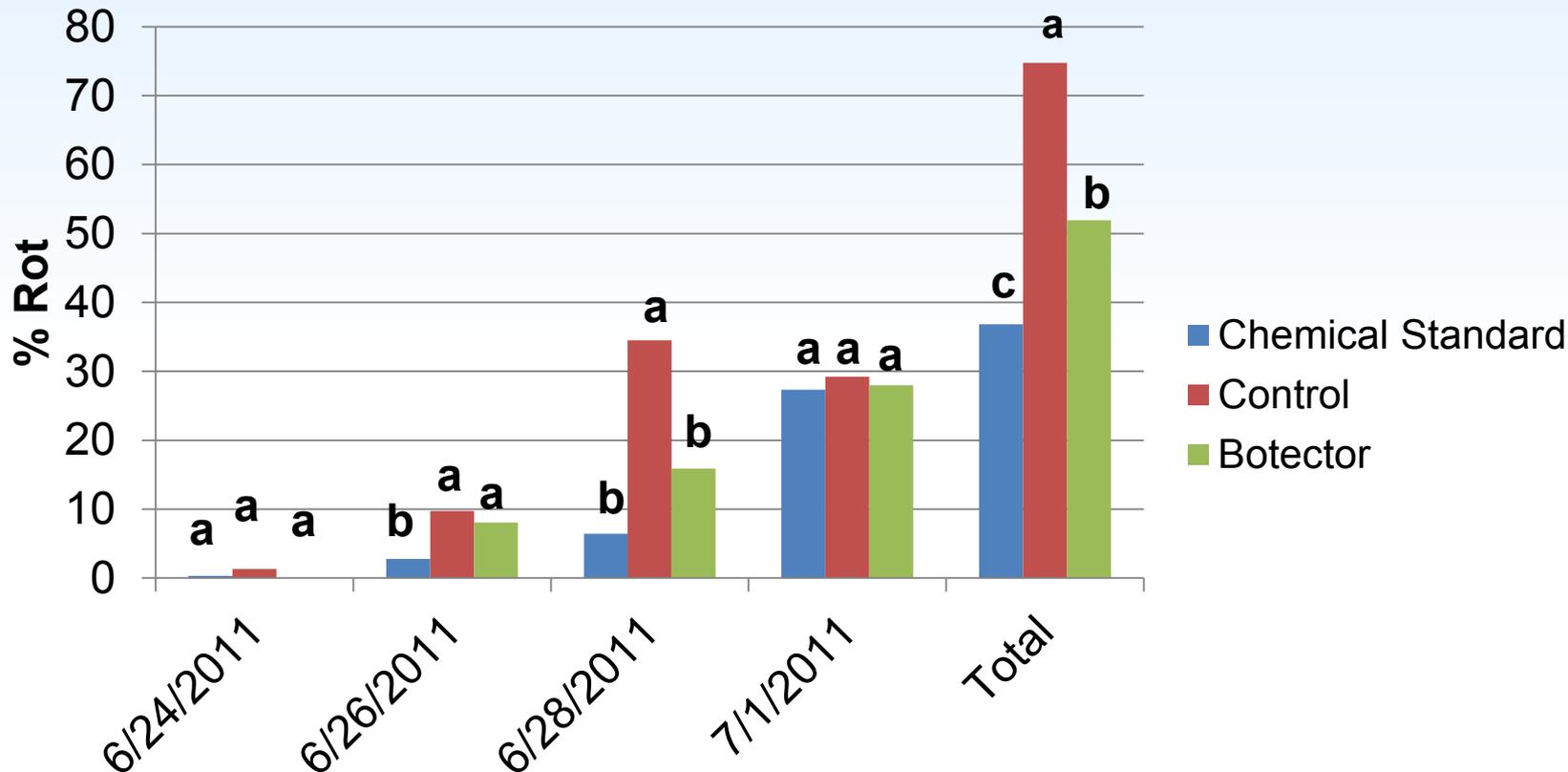
- Inclusion in this list does not imply endorsement of the product
- It is better, if at all possible, to apply any fungicide sequentially
- Do not assume other biological products are compatible, many are not



STRAWBERRY TRIALS

Effect of Botector® on Botrytis Fruit Rot on Strawberries

Hillsboro, OR, 2011



Botector® was applied on 5/18, 5/24, 5/30, 6/6, 6/13, and 6/20 at a rate of 14oz/Acre per application. Rain events occurred on 5/21, 5/25, 5/30, 6/13, 6/18.

Effect of Botector® on Botrytis Fruit Rot on Strawberries

Hillsboro, OR, 2011



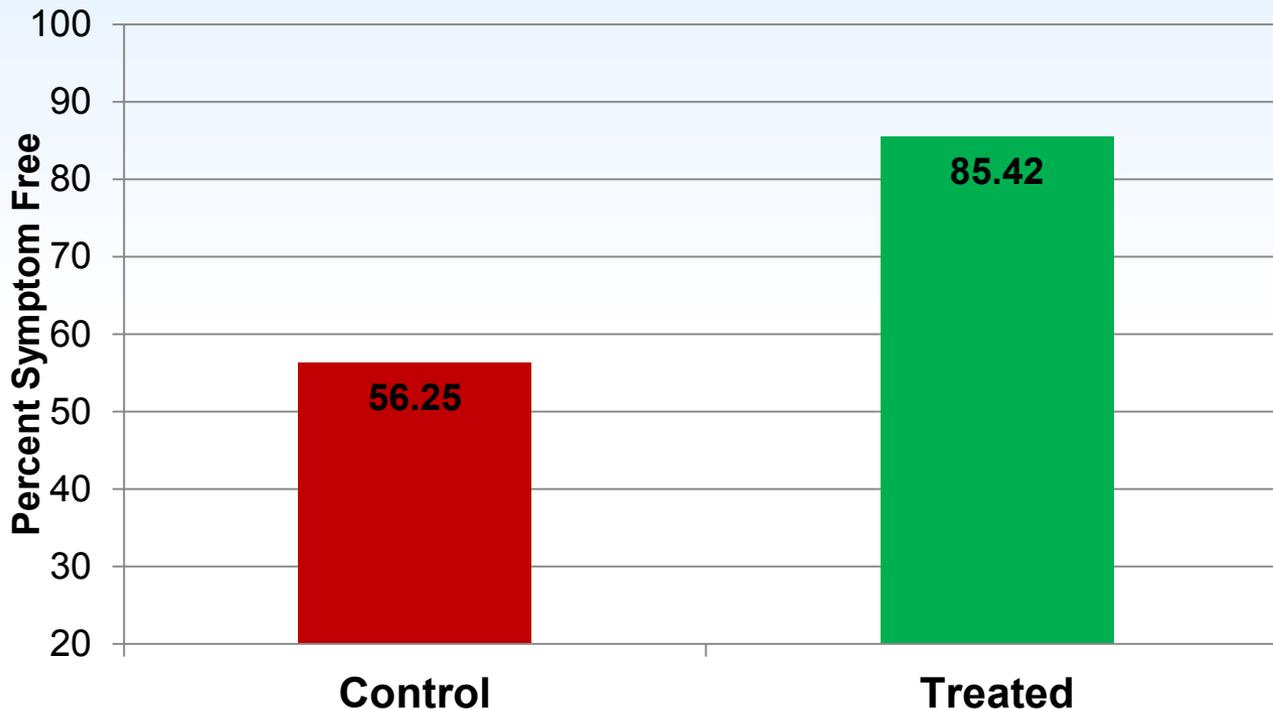
Control



Botector®

Botector® for the Control of Botrytis and Rhizopus in Strawberries var. Camarosa

Trial at Commercial Organic Farm, San Diego County, CA, 2013



- Applications of 6 oz/Acre at 2/28, 3/7, 3/14, 3/22, and 3/28
- Harvested on 4/11 and held at >70 F and 100% RH for 3 days

Botector® on Camarosa Strawberries Post 3 Days @ 70° F and 100% RH



Control (Untreated)



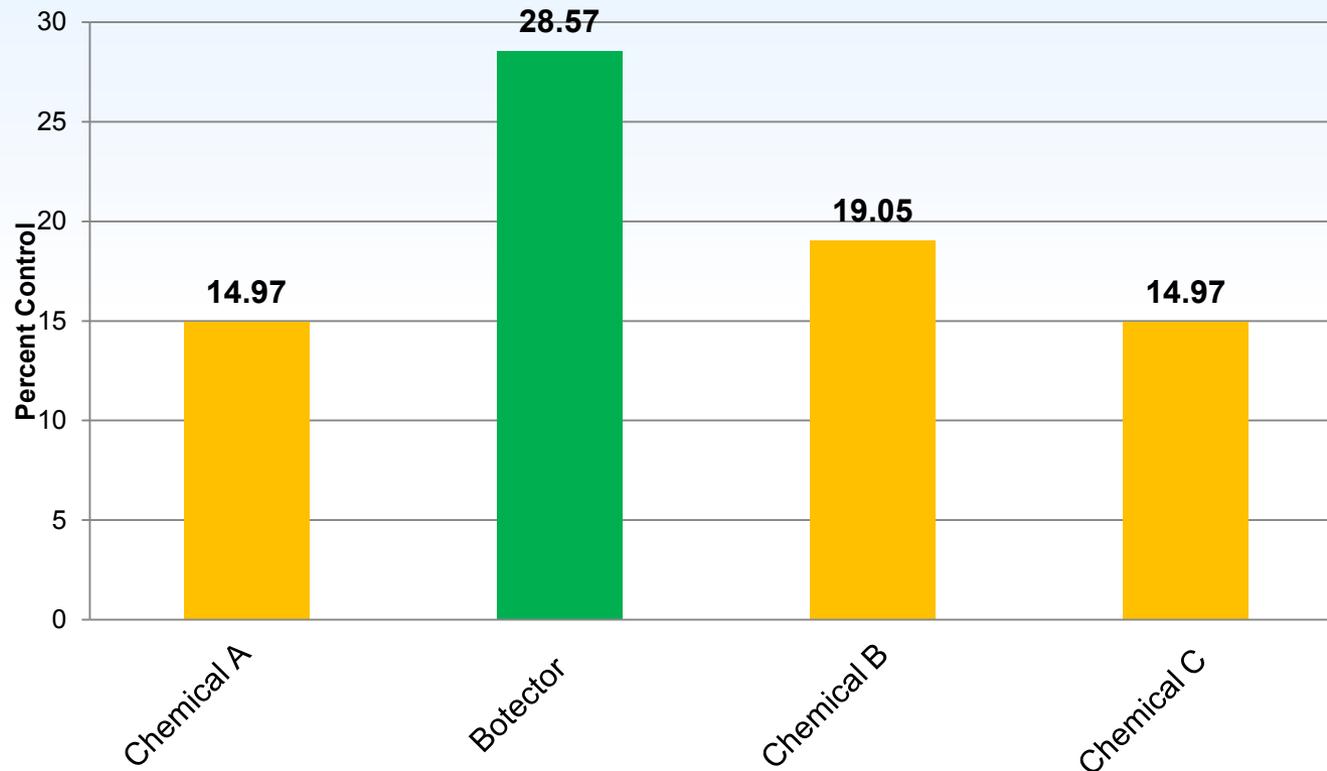
Botector® Treated

- Commercial Organic Farm, CA, 2013
- Botector® applications of 6 oz/Acre at 2/28, 3/7, 3/14, 3/22, and 3/28
- Harvested on 4/11 and held at >70 F and 100% RH for 3 days

Botector®

Botrytis Control on Strawberry

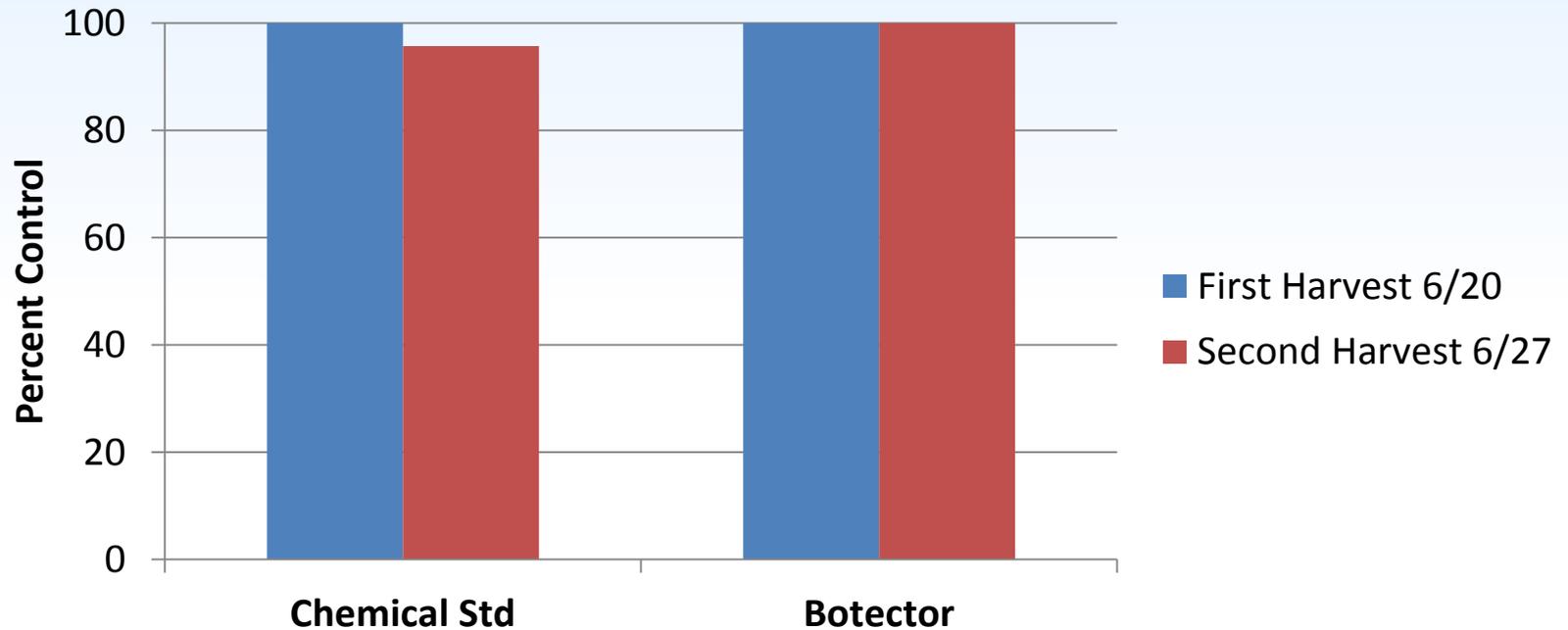
University Trial, CA 2012



Spray Schedule: 6/8, 6/22, 7/6, and 7/20;
GPA:150;PSI: 120

Botector® on Strawberry Control of Anthracnose Fruit Rot

University Trial, MI, 2011



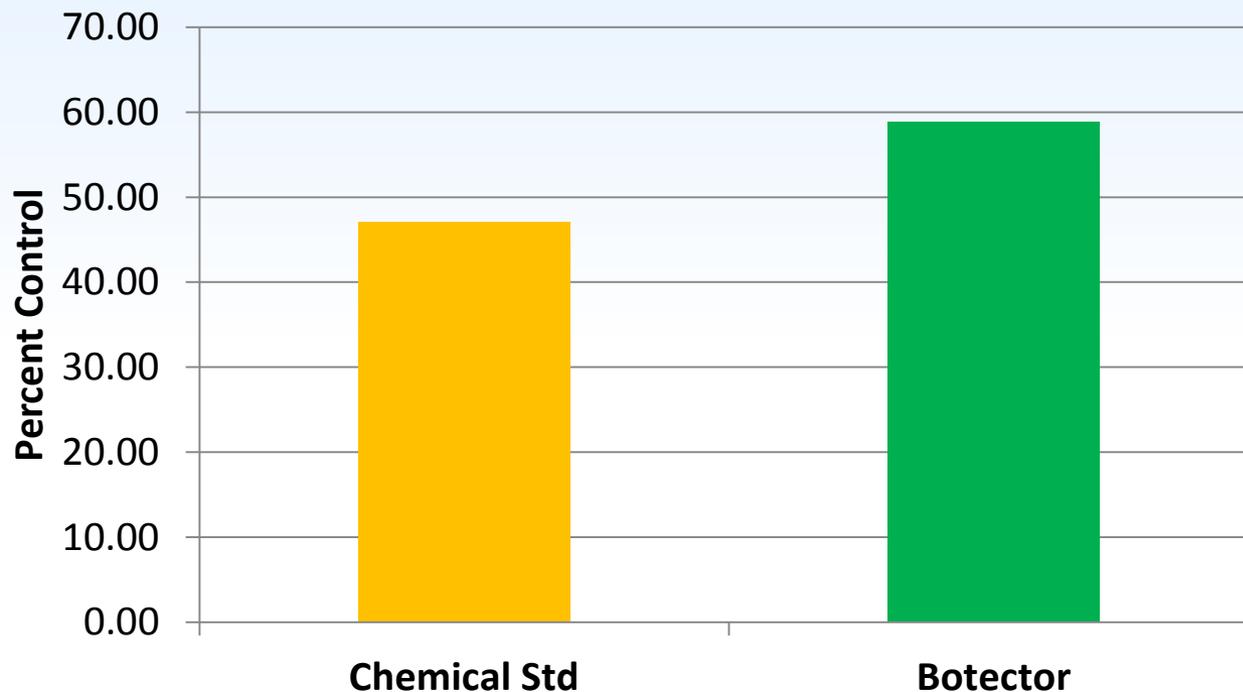
Spray Schedule: Bloom (5/27), Bloom-Small Green Fruit (6/4), Green Fruit (6/10),
2 d pre-harvest 1 (6/18), 2 d pre-harvest 2 (6/25). Evaluated after 6 days @ 72 F and 100% RH.

Chemical Standard: Captec 4L, Topsin M, and Kocide 3000-Apps. 1, 2;

Cabrio EG-App 3; Switch 62.5-Apps. 4,5

Botector® on Strawberry Reduction of Phomopsis Leaf Blight

University Trial, MI, 2011

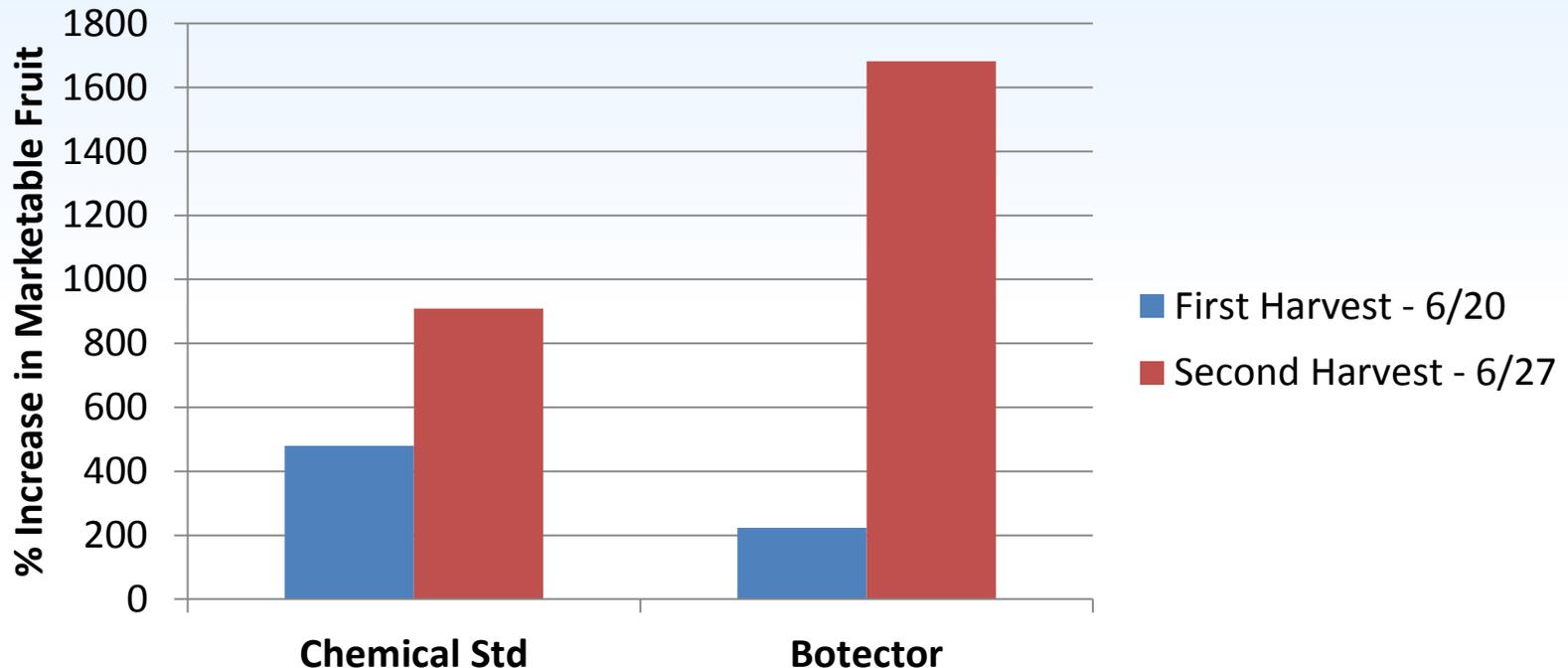


Spray Schedule: Bloom (5/27), Bloom-Small Green Fruit (6/4), Green Fruit (6/10),
2 d pre-harvest 1 (6/18), 2 d pre-harvest 2 (6/25). Evaluated after 6 days @ 72 F and 100% RH.

Chemical Standard: Captec 4L, Topsin M, and Kocide 3000-Apps. 1, 2; Cabrio EG-App 3; Switch
62.5-Apps. 4,5.

Botector® on Strawberry var. Jewel Increases Marketable Fruit

University Trial, MI, 2011



Spray Schedule: Bloom (5/27), Bloom-Small Green Fruit (6/4), Green Fruit (6/10), 2 d pre-harvest 1 (6/18), 2 d pre-harvest 2 (6/25). Evaluated after 6 days @ 72 F and 100% RH

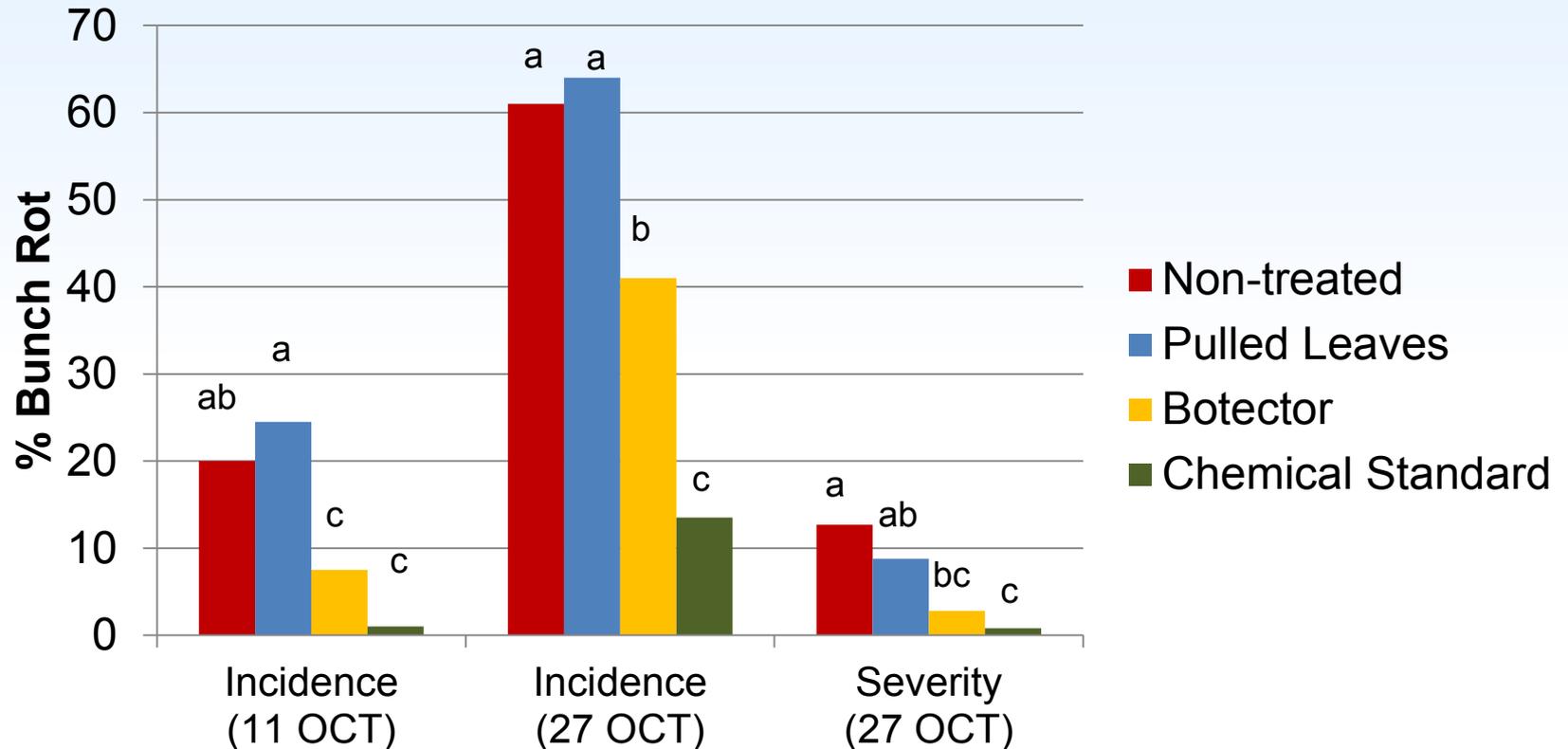
Chemical Standard: Captec 4L, Topsin M, and Kocide 3000-Apps. 1, 2; Cabrio EG-App 3; Switch 62.5-Apps. 4,5.



GRAPE TRIALS

Botector® on Botrytis Cluster Rot in Wine Grapes

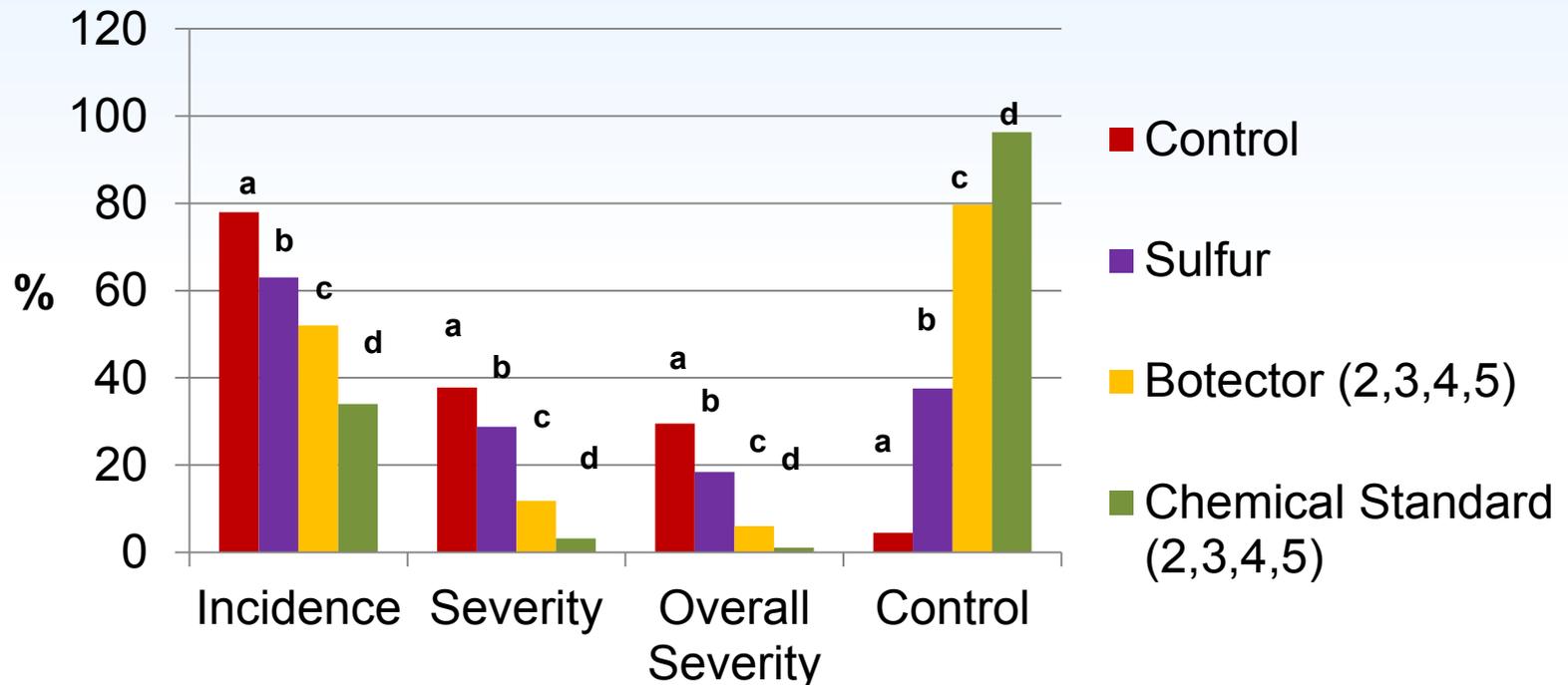
University Trial, Oregon, 2011



Botector® was applied 5 times at Bloom (14 Jul), Bunch Close (4 Aug), Veraison (15 Sep), Pre-harvest (29 Sep) and Pre-harvest (13 Oct). Chemical Standard was 4 applications

Effect of Botector® on Botrytis Cluster Rot in Wine Grapes

Michigan State University, 2011

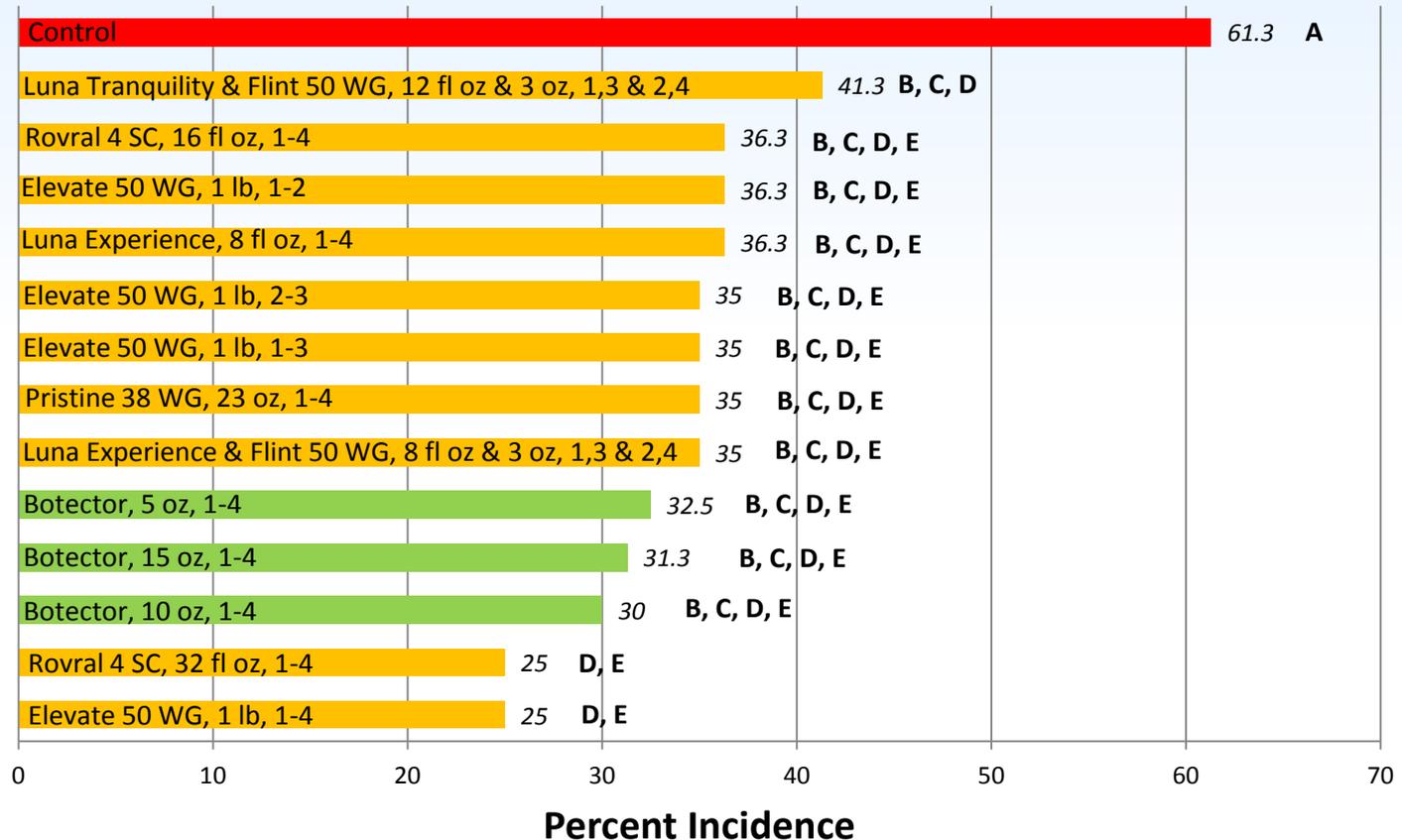


Spray dates: 1 = 9 May (dormant), 2 = 14 Jun (bloom), 3 = 29 Jun (pea-sized clusters), 4 = 18 Jul (bunch closure), 5 = 8 Aug (veraison).

Botector® on Wine Grapes

University Trial, New York, 2012

Botrytis on Vignoles Wine Grape

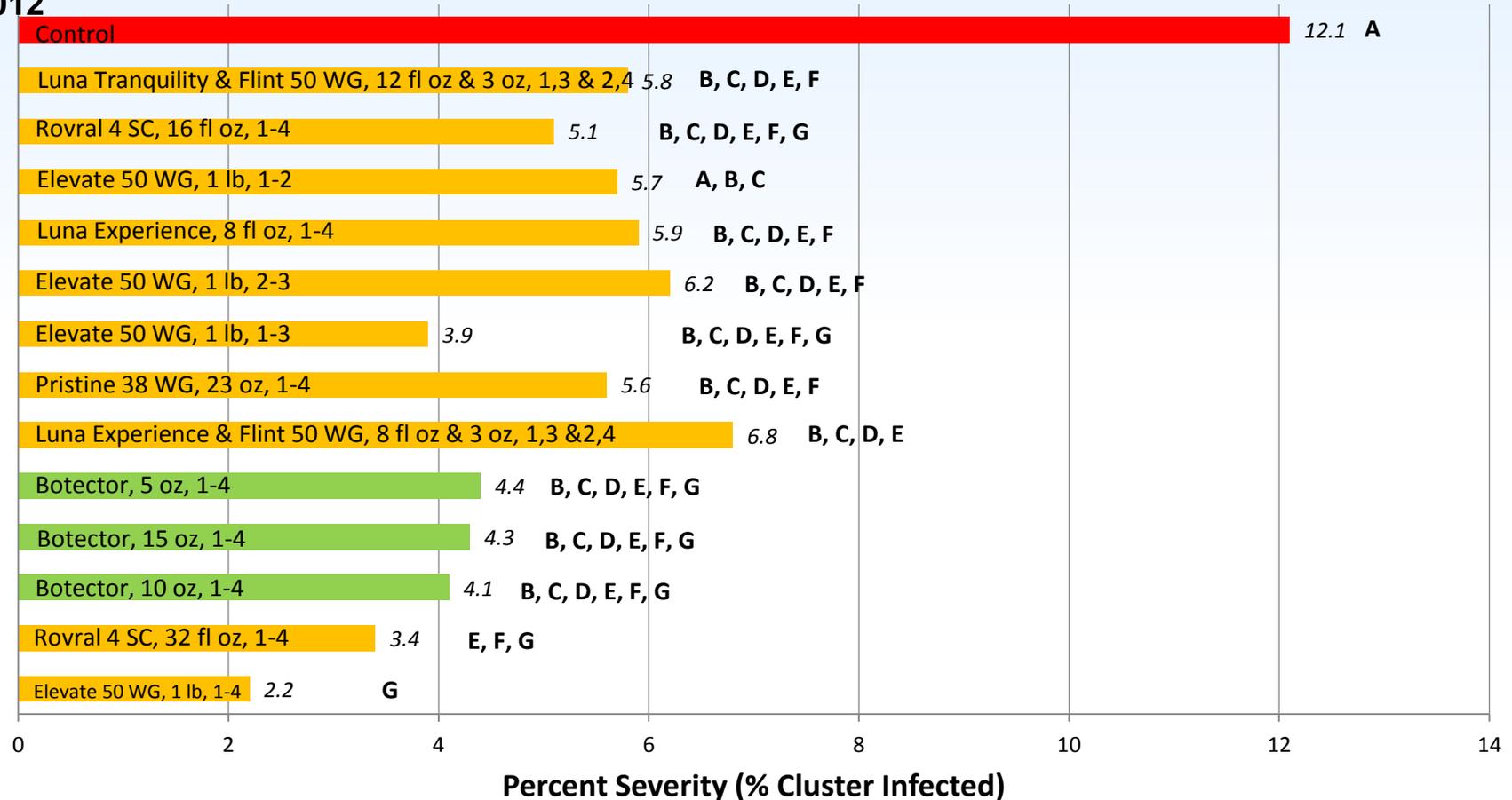


Timing 1: Late Bloom; 2: Bunch Closure; 3: Veraison; 4: + 2 Weeks
 App 1 @ 50 GPA, Apps 2-4 @ 100 GPA

Botector® on Wine Grapes

University Trial, New York,
2012

Botrytis on Vignoles Wine Grape

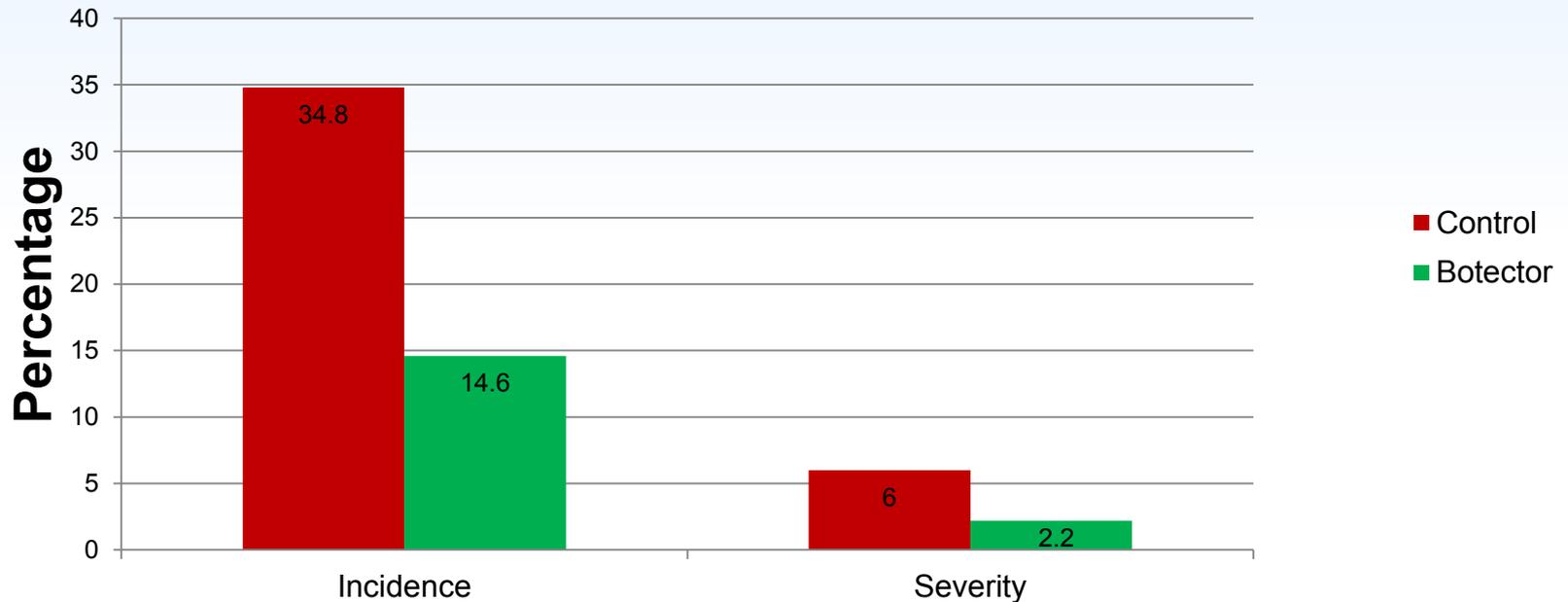


Timing 1: Late Bloom; 2: Bunch Closure; 3: Veraison; 4: + 2 Weeks

App 1 @ 50 GPA, Apps 2-4 @ 100 GPA

Botector® for Botrytis Control Fiesta Raisin Grapes

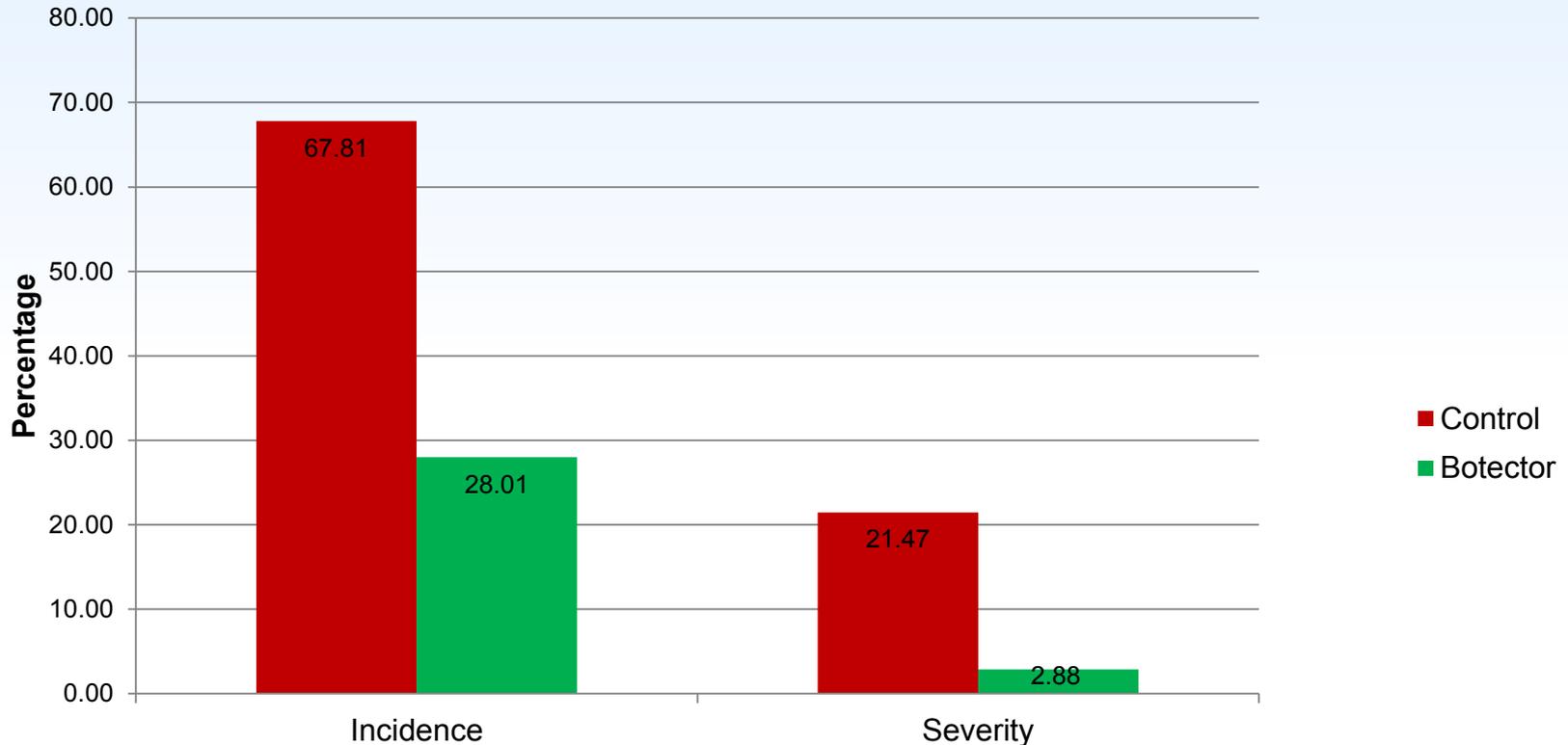
Fresno, CA Grower Trial, 2013



- Three Botector® applications between 80% cap fall and berry softening
- Percent incidence is the percent clusters with *any* disease, >99% confidence of statistical significance
- Percent severity is percent clusters with 50% or more of the cluster affected
- Evaluation date: **July 17, 2013**

Botector® for Botrytis Control Fiesta Raisin Grapes

Fresno, CA Grower Trial, 2013

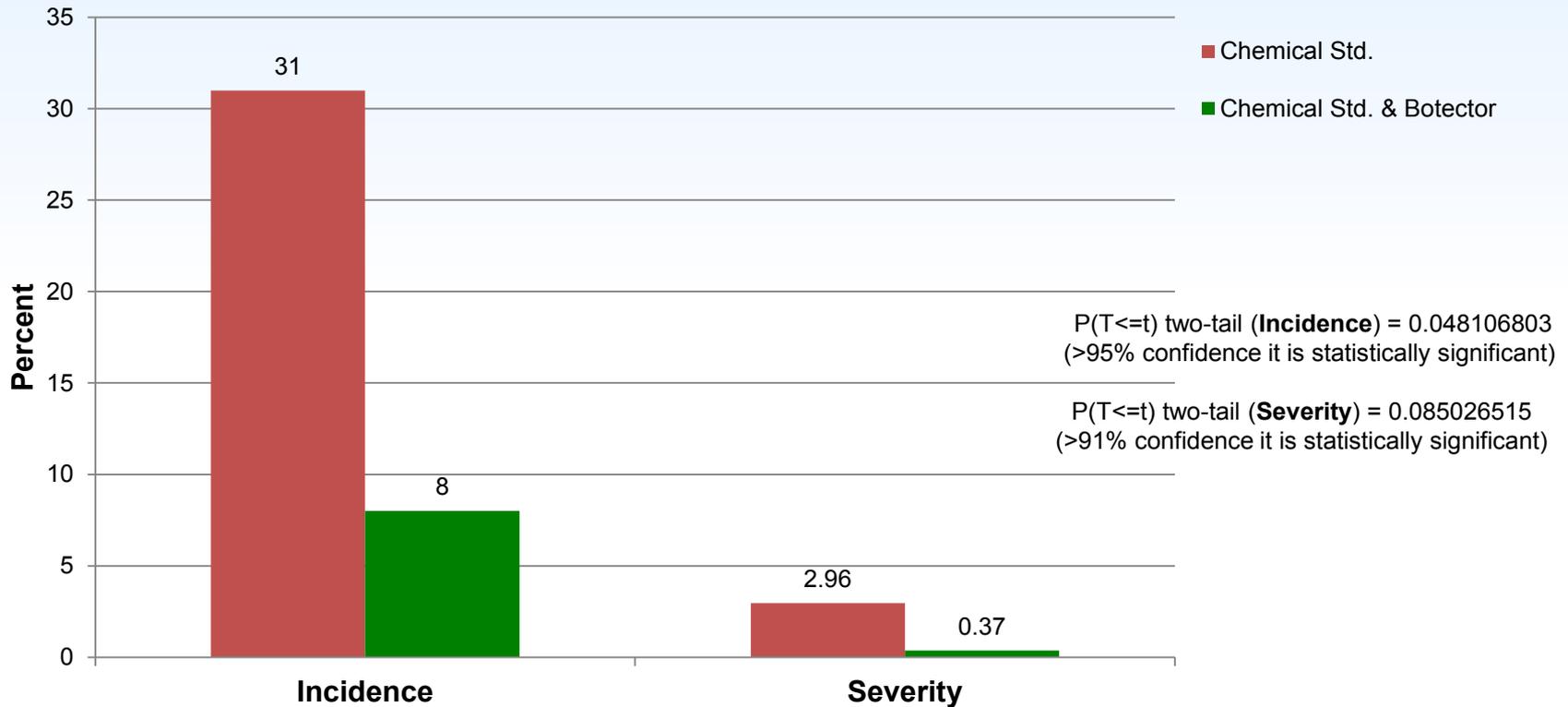


- Three Botector® applications between 80% cap fall and berry softening
- Percent incidence is the percent clusters with *any* disease, >99% confidence of statistical significance
- Percent severity is average percent of cluster with symptoms
- Evaluation date: **September 11, 2013**

Botector[®] for Botrytis Control

Commercial Trial, Fredonia, NY, 2013

Reisling Grapes



- Botector applied at 10 oz/acre 3 days after respective conventional application
- Application Timings: 80% cap fall, pre-bunch closure, veraison, and ripening

Botector® Control of Botrytis in 'Fiesta' Raisin Grapes



Control



Treated

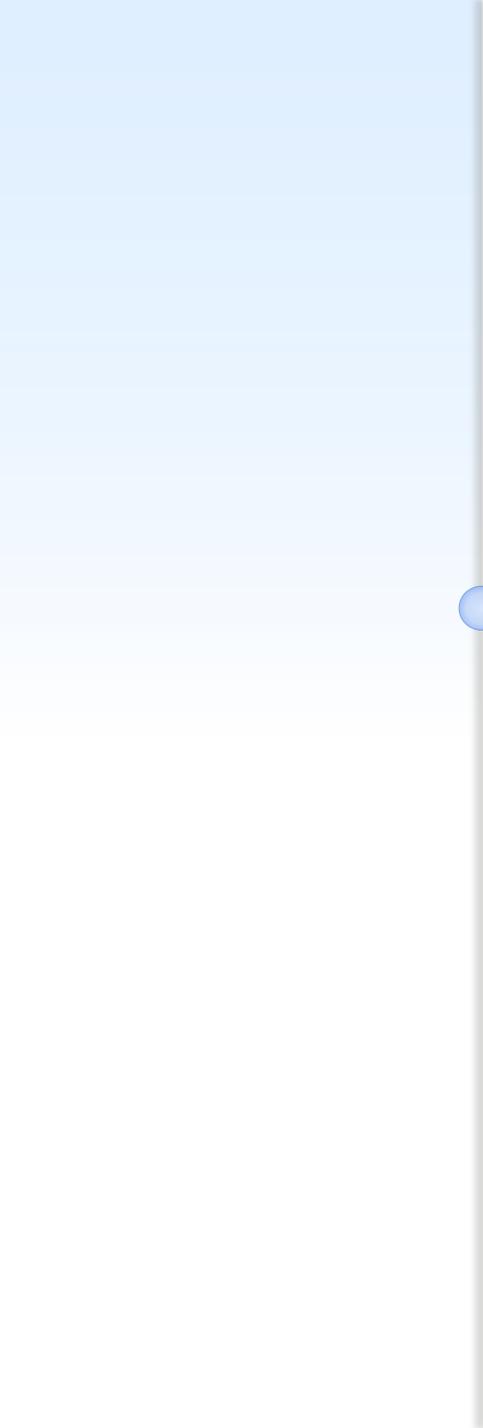
Botector® Control of Botrytis in 'Fiesta' Raisin Grapes



Control



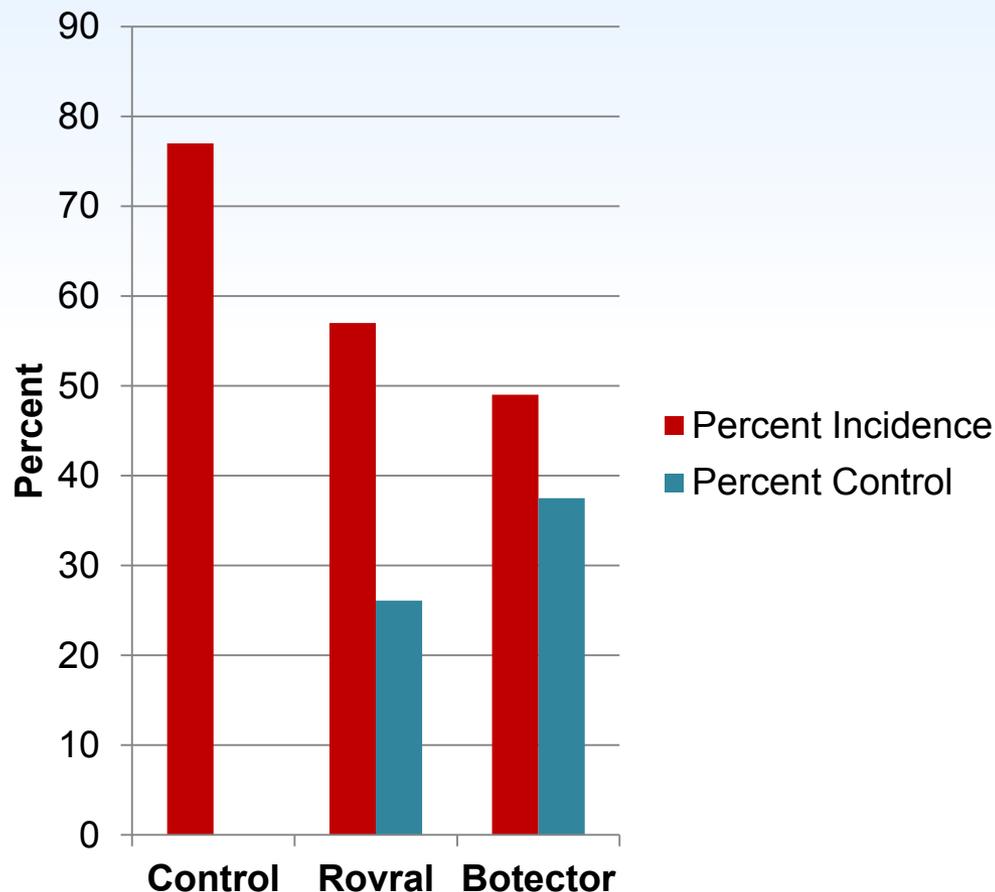
Treated



STONE FRUIT TRIALS

Botector® for Monilinia Control 'Santa Rosa' Plums

Commercial Research Trial, CA, 2013



- Rovral @ 48 fl oz/Acre
- Rovral applied at 70% bloom and 50% petal fall
- Botector@10 oz/Acre
- Botector applied at 70% and 100% bloom and 50% and >60% petal fall
- +98% confidence Botector has significantly less disease than the control

Advantages of Using Botector®



- Shown to be safe for use around bees and beneficial insects.
- Excellent IPM and resistance management partner for both organic and conventional programs.
- Unique mode of action eliminates chance of resistance development.
- Naturally occurring yeast is exempt from MRL's making it an ideal product to use when pesticide residues are a concern.
- No visible residues left from the compound after application.
- Does not affect fermentation or wine quality.
- Zero (0) Day Pre-Harvest Interval
- Proven efficacy

Thank You

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