



FLUTIANIL

Fungicide

Product name: **GATTEN[®]**



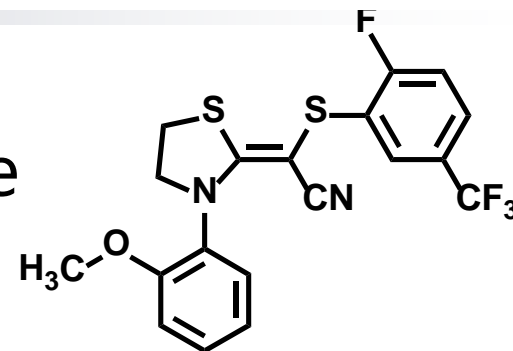
OAT Agrio Co., Ltd.

—Tokyo, Japan—



Flutianil, Characteristics

- New chemical group : cyano-methylene thiazolidine
- Effective in controlling powdery mildew
- **Novel Mode of Action against powdery mildew (FRAC Code U13)**
- **No Cross-Resistance with other chemical classes**





Regulatory Information

■ US

- Reduced risk status granted for all of the registered crops
- Approval: Registration granted March 2018
- Registered crops: Apple, Cantaloupe, Cherry, Cucumber, Grape, Squash, and Strawberry. Anticipated label expansion: Cucurbits group and Hops

■ Canada

- Pre-submission discussions with PMRA ongoing. Submission planned soon

■ Japan

- Registered on Eggplant, Cucumber, Pumpkin and Squash, Watermelon, Melons, Strawberry, Zucchini, Tomato, Peas, Flowers and Ornamental plants, and Trees and Shrubs.

■ Korea

- Registered on Green & Red pepper (Fresh), Strawberry, Watermelon, Cucumber, Korean melon, and Sweet pepper

■ EU

- Under evaluation
- Anticipated registration in 2018
- Proposed crops: Grapes and Flowers and Ornamental plants



- **Type:** Fungicide
- **Product Name:** GATTEN[®]
- **Active ingredient:** Flutianil
- **Formulation:** 5% EC
- **Use rate:** 0.04 lb ai/acre (0.01-0.05 lb ai/acre global)
 - **Note: 0.01 – 0.02 lb ai/A is new targeted use rate in US**
- **Application:** 4-5 times per season, 7 day interval
- **PHI:** 0-14 days
- **Crops:** Apple, Cantaloupe, Cherry, Cucumber, Grape, Squash, and Strawberry
 - All granted reduced risk status



- Cucurbit Crop Group
- Hops
- Mustard Greens (possible)
- Current IR-4 Studies – Lettuce (incl. GH), Peach, Cucumber (GH part of GMUS) and possibly Rosemary and Sage (IR-4 efficacy studies on-going)
- All studies completed and ready to submit except for IR-4 on-going studies



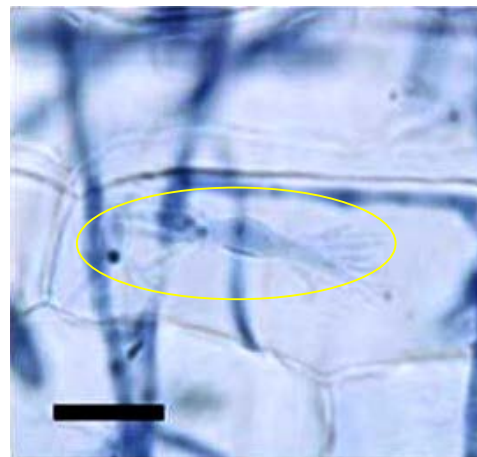
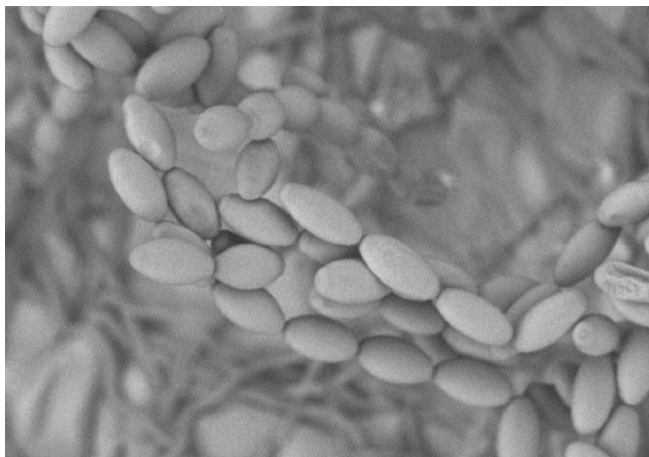
- **Cherry, hops and greenhouse pepper (2019)**
- **Greenhouse tomato efficacy study done in 2017**
- **Use rate:** 4 times/7 day interval 0.01 and 0.02 lb ai/acre (targeted label use rate)

- **Results:**
 - *at 0.01 or 0.02 lb a.i./acre flutianil controlled powdery mildew of greenhouse tomato very well in the trial in 2017.*
 - *Under moderate disease pressure, GATTEN 5% (flutianil) reduced leaf area diseased by 70-90% compared to the check and was similar to NOVA, up to 21 days after the last application.*
 - *There was no difference between the 0.01 or 0.02 lb a.i. rates. No phytotoxicity on foliage, flowers or fruit.*

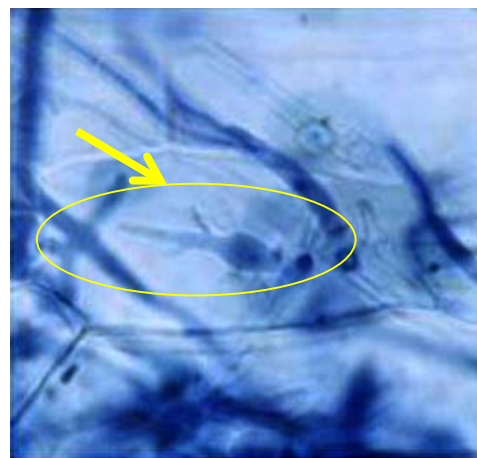
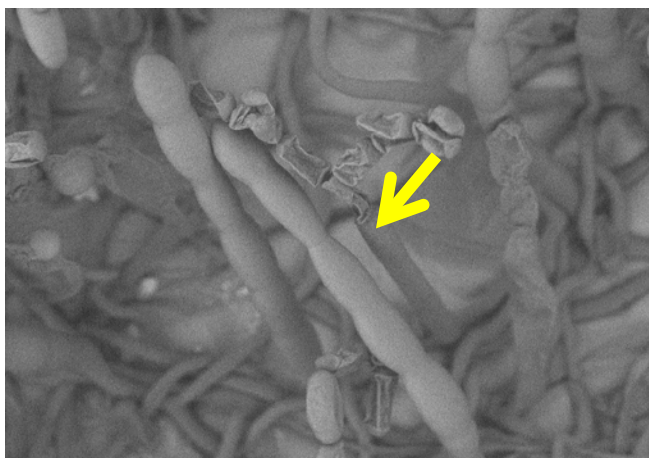


Novel Mode of Action

untreated



10 mg/L
Flutianil



**Inhibition of
haustorial
formation, and
sporulation**

Conidiophores

Haustrorium

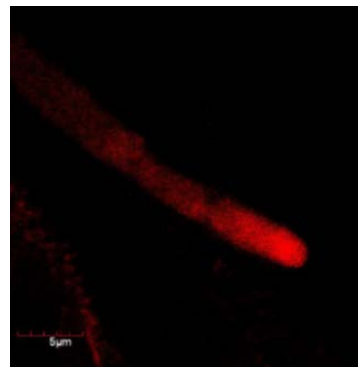
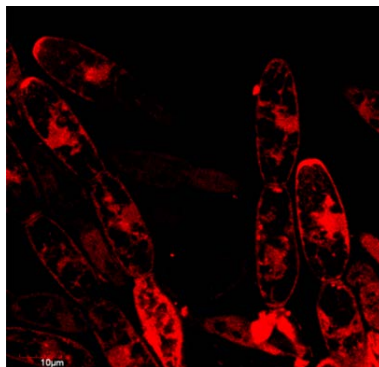
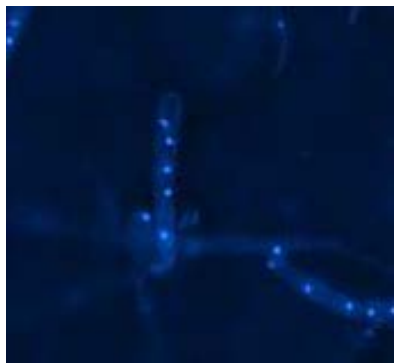
The 1.2-leaf stages of cucumber plants that were inoculated with *Podosphaera xanthii* 7 d before a flutianil application were observed in a low-temperature cryofixation electron microscope

The 1.2-leaf stages of barley that were inoculated with *Blumeria grainis* f.sp. *hordei* 7 days before a flutianil application and stained with lactophenol trypan blue, at 3 d after fungicide application and observed under a microscope. Bars=50 μ m

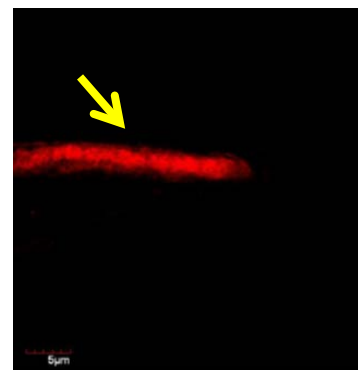
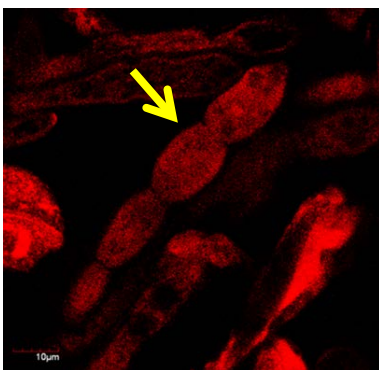


Novel Mode of Action

untreated



10 mg/L
Flutianil



**Actin disruption
and abnormal
nuclei were
observed**

conidiophores

Nuclei
distribution

conidiophores

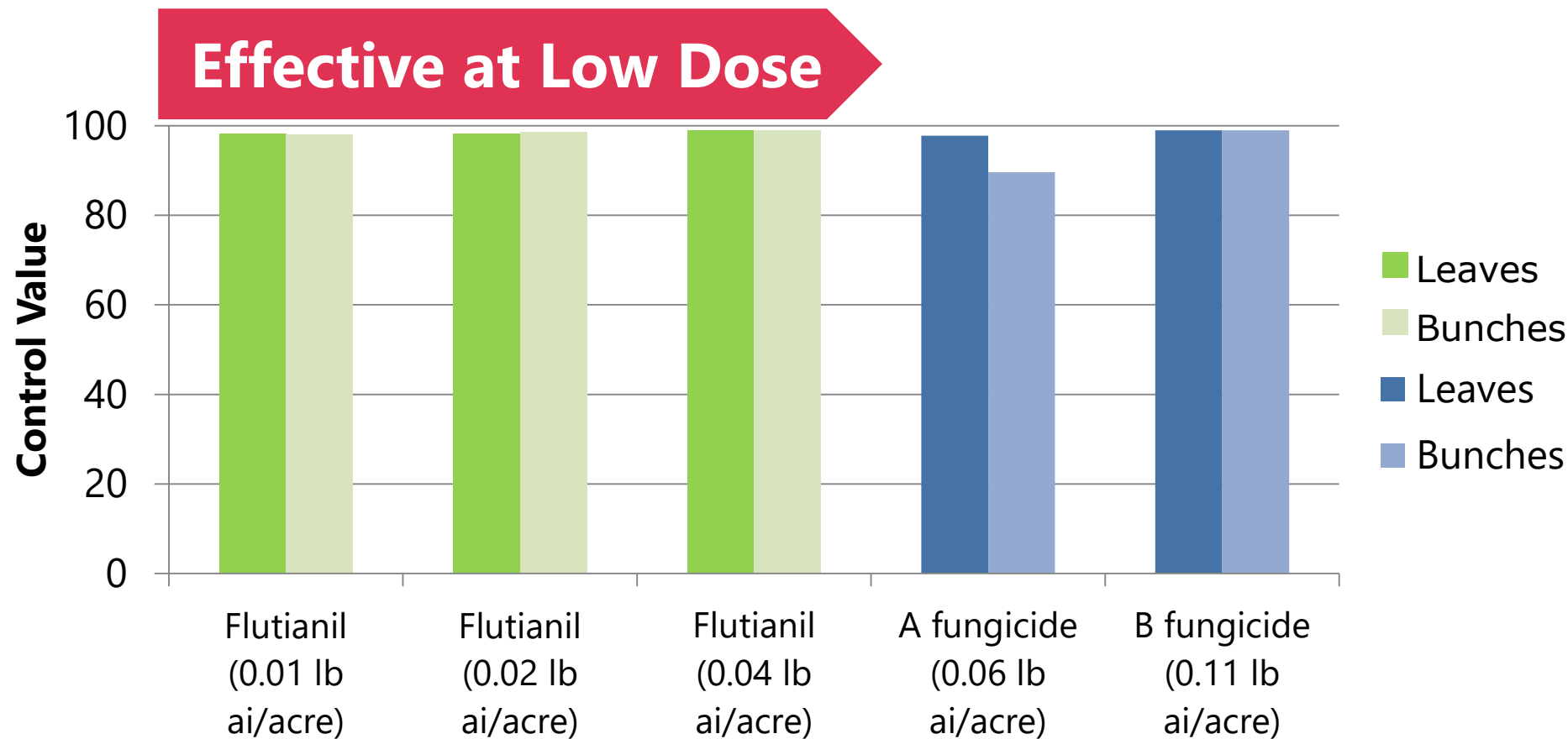
Actin organization

Hyphae

The 1.2-leaf stages of barley that were inoculated with *B. grainis* f.sp. *hordei* 7 days before a flutianil application and stained with DAPI or rhodamine phalloidin, at 3 d after fungicide application and observed under a microscope.



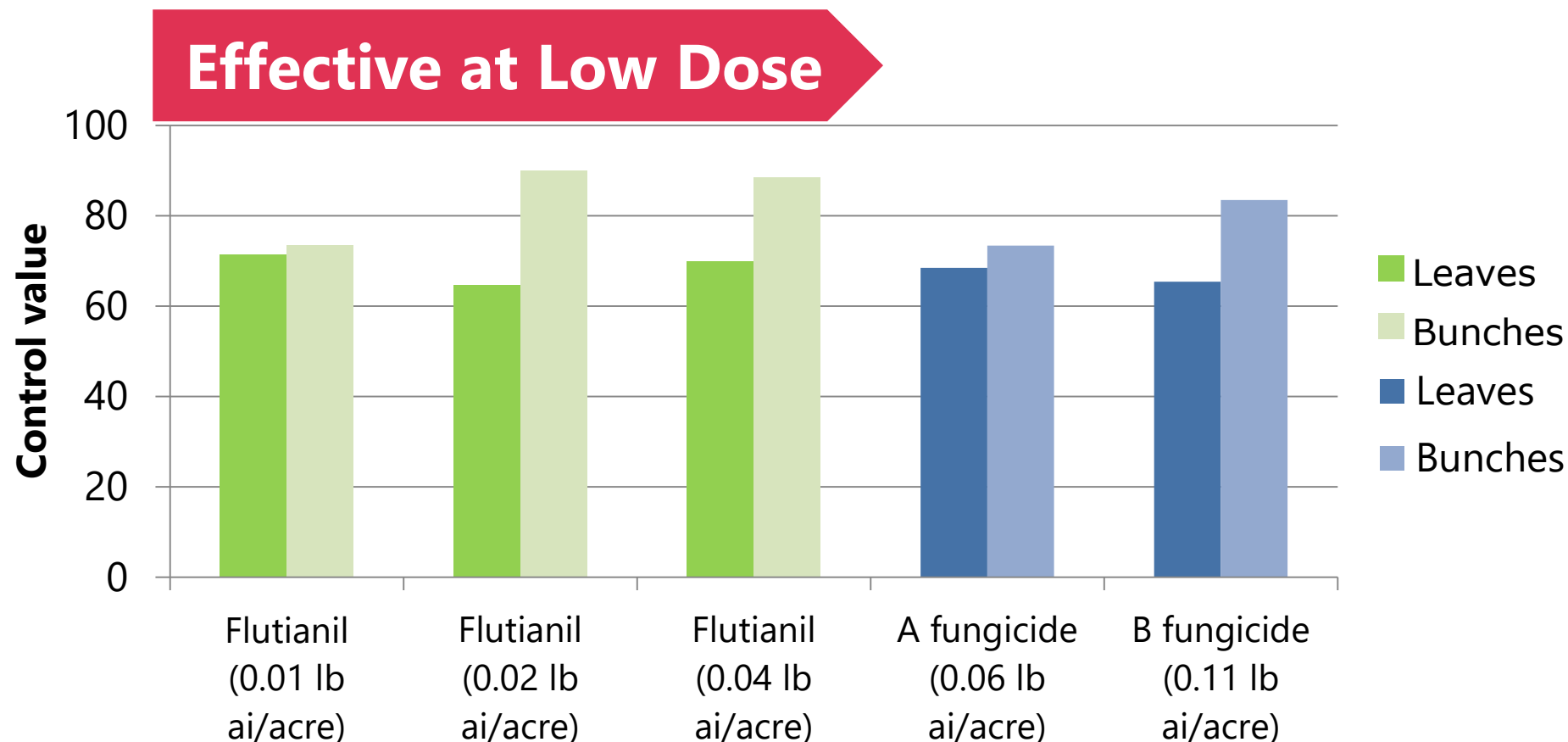
Erysiphe necator on Chardonnay Grape



- Location: Italy
- Four applications, targeted for every 10 days until color change
- Assessment was determined at 11 (leaves) and 10 (bunches) days after the last application
- Application: 1 – 6/28/11, 2 – 7/9/11, 3 – 7/20/11, 4 – 7/31/11



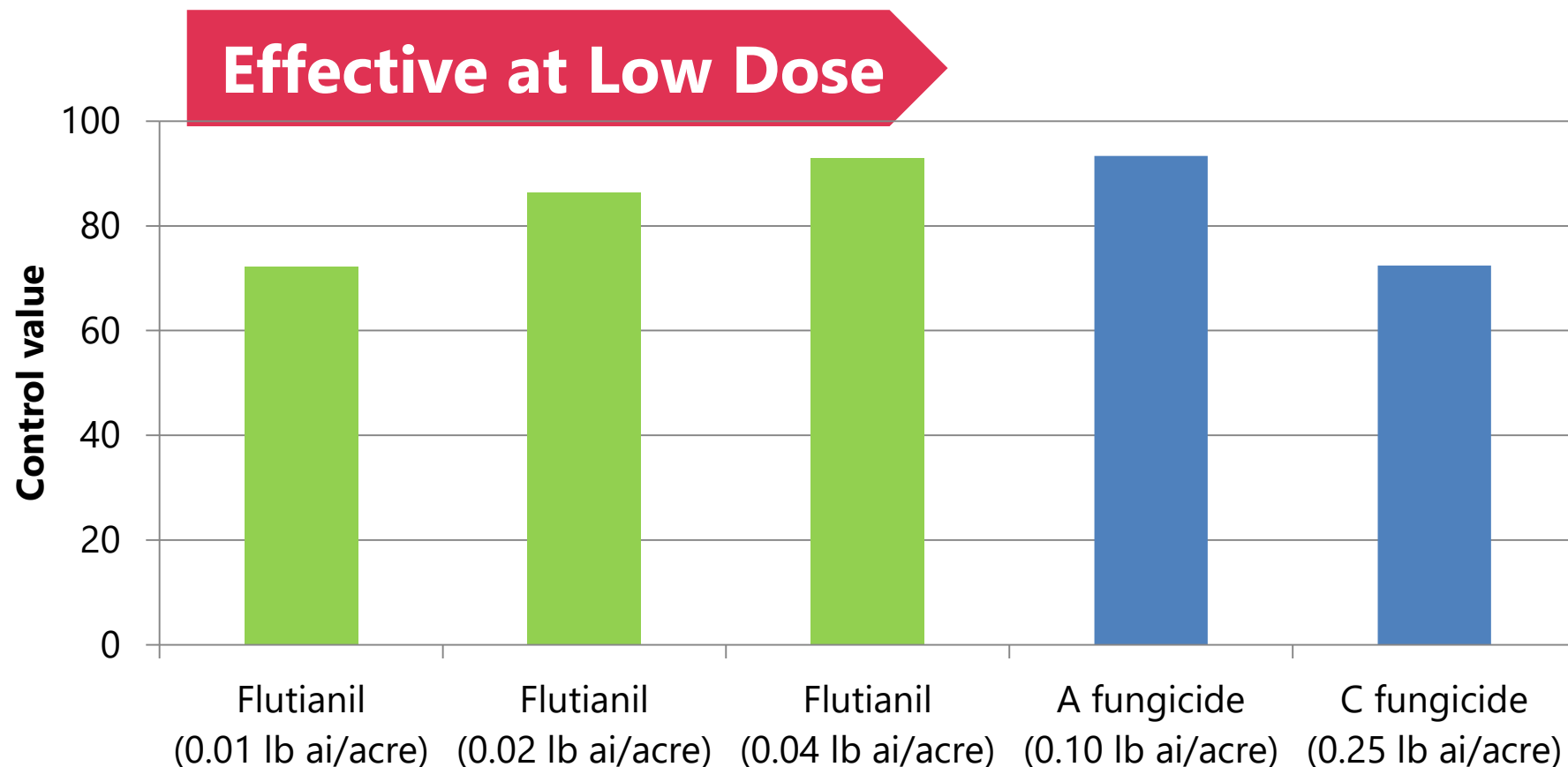
Erysiphe necator on Tempranillo Grape



- Location: Spain
- Four applications made every 7-10 days. Applications were started late in the season when bunches were already formed.
- Assessment was determined at 12 (leaves) and 8 (bunches) days after the last application
- Application: 1 – 7/7/11, 2 – 7/15/11, 3 – 7/27/11 and 4 – 8/4/11



Podosphaera xanthii on Leaves of Yellow Squash



- Location: Raleigh, NC
- Five applications targeted at 7 days intervals
- Assessment was determined at 7 days after the last application
- Application: 1 - 7/27/2011, 2 - 8/3/2011, 3 - 8/10/2011, 4 - 8/17/2011, 5 - 8/24/2011



Sphaerotheca fuliginea on Squash

0.03 lb ai/acre Flutianil



untreated



- Location: Tokushima, Japan, OAT AGRIO
- One application targeted, Assessment was determined at 25 days after application
- Application: 1 - 6/18/2012



Thank you



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—Tokyo, Japan—