

FLUTIANIL

Fungicide

Product name: GATTEN[®]



OAT Agrico Co., Ltd.

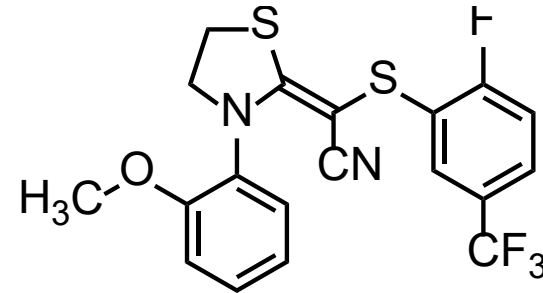
— Tokyo, Japan —

2023 IR-4 Technology Session



Flutianil, Characteristics

- New chemical group: cyano-methylene thiazolidine
- Effective in controlling powdery mildew
- **Novel Mode of Action against powdery mildew (FRAC Code U13)**



We'd like to propose a MOA of flutianil as "functional inhibition of the haustorium"*

No Cross-Resistance with other chemical classes

*Reference: J Pestic Sci 45(4), 206-2015 (2020)
J Pestic Sci 26(2), 206-2013 (2021)

Regulatory Information

- US**
- Reduced risk status granted for all of the registered crops
 - Registered crops: Apples, Cherry Subgroup 12-12A, Berry, low growing subgroup 13-07G, Melon subgroup 9A and Squash/cucumber subgroup 9B, Small fruit, vine climbing, except fuzzy kiwifruit, subgroup 13-07F, Berry, low growing, subgroup 13-07G, and Hops.
- Canada**
- Registered on Cucurbits Crop Group 9, Cherry Subgroup 12-09A and Grape. Apples and strawberries were approved as an import tolerance.
- 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**
- Approval: Annex I granted April 2019
 - Approved crops: Grapes and Flowers and Ornamental plants



US Label

- **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**
- **Application:** 3-5 times per season, 7-day interval
- **PHI:** 0-14 days
- **Crops:** Apples, Cherry Subgroup 12-12A, Melon subgroup 9A and Squash/cucumber subgroup 9B, Small fruit, vine climbing, except fuzzy kiwifruit, subgroup 13-07F, Berry, low growing, subgroup 13-07G, and Hops.
 - All granted reduced risk status



US Label Expansion – IR-4

■ Label Expansion with the EPA (submission by IR-4 2023)

- Lettuce (Head and Leaf including greenhouse)
- Peach – completed old study
- Mustard Green - completed old study
- Cucumber (Greenhouse)
- Eggplant (Greenhouse)
- Tomato (Greenhouse)
- Pepper (Greenhouse)



US Label Expansion – STUDIES

■ Label Expansion with the EPA

■ Strawberry greenhouse

- ✓ Submission to PMRA by PMC and to EPA by IR-4 – Studies on-going PMC
(submission dates not set, joint submission with PMC)
- Herb Group 25. Rosemary and Sage Efficacy and Crop Safety studies done.
Basil residue study in progress, mint residue study planned (submission date 2025)
- Hemp (2024)

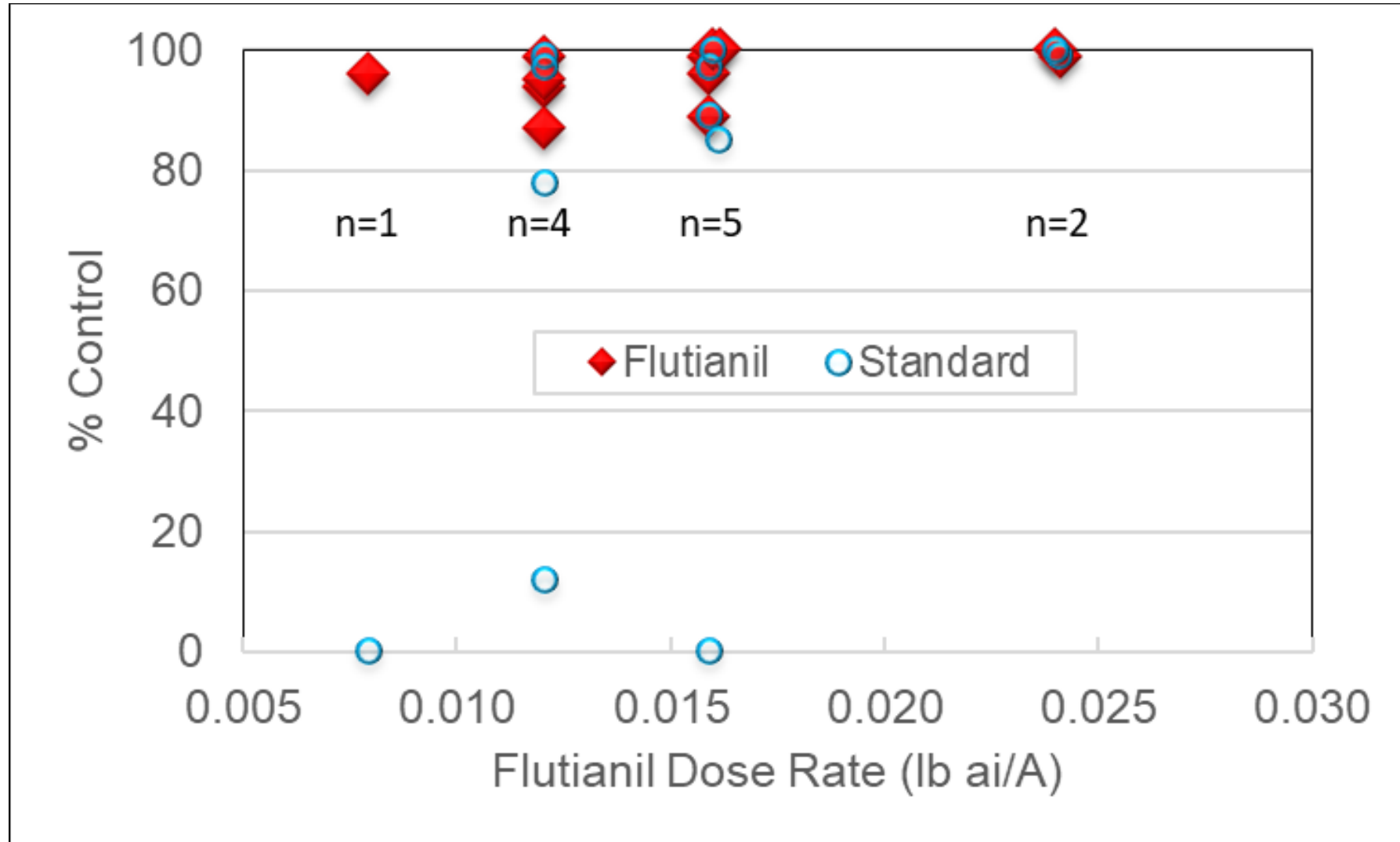


Canada Label Expansion

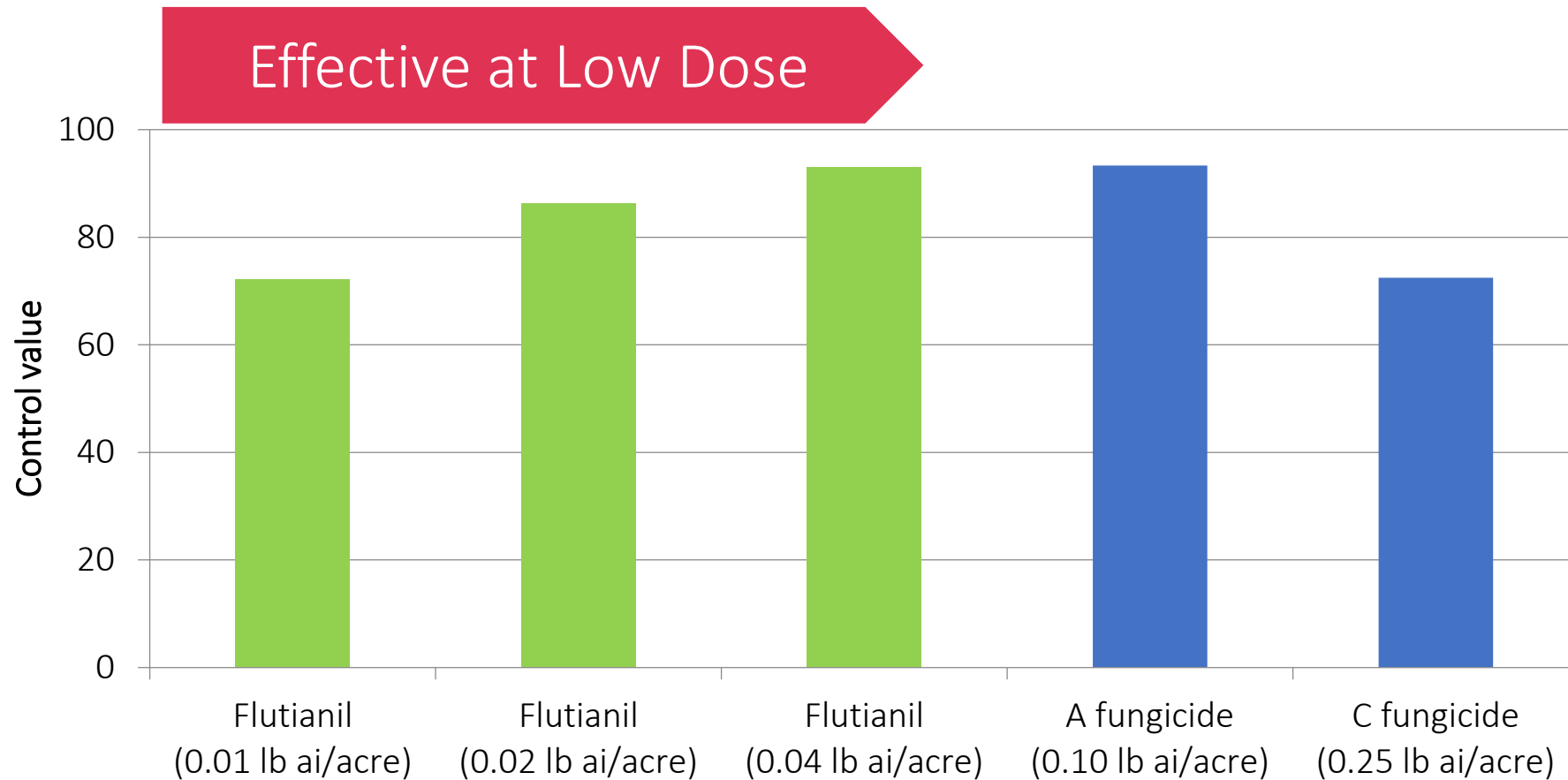
- Current PMC Studies
 - Pepper (GH) – 2023 submission
 - ✓ Joint with IR-4, PMC leading
 - Cucumber (GH part of GMUS) -2023 submission
 - ✓ Joint with IR-4; IR-4 leading, PMC doing efficacy and some residue trials
 - Hops – 2023 submission to PMRA and JMPR
 - ✓ Joint with IR-4, PMC leading
 - Ornamental Crops Safety and Efficacy – 2023 submission (greenhouse)
 - ✓ PMC project with crop safety also being done by IR-4
 - Apple, Peach and Field Strawberry – 2023 submission (peach may be 2024 since IR-4 needs to submit first, apple and strawberry already submitted)
 - ✓ URMULE submitted with existing IR-4 data
 - Tomato (GH) – 2023 submission
 - ✓ Joint with IR-4; IR-4 leading, PMC doing efficacy
 - Strawberry (GH) – ongoing at PMC
 - Haskap – ongoing at PMC, submission date not set
- PMC on-going studies to be submitted when complete. Target 2023 except for haskap which just started, strawberry which is ongoing and peach which will be submitted as an URMULE after IR-4 submits.
- All crops eventually planned for registration in Canada and the USA.



Field Performance on Grape (US)



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

New Biopesticide
Code name: OAT-1401EC
(formerly RM-1963K)
Edible oil



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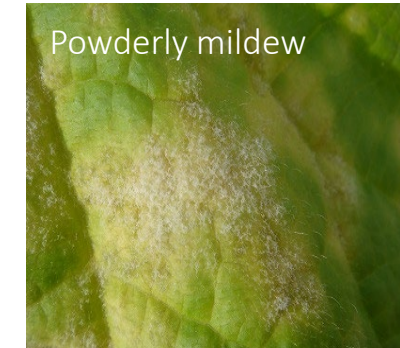
Technical Information

- Product name
OAT-1401EC (Code name)
Suffoil (Product name in Japan)



- Active Ingredient
Edible oil

- Type
Insecticide, Miticide & Fungicide



- Human-Friendly
 - Naturally occurring product
 - ADI/MRL: Exempted
 - PHI: 0 day

- Environmental-Friendly
Low impact on beneficial insects, predatory mites and bees

- Countries for sale
Japan, Taiwan, Korea, and Malaysia

NOTICE

JAS (Japanese Agricultural Standards) certifies A.I. of OAT-1401 EC is compatible with organic cultivation.



Characteristics

■ Efficacy

1. No systemic activity, translaminar effect or vapor action
2. Rapid reduction of pest population
3. Active to all growth stage, eggs, larvae, nymphs, and adults
4. Residual effects (up to 7 days) on *T. urticae*

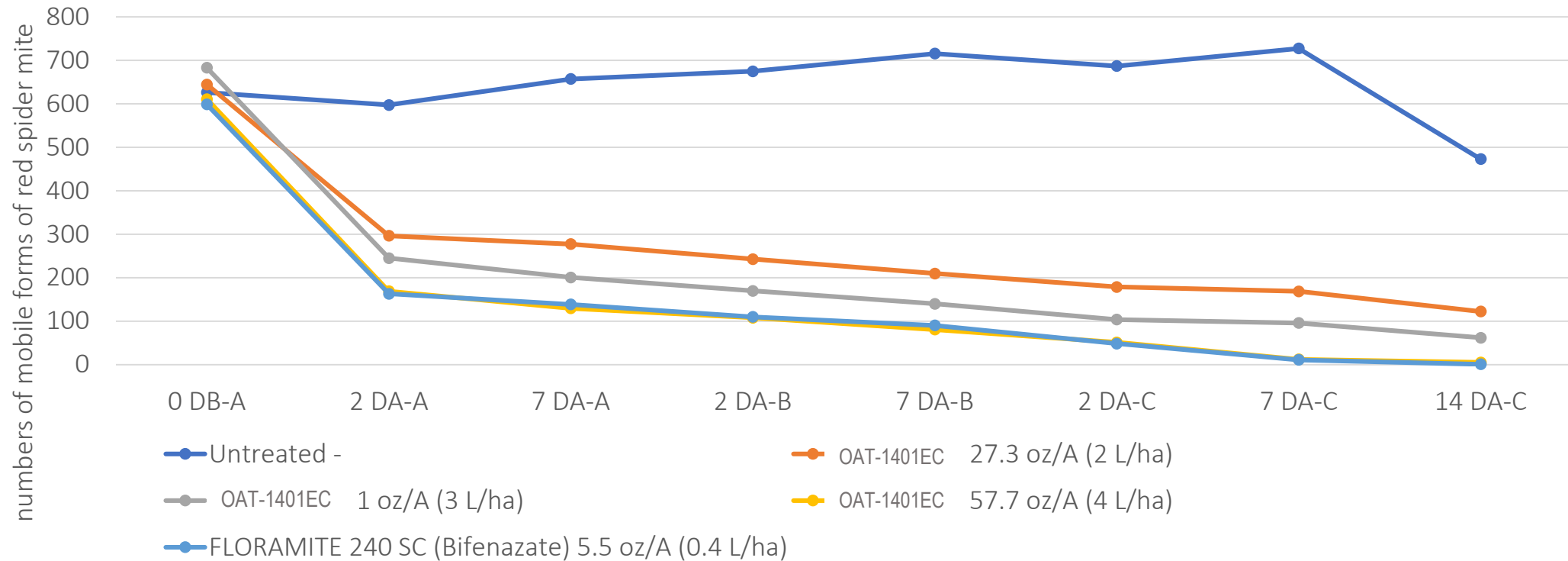
■ Mode of Action

1. Consider to be suffocation by blocking the spiracle
2. Inhibit the behavior and egg laying in mites
3. Inhibit the orientation and the courtship behavior in white flies



Mobile forms of Red spider mite to tomato (GH)

The efficacy of OAT-1401EC against **mobile forms** of red spider mite on tomato (GH), Romania, 2017



Region/county/state/Country: COMLOSUL MIC, Romania

Application volume: 264 GAL

Crop: Tomato (cv. CINDEL)

Target pest: Red spider mite (*Tetranychus urticae*)

Number of application: 3

Application interval: 7 day

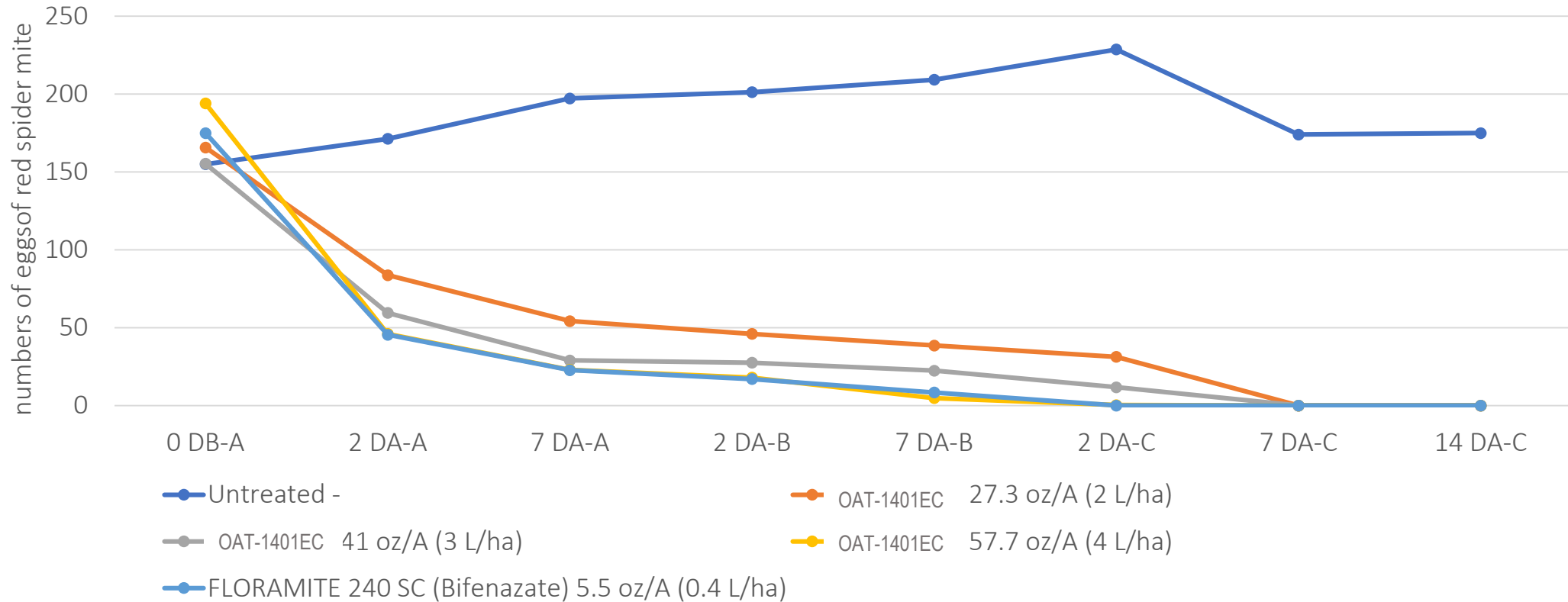
DAA: days after 1st application, DAB: days after 2nd application

DAC: days after 3rd application



Eggs of Red spider mite to tomato (GH)

The efficacy of OAT-1401 EC against **eggs** of red spider mite on tomato (GH), Romania, 2017



Region/county/state/Country: COMLOSUL MIC, Romania

Application volume: 264 GAL

Crop: Tomato (cv. CINDEL)

Target pest: Red spider mite (*Tetranychus urticae*)

Number of application: 3

Application interval: 7 day

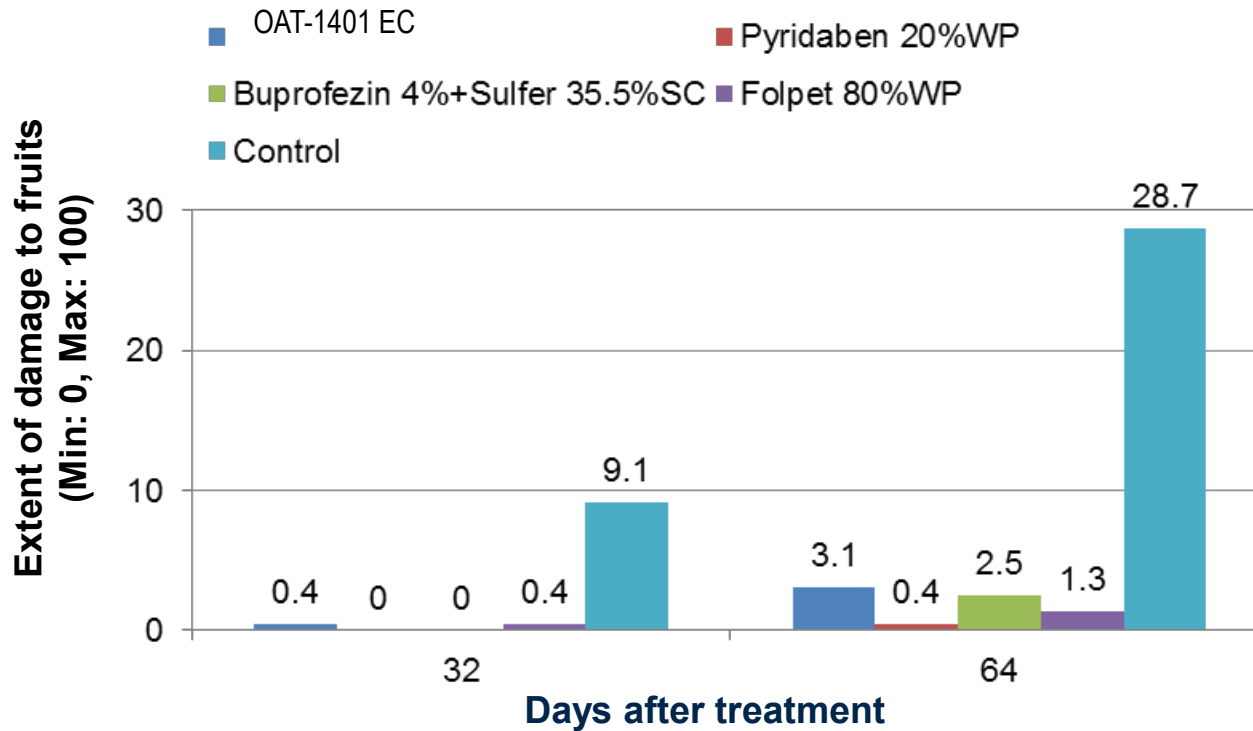
DAA: days after 1st application, DAB: days after 2nd application

DAC: days after 3rd application



Trial Results

Citrus rust mite on Mandarin Orange (Japan)



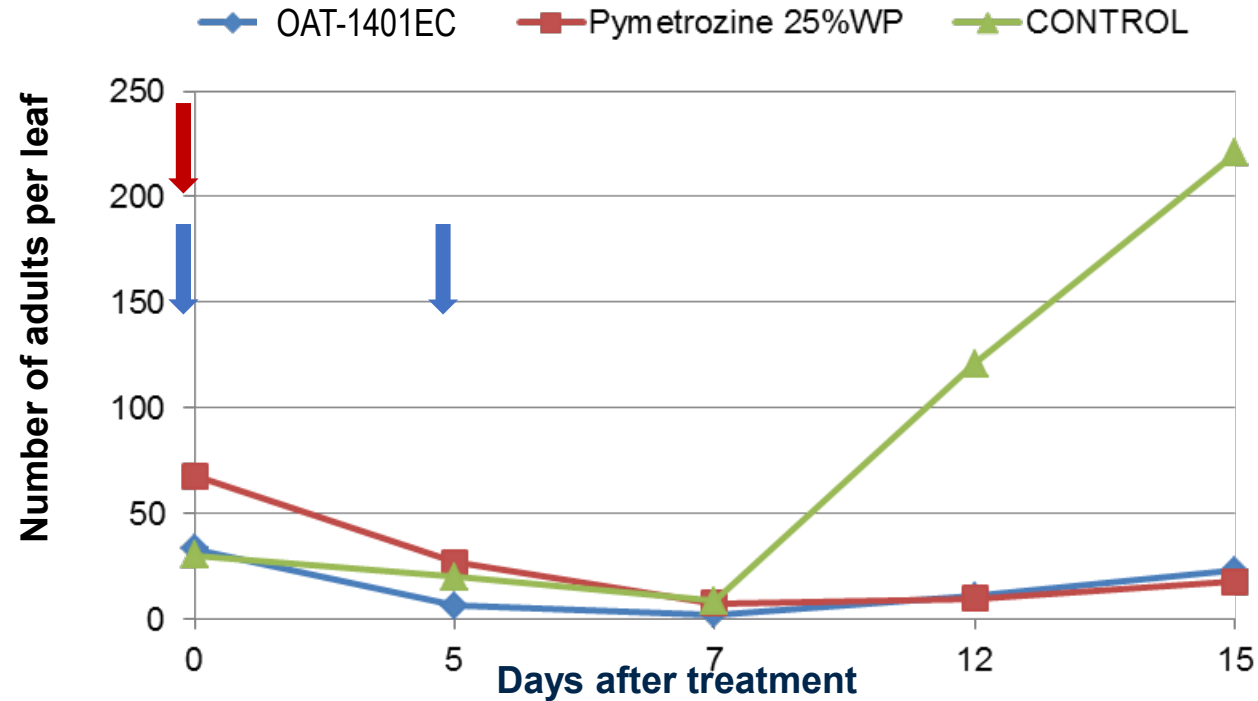
- Prefecture : Nagasaki
- Plot size : 1 tree
- Replication : 4
- Dilution rate : OAT-1401 EC 300-fold
- Spray volume : 1.8 Gal/ tree
- Application Date : Jul. 8 (OAT 1041EC & The others), Jul. 15 (OAT 1041EC)

Nagasaki Agricultural and Forestry Technical Development Center (2010)



Trial Results

Whitefly (*Bemisia tabaci*) on Eggplant (Japan)



- Prefecture : Okinawa
- Plot size : 10 plants
- Replication : 2
- Dilution rate : OAT-1401EC 300-fold
- Spray volume : 214 Gal/Acre
- Application Date : Jun. 6 (OAT 1041EC & Std), Jun. 11 (OAT 1041EC)

Plant Protection Center, Agricultural Support Division, Okinawa Prefecture (2007)



IR-4 Studies With OAT-1401EC

- Whitefly

- Aphids

PMC Studies With OAT-1401EC

- TBD



Thank you



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