

Biopesticide Research Report 2003

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BIOPESTICIDE RESEARCH REPORT 2003

Executive Summary

This document contains reports of biopesticide research funded entirely or in part by the IR-4 Biopesticide Research Grant Program in 2003. The research reports compiled in this report are from individual researchers and were not conducted by the IR-4 Project. Therefore, the researchers should be contacted directly regarding any questions about their studies. Please note, mention of trade names does not constitute an endorsement of a particular product, but rather reflects the information provided by the researchers.

BIOINSECTICIDES

Western Poplar Clearwing Moth Pheromone (E,Z-3,13-Octadecadienol and Z,Z-3,13-Octadecadienol) completely eliminated trap captures of the Western Poplar Clearwing Moth (1)*. This averted the application of over 44,000 pounds of Lorsban (Chlorpyrifos). The pheromone Z tetradecen-one was effective in causing mating disruption of Oriental Beetle in blueberry and ornamentals (9). Codling moth control in pears with CM granulosis virus was superior to the untreated control, but not as effective as Entrust (Spinosad) or Guthion (Azinphos-methyl) (13). Mating disruption with Isomate (E,E 8, 10-Dodecadien) reduced moth damage compared to the control and CM granulosis virus improved codling moth control over mating disruption alone. The Gypsy Moth Pathogen *Entomophaga maimaiga* spores have now been successfully grown *in vitro* without going into dormancy (29). Repel (Garlic)and Mycotrol (*Beauvaria bassiana*) did not effectively control thrips on onion (37). Hexacide (Rosemary oil) applied at daybreak was generally less phytotoxic to bentgrass compared to mid-day applications (47). Black cutworm egg hatch was not effected but 2nd-4th instar larva were controlled. Sod webworm was not controlled. Capsyn (Capsaicin) plus Nufilm provided some control of plum curculio but did not have residual activity (58).

BIOFUNGICIDES

Serenade (*Bacillus subtilis*) and Armicarb (Potassium Bicarbonate) in rotation programs allowed for at least a 50% reduction in the use of Nova (Myclobutanil) for control of

* The numbers in parenthesis are the first page number relating to the individual research report cited in this summary .

Peach Rusty Spot (60). Bees were effective in vectoring spores of Serenade, but did not decrease mummy berry or improve yield of blueberry (71). When Serenade was applied in blueberry as a spray, it was as effective as Indar (Febuconazole) (78) in controlling mummy berry. Serenade rotated with Indar was also effective in controlling mummy berry (78), but did not control *Alternaria* or *Anthraco* fruit rot (79). Serenade provided early season control of white mold of lima bean while Sonata (*Bacillus pumilus*) did not (80). Serenade, Sonata and most conventional fungicides did not improve lima bean yield, but Endura (Boscolid) did (80). Sonata and Serenade did not control downy mildew on lima bean (81). Serenade and Sonata controlled white mold in snap beans(82). Sonata, Serenade and all conventionals resulted in similar snap bean yields and all were better than the control. In potato, Sonata rotated with conventional products provided some control of white mold, early blight and late blight. All treatments improved potato yields compared to the control (83).

Biophos (Dipotassium phosphonate and phosphate) and Vital (Potassium phosphate) treatments resulted in significantly less black rot of pansy and was similar to Cleary 3336 (Thiophanate methyl) (85). In the ornamental Calibrachoa-million bells, Biophos controlled *Pythium* and *Phytophthora* (86). Biophos provided good control of powdery mildew in Gerbra daisy, but Heritage (Azoxystrobin) was superior(90). Biophos did not control *Phytophthora* root rot in vinca (91). *Phytophthora capsici* (Squash crown and fruit rot) were not controlled by FNX -100 (Dipotassium phosphate) or ABM 127 *Gliocladium virens* in the spring but FNX-100 enhanced control obtained by conventional products in the fall (92).

In pumpkin, powdery mildew, *Xanthomonas*, virus and marketable fruit number were similar with treatments of Milsana (*Reynoutria sachalinensis*) or Serenade alone or in combination with conventional fungicides (95). Most Milsana and Kaligreen (Potassium bicarbonate) treatments alone or with conventional fungicides controlled powdery mildew in pumpkin while Serenade did not (100). Most treatments including Pre-stop (*Gliocladium catenulatum*) or Milsana were similar to conventional fungicides in controlling *Botrytis* in greenhouse tomato. Serenade and BAS-516 (Pyraclostrobin and Boscolid) were similar to the control (101). Milsana alone or in rotation with Elevate (Fenhexamid) controlled powdery mildew and *Phomopsis* leaf blight similar to Pristine (Pyraclostrobin and Boscolid) in strawberry (106).

Messenger (Harpin protein) did not control *Ramularia* leaf spot in artichoke as well as Rally (Myclobutanil) (107). *Phytophthora* root rot ratings in avocado treated with Messenger and Aliette (Fosetyl-Al) were similar, but only Messenger increased yields compared to the control (114).

Oxidate (Hydrogen dioxide) did not control *Anthraco* fruit rot or gray mold in strawberry (128). Bio-Save (*Pseudomonas syringae*), Tsunami (Peroxyacetic acid) and Storox (Hydrogen dioxide) did not provide postharvest control of *Fusarium* in sweet potato while Pristine and Scholar (Fludioxonil) did (129). *Rhizopus* soft rot was not

controlled by Tsunami or Storox, but Bio -Save had some activity in sweetpotato(130). *Cercospora* leaf spot in sugarbeet was reduced by Bac-J (*Bacillus mycoides*) in moderate, but was not reduced in *Cercospora* susceptible sugarbeet cultivars(131). BioYield (*Paenobacillus macerans* and *Bacillus amyloliquefaciens*) provided good control of damping off in ornamentals (134).

EcoGuard (*Bacillus licheniformis*) had some early season activity against powdery mildew and *Rhizoctonia* in bedding plants, but was not active on *Botrytis* (149). In ginseng, Endorse (Polyoxin-D) performed favorably against *Botrytis* and *Alternaria* and appeared to be a good rotational tool with Quadris (Azoxystrobin) (167). In general Eco Guard was not effective in controlling vegetable diseases alone but may be useful in rotation(174).

BIONEMATICIDES

Dominator, liquid compost factor , castor oil and DiTerra (*Myrothecium verrucaria*) provided variable suppression of nematodes in grapes (188).

Easter lilys grown in nematode infested soil produced more bulblets when treated with Neem or Thimet (Phorate), but not Quillaja (*Quillaja saponaria*) or DiTera (195). Quillaja treatment resulted in larger bulb size. Tomato yields increased with Quillaja extract and were greater than with Telone (1,3-dichloropropane and chloropicrin) (196).

MeloCon (BioAct) (*Paecilomyces lilacinus*) protected plants as well as Vapam (Metam sodium)soil fumigant against root knot nematodes in tomato and better than the untreated control (200). While not significant, results were consistent in that tomato fruit numbers and weights from MeloCon treated plots were greatest in every case. Cucumbers were intolerant of the nematodes present in this study that neither the Vapam soil fumigant nor MeloCon treatment were able to help cucumbers overcome the damage.

PLANT GROWTH REGULATORS

AuxiGro (Glutamic acid) did not improve blueberry yields (206). AuxiGro tended to reduce bitter pit in apples, but did not impact total yield, size or color(208). AuxiGro did not impact any component of cranberry yield(211)