Features

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INSECTICIDE EFFICACY AGAINST EGYPTIAN ALFALFA WEEVIL LARVE IN 2014

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Two insecticide efficacy trials were conducted during the spring of 2014. The objective of the studies was to evaluate the efficacy of the new and old insecticidal compounds used against Egyptian alfalfa weevil (EAW): *Hypera brunnipennis* (Boheman) larvae on alfalfa grown for hay production under desert growing conditions. A field study was conducted during the spring of 2014 at the UC Desert Research and Extension Center. A stand of alfalfa, 'CUF 101', was used for the experiment. The experimental design was RCB using four replicates with twelve insecticidal treatments and an untreated check. Plots for each experiment measured 13.33 ft by 50 ft. Insecticide treatments for the two efficacy trials were applied on 5 Feb and on 7 Feb 2014, respectively. Insecticide treatments were broadcast applied by ground using a handheld CO_2 backpack sprayer with a boom covering a 13.33 ft swath operated at 30 psi, delivering 20 gpa through 10 (TJ-80015) nozzles. The larval EAW population was measured with a standard 15-inch diameter insect net consisting of ten 180° sweeps; means reported in the tables are per sweep. Pre-treatment samples were collected on 4 Feb for both experiments, and indicated as 1DPT for the first experiment and as 3DPT for the second experiment, in the respective tables. Post-treatment samples for the first experiment were collected on 10 Feb or 5 days after treatment (DAT), 12 Feb (7DAT), 19 Feb (14 DAT) and 26 Feb (21DAT) and for the second experiment on 10 Feb or 3-days after treatment (DAT), 14 Feb or 7-DAT, 21 Feb or 14-DAT & 28 Feb or 21-DAT. Sweep samples were bagged, labeled and frozen for later counting of EAW larvae in the laboratory. Data sets were analyzed using a 2-way ANOVA and means separated by Tukey's Honestly Significant difference Test; ($P \leq 0.05$).

The 2014 Egyptian alfalfa weevil larvae levels were fairly high for early Feb. in Imperial Valley, CA. There were no differences among the means for EAW larvae on 4 Feb, 1DPT in Table 1 and 3DPT in Table 2. In the first experiment, only the insecticide treatments Cobalt Advanced, Sivanto 200SL @ 10 fl oz/acre, all three rates of the Cyclaniliprole 50SL treatments, and Assail 30SG @ 5 oz/acre and 7 oz/acre had means for EAW larvae that were significantly lower than the means for the untreated check 5DAT and for the PTA. Only the following insecticide treatments: Cobalt Advanced, Sivanto 200SL @ 10 fl oz/acre, and all Cyclaniliprole 50SL treatments had means for EAW larvae that were significantly lower than the means for the untreated check 7DAT. Only the treatments with Cobalt Advanced, Lorsban Advanced and all Cyclaniliprole 50SL treatments had means for EAW larvae that were significantly lower than the means for the untreated check 14DAT. None of the insecticides treatments had fewer EAW larvae compared to the untreated check 21DAT. The post treatment average (PTA) for Cobalt Advanced was significantly lower than the PTAs of all other insecticide treatments except Cyclaniliprole 50SL applied at 16.4 oz/acre and applied at 20.0 oz/acre.

In the second experiment, there were no differences among the means for EAW larvae on 4 Feb 3DPT and on 14 Feb 7DAT (Table 2). Only the insecticide treatments Fulfill, Grandevo and Beleaf 50SG did not have means for EAW larvae that were significantly lower than the means for the untreated check on any of the post-treatment sampling dates and for the PTA; all other insecticide treatments had fewer EAW larvae than the untreated check on all sampling dates and for the PTAs, except on the 7DAT.

Transform WG is a formulation of the active ingredient sulfoxaflor that has been developed by and marketed within several states of the U.S. outside of California; not labeled for use in California at the time of publication. Sivanto 200SL is a formulation of the active ingredient flupyradifurone under development by Bayer CropScience that is not registered for use within California or the U.S. at the time of publication. Cyclaniliprole 50SL is a formulation of the active ingredient cyclaniliprole that is under the development of Ishihara Sangyo Kaisha, ISK BioSciences and is not registered for use within California or the U.S. Beleaf 50SG is a formulation of the active ingredient flonicamid that may be used on alfalfa in California under a FIFRA 24(c) Special Local Need Label; SLN No. CA-140006. Assail 30SG is a formulation of the active ingredient acetamiprid being marketed in the U.S. by United Phosphorus, Inc. but is not labeled for use on alfalfa grown for hay nor labeled for alfalfa grown for seed production in California. Endigo ZCX 2.71ZC is a formulation of the active ingredients Chlorantraniliprole and lambda-cyhalothrin that is being marketed in the U.S. by Syngenta Crop Protection, LLC and is not labeled for use on in the U.S. including California. Fulfill is a formulation of the active ingredient pymetrozine that is being marketed in the U.S. by Syngenta Crop Protection, LLC but is not labeled for use on alfalfa grown for hay nor labeled for alfalfa grown for seed production in California.

Table 1. Egyptian Alfalfa Weevil Larvae per Ten Sweeps, Holtville, CA, 2014.

Treatment	oz/acre	1DPT[w]	5 DAT[x]	7 DAT[z]	14 DAT[z]	21 DAT	PTA[yz]
Check	--------	47.75 a	123.00 a	199.08 a	153.81 a	31.25 a	127.47 a
Cobalt Advanced	26.0 fl oz	90.00 a	2.50 b	1.38 d	13.75 bcde	3.75 a	5.06 e
Lorsban Advanced	26.0 fl oz	35.50 a	47.75 ab	27.97 abc	16.36 bcde	28.25 a	28.32 bcd
Transform WG	0.75 dry oz	51.50 a	83.50 ab	116.19 abc	82.95 abc	39.75 a	83.88 abc
Transform WG	1.50 dry oz	63.00 a	82.75 ab	147.80 ab	93.25 ab	31.50 a	89.64 ab
Sivanto 200SL	7.0 fl oz	82.50 a	41.00 ab	60.24 abc	52.6 abcde	39.50 a	52.48 abcd
Sivanto 200SL	10.0 fl oz	63.50 a	6.25 b	17.18 c	41.15 abcde	46.00 a	28.35 bcd
Cyclaniliprole 50SL	16.4 fl oz	48.25 a	12.25 b	19.56 bc	8.76 de	17.25 a	17.07 de
Cyclaniliprole 50SL	20.0 fl oz	64.25 a	23.75 b	23.34 bc	6.20 e	13.75 a	16.27 de
Cyclaniliprole 50SL + Beleaf 50SG	10.9 fl oz 1.71 dry oz	71.00 a	19.25 b	23.31 bc	9.26 cde	26.25 a	21.17 cde
Assail 30SG	3.0 dry oz	36.25 a	39.25 ab	103.81 abc	75.61 abcd	39.00 a	65.45 abcd
Assail 30SG	5.0 dry oz	77.50 a	12.75 b	66.38 abc	38.02 abcde	12.75 a	34.87 abcd
Assail 30SG	7.0 dry oz	77.50 a	7.50 b	39.70 abc	51.88 abcde	33.50 a	34.42 abcd

Means within columns followed by the same letter are not significantly different, Tukey's Honestly Significant difference Test; $P>0.05$.

[w] Days pre-treatment

[x] Days after treatment.

[y] Post treatment average.

[z] $Log_{10}(X+1)$ transformed data used for analysis, back transformed means shown in the table.

Table 2. Egyptian Alfalfa Weevil Larvae per Sweep, Holtville, CA, 2014.

Treatment	amt/acre	3-DPT[w]	3-DAT[xz]	7-DAT	14-DAT[z]	21-DAT	PTA[yz]
Check	--------	10.95 a	31.28 a	33.98 ab	3.82 a	2.20 a	17.54 a
Warrior II 2.09CS	1.92 fl oz	7.15 a	0.58 b	0.25 b	0.07 b	0.13 b	0.25 b
Endigo ZCX 2.71ZC	3.9 fl oz	8.75 a	0.77 b	1.98 b	0.21 b	0.18 b	0.71 b
Besiege 1.25ZC	9.0 fl oz	6.73 a	0.77 b	0.48 b	0.11 b	0.28 b	0.52 b
Cobalt Advanced	24.0 fl oz	6.93 a	0.37 b	0.20 b	0.12 b	0.23 b	0.23 b
Fulfill	5.5 fl oz	6.35 a	26.88 a	49.30 a	5.85 a	3.13 a	20.28 a
Grandevo	3 lb	9.75 a	26.31 a	30.20 ab	8.51 a	2.58 a	16.45 a
Beleaf 50SG	2.8 dry oz	4.78 a	16.80 a	19.85 ab	5.49 a	3.83 a	11.94 a
Mustang 1.5EW	4.3 fl oz	7.23 a	1.17 b	1.78 b	0.39 b	0.28 b	0.83 b
Stallion 3.025EC	11.75 fl oz	7.65 a	0.54 b	0.25 b	0.16 b	0.13 b	0.29 b
Stallion 3.025EC+ Dimethoate 2.67E	11.75 fl oz 16.0 fl oz	8.28 a	0.75 b	0.45 b	0.12 b	0.15 b	0.38 b

Means within columns followed by the same letter are not significantly different, Tukey's HSD Test; $P= 0.05$.

[w] Days pre-treatment

[x] Days after treatment.

[y] Post treatment average.

[z] $Log_{10}(X+1)$ transformed data used for analysis, back-transformed means reported.

INVESTIGATION OF A LEAF SPOT PROBLEM ON RADISH

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Steven Koike, Farm Advisor, UCCE Monterey County

Radish (*Raphanus sativus*) is harvested for its fleshy taproot and is usually harvested in bunches with the foliage left attached. The whole plant must be free from discoloration, disease, decay and insects. Recently a pest control advisor brought in several radish plant samples with a foliar problem (Figure 1). This radish field was very close to harvest and plants had scattered spotting on the leaves.

These plants had leaf spots that started out small and circular in shape (Figure 2); the spots gradually increased in size and number as the leaf grew and expanded. As the disease developed, the spots turned brown and affected tissue eventually died (Figure 3). The older leaves of the radish showed the most severe damage. The roots did not have any visible damage. This leaf damage resembled insect feeding damage of flea beetles. However, no insects were found after a thorough inspection of all the submitted plants. Therefore at this point in the investigation insect feeding appears unlikely to be the cause of the field problem.

Figure 1. Radish leaves with spotting and necrosis.

The possible role of environment has been considered. This production area had experienced nighttime temperatures close to freezing with the temperature gradually warming up. It is possible that this changing environment was involved with the problem but this connection has not been documented.

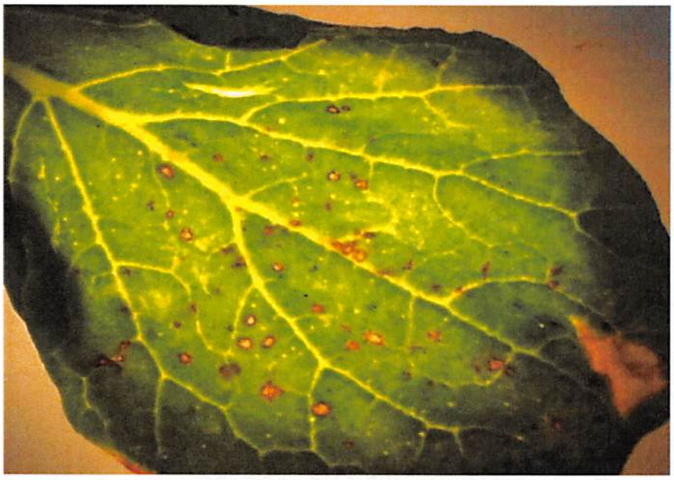

Figure 2. Radish leaf with initial stages of disease consisting of small, oval to round spots.

Figure 3. Radish leaf with advanced symptoms consisting of irregular, brown lesions. Lesions become papery in texture and the leaf tissue can break and tear.

Fresh radish samples were collected and sent to the UCCE Diagnostic lab in Salinas for further analysis. Some non-pathogenic, secondary mold fungi were recovered from some spots. In addition, one type of *Alternaria* fungus was also found (Figure 4). Spores of this *Alternaria* are similar to those of known *Alternaria* pathogens. To investigate if the recovered *Alternaria* could be the causal agent, radish test plants were grown in the UCCE greenhouse in Salinas. Plants were then spray inoculated with a concentrated solution of the purified spores. Plants were subsequently incubated in humid conditions (Figure 5). After 10 days however, no leaf spots were observed on the inoculated plants. The experiment was repeated and again no leaf spots were observed on the test.

Figure 4. *Alternaria* sp. recovered from necrotic areas.

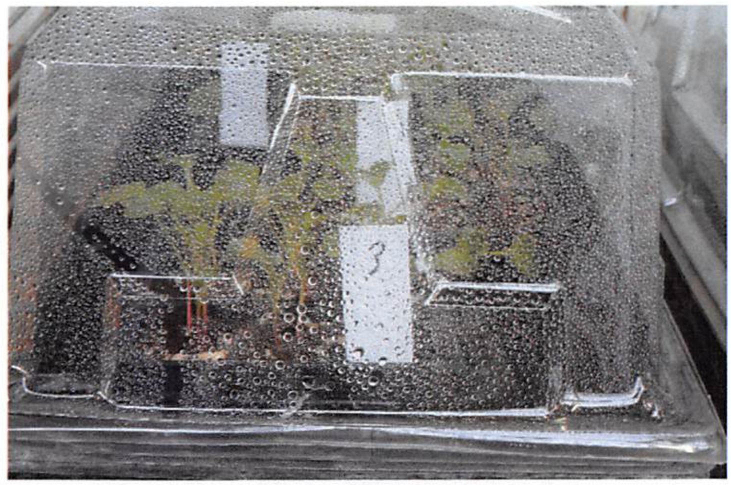

Figure 5. Young radish plants inoculated with isolates of an *Alternaria* sp. that were recovered from the radish plants with leaf spotting.

This process demonstrates the value in laboratory analysis and follow-up experiments in attempting to diagnose problems for the industry. Growers and Pest Control Advisors who see this problem on radish are encouraged to submit additional samples to their local UCCE office because this is an ongoing investigation and research on this problem continues.

POTENTIAL BIOLOGICAL SUPPRESSION OF AFLATOXIN FOR THE LOW DESERT SILAGE CORN PRODUCTION[1]

Oli Bachie, Agronomy Advisor, UCCE Imperial County

The hot and dry summer months of the low desert is ideal environment for the production of silage corn. However, it is also conducive for the development of naturally occurring *Aspergillus* spp. ear rot that produce aflatoxins in corn. Aflatoxin producing *Aspergillus* spp. can also infect peanuts, cottonseed, nuts, almonds, figs, spices, and a variety of other foods and feeds. Consumption of aflatoxin-contaminated feedstuffs (silage corn) by animals can contaminate milk, cheese, eggs, and meat products. Aflatoxins cause adverse health effect in animals and is carcinogenic to humans.

Figure 1: appearance of *Aspergillus* spp infected corn cob

A similar, but non-virulent, non-aflatoxin producing strain of the *s* fungus *Aspergillus flavus* NRRL 21882, sold as Afla-Guard GR by Syngenta, was developed by USDA ARS. Afla-Guard GR has been cited as controlling or suppressing growth of the virulent, aflatoxin producing *Aspergillus* spp. We tested the effectiveness of the biological agent in Afla-Guard GR under the hot and dry corn production conditions of the low desert. The trial was conducted at the University of California, Desert Research and Extension Center, Holtville, California. Prior to field trials, the sporulation potential of Afla-Guard GR was detected using Petri dishes filled with agar media. At the end of the sporulation period, all Petri dishes (100%) showed excellent viability and spore formation of the biological agent. The non-sporulating, vegetative fungal mycelium may appear white or nearly white with a cottony appearance. Following sporulation, the surface of the mycelium may appear green, black, brown or some other color (Figure 2).

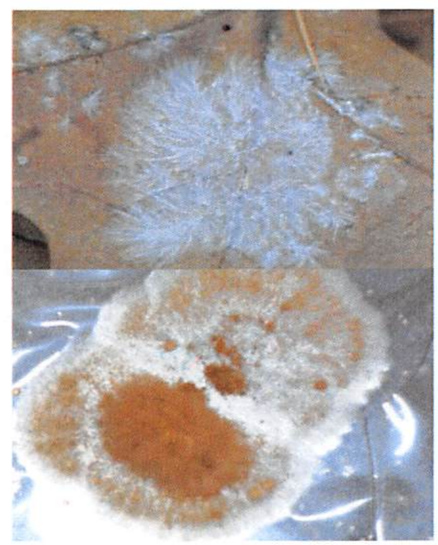

Figure 2: appearance of non-sporulating (above) and sporulated (below) Aflaguard

[1]summary of a joint paper presentation with Casey Butler, Syngenta R and D specialist, on the 25th Annual Fall Desert Crops Workshop, November 13, 2014, Imperial, CA

Three corn hybrid varieties (acquired from Syngenta) having variable susceptibility to corn earworm were used as indicator crops for the efficacy of the biological agent against production of aflatoxins. Each of the three varieties was grown with and without Afla-Guard. The Afla-Guard was applied at 10lb/acre and spread into the treatment plots with a simple hand held canister (Figure 3).

Crops were sampled for insect damage before harvest and at maturity on 2 of the middle beds of the 12-beds wide plots for each treatment. Treated plots were harvested first, just to reduce potential cross contamination of samples after rating them for corn earworm damage. Ten pounds of harvested corn ear samples were sent to a diagnostic laboratory for analysis of aflatoxin concentration (ppb). The first year results of a 3- year trial suggested that corn varieties were variable in their susceptibility to earworm and the degree of aflatoxin concentration in the corn ear samples. Aflatoxin intensities increased with increasing earworm infestation. Therefore, insect infestation may be one of the factors that aggravate aflatoxin levels. Afla-Guard treatments suppressed aflatoxin production, but did not eliminate it. Yet, the effectiveness of the Afla-Guard varied among varieties. These results suggest that the active ingredient of Afla-Guard, a non-toxigenic strains of *Aspergillus flavus*, suppresses the virulent aflatoxin producing *Aspergillus* spp. via bio-competition thereby reducing the buildup of the toxin-producing strains that normally occur during late-corn growing season. The ongoing experiment will continue with field trials during the next two years. Results of the 3-year experiment, following statistical analysis, will be made public at the end of the experimentation period.

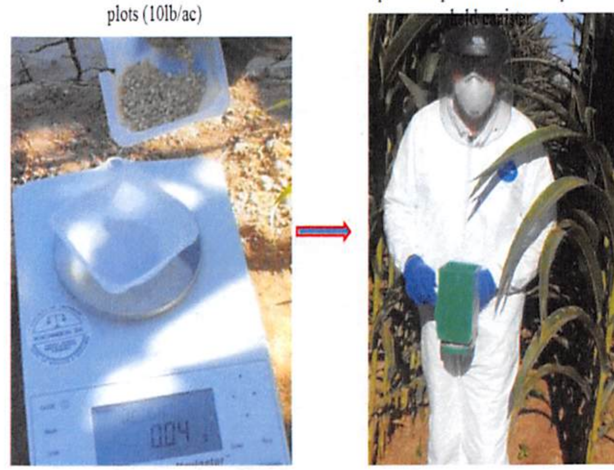

Figure 3: Afla-guard Plot Treatment

CIMIS REPORT AND UC DROUGHT RESOURCES

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California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of February 1 to April 30 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Ag Water Science Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (Google CIMIS for the current link to CIMIS site).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	February		March		April	
	1-15	16-29	1-15	15-31	1-15	16-30
Calipatria	0.12	0.14	0.18	0.22	0.26	0.29
El Centro (Seeley)	0.12	0.14	0.16	0.20	0.24	0.28
Holtville (Meloland)	0.12	0.14	0.17	0.21	0.25	0.28

*** Ag Water Science Unit, Imperial Irrigation District.**

Water and Drought Online Seminar Series

The latest research-based advice on weathering a drought is now available free online. The UC Division of Agriculture and Natural Resources is working to help farmers cope with the unwelcome outcome of historically low rainfall the last three years. UC scientists, with support from the California Department of Water Resources, have recorded video presentations on high-priority drought webpages.

Each presentation is about one half hour in length and is available at the link below:

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Then click on the drought resources link.

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