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Egyptian Alfalfa Weevil Management and Control

Eric T. Natwick

A field study was conducted during the spring of 2006 at the UC Desert Research and Extension Center. A stand of alfalfa, VAR. CUF 101, was used for the experiment. Plots were arranged in a randomized complete block design with four replications. Ten insecticide treatments were included along with an untreated control. Insecticide treatments and rates are listed in Table 1. Plots measured 13.3 feet by 50 feet and insecticide treatments were applied February 3, 2006, using a broadcast application with a tractor mounted boom. Egyptian alfalfa weevil (EAW) larval populations were measured in each plot with a standard 15-inch diameter insect net consisting of ten, 180° sweeps. Plots were sampled on February 2, 7, 10 & 17, 2006; 1-day pre-treatment (DPT), 4-days after treatment (DAT), 7-DAT, and 14-DAT.

No differences were found among treatments for EAW larvae in the pre-treatment samples, \( P = 0.05 \), Table 1. All of the insecticide treatments controlled Egyptian alfalfa weevil with larval means that were significantly lower than the untreated control treatment means from 4-DAT through 14-DAT. The best control of weevil larvae through 14-DAT was from Mustang 1.5 EW + Furadan 4F, Baythroid XL, Baythroid XL + Lorsban 4E, Warrior 1 EC, and Furadan 4F.

Egyptian alfalfa weevil, *Hypera brunneipennis*, is a 0.20 inch long beetle dark gray with a long snout. Weevil larvae are legless with a brown head and are light green with a white stripe down the back. They are about 0.25 inch long when fully grown. Larvae complete their growth in 3 to 4 weeks and are most abundant from late January through March and will begin to pupate toward the end of March. Larvae spin a cocoon and pupate either in the leaves of the plant or on the ground by early summer. There are three to four generations a year, and it is not uncommon to find this pest in the field throughout the year. The numbers of Egyptian alfalfa weevil larvae will decline rapidly through April and newly emerged adults will be appearing in fields.

Egyptian alfalfa weevil adults leave alfalfa fields late in the spring to find places to spend the summer under tree bark, under litter in wind breaks, in buildings, etc. Adult weevils spend the summer and most of the fall in a resting state called aestivation. When night-time temperatures drop below 42° F, adult Egyptian alfalfa weevils will emerge from their aestivation sites, fly to alfalfa fields, feed, and mate. This usually occurs in late-November in the low desert alfalfa production areas. Females chew holes in the stems of alfalfa plants and lay eggs. Adult females insert 10 to 30 smooth, shiny, yellowish eggs are into the centers of living and dead stems 3 to 6 inches above the soil surface or into stems in debris on the ground. A single female may deposit from 400 to
1,000 eggs during a single season. Eggs usually hatch in 5 to 10 days and larval development takes about a month. Hatching larvae make their way into the alfalfa terminals. The adult weevils do not cause economic damage, but this is an indicator of the levels of larval populations which will be present from January through March. Egyptian alfalfa weevil is usually a problem only during the first cutting, although damaging populations may persist into the second cutting, or the third cutting.

To sample for weevil larvae, divide the field in to 4 or more sections and take 5 sweeps in each section. Divide the total number of weevil larvae by the total number of sweeps to get the field average. The treatment threshold is an average of 20 larvae per sweep. On short alfalfa early in the season or on stubble following cutting that cannot be checked with a sweep net, treatment is needed when growth is retarded because of weevil feeding.

Table 1. Mean Numbers of Egyptian Alfalfa Weevil Larvae per Ten Sweeps, Holtville, CA, 2006.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>oz/acre</th>
<th>PT(^w)</th>
<th>4 DAT(^x)</th>
<th>7 DAT</th>
<th>14 DAT(^y)</th>
<th>PTM(^z)</th>
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<tbody>
<tr>
<td>Untreated</td>
<td>--------</td>
<td>21.00 a</td>
<td>19.75 a</td>
<td>8.50 a</td>
<td>30.83 a</td>
<td>20.18 a</td>
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<tr>
<td>Mustang 1.5 EW</td>
<td>4.3</td>
<td>15.75 a</td>
<td>1.75 bc</td>
<td>2.25 b</td>
<td>5.44 b</td>
<td>3.17 b</td>
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<tr>
<td>Mustang 1.5 EW + Furadan 4F</td>
<td>4.3 + 4.0</td>
<td>14.75 a</td>
<td>0.50 c</td>
<td>0.50 b</td>
<td>0.86 c</td>
<td>0.57 d</td>
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<tr>
<td>Mustang Max 0.8EW</td>
<td>4.0</td>
<td>16.25 a</td>
<td>0.00 c</td>
<td>0.50 b</td>
<td>1.78 c</td>
<td>0.82 cd</td>
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<tr>
<td>Warrior 1 EC</td>
<td>3.2</td>
<td>16.00 a</td>
<td>0.00 c</td>
<td>1.00 b</td>
<td>1.38 c</td>
<td>0.73 d</td>
</tr>
<tr>
<td>Warrior 1 EC</td>
<td>3.8</td>
<td>13.00 a</td>
<td>0.25 c</td>
<td>0.75 b</td>
<td>1.00 c</td>
<td>0.77 d</td>
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<tr>
<td>Renounce 20 WP</td>
<td>3.5</td>
<td>12.50 a</td>
<td>5.75 b</td>
<td>1.25 b</td>
<td>2.81 bc</td>
<td>2.40 bc</td>
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<tr>
<td>Baythroid XL</td>
<td>2.8</td>
<td>14.00 a</td>
<td>0.50 c</td>
<td>0.50 b</td>
<td>1.34 c</td>
<td>0.75 d</td>
</tr>
<tr>
<td>Baythroid XL + Lorsban 4E</td>
<td>2.8 + 8.0</td>
<td>15.50 a</td>
<td>0.50 c</td>
<td>0.75 b</td>
<td>1.00 c</td>
<td>0.68 d</td>
</tr>
<tr>
<td>Proaxis 0.497 CS + Lorsban 4E</td>
<td>3.0 + 16.0</td>
<td>11.25 a</td>
<td>1.25 bc</td>
<td>1.75 b</td>
<td>1.63 c</td>
<td>1.31 bcd</td>
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<tr>
<td>Furadan 4F</td>
<td>16.0</td>
<td>14.25 a</td>
<td>0.00 c</td>
<td>1.00 b</td>
<td>1.28 c</td>
<td>0.79 cd</td>
</tr>
</tbody>
</table>

\(^v\) Mean separations within columns by LSD\(_{0.05}\).
\(^w\) Pre-treatment.
\(^x\) Days after treatment.
\(^y\) Log transformed data used for analysis; true means reported.
\(^z\) Post treatment means.
Some New Products for Onion Weed Control

Rick Bottoms

Imperial County is a state leader in the winter production of vegetable and melon crops; an industry that generates over 7.28 billion in vegetable and melon crop sales. Imperial County’s contribution includes leaf lettuce, carrots, broccoli, onions, cantaloupes; spinach, cauliflower, watermelon, sweet corn, mixed vegetables, potatoes, asparagus, and cabbage are other vegetables grown on 100,000 acres had a value greater than $572 million in 2005.

To produce this staggering diversity of vegetable and melons requires knowledge and skills associated a variety of cultural practices including the selection of varieties, irrigation, fertility and chemical application techniques and effective products.

One of the most challenging areas of management is providing cost-effective weed control that provides no crop injury and a marketable product. One of the more challenging commodities is onion weed control. Even with nearly 11,000 acres and $50 million in onion crop income in Imperial County of a $290 million state onion production the potential for new herbicide development lags far behind major US crops like corn and soybean that traditionally see the opportunity to utilize new herbicide products.

Fortunately more compounds are becoming available to address minor crops like onions. Recent herbicide studies by UC Advisor Kurt Hembree on onions indicates Chateau worked well on the spectrum of winter and summer weeds in experiments as a pre-emergence, post plant material through chemigation for annual weeds in onions. Rates of only one-fourth- and one-eighth-ounce per acre were used with two applications through chemigation compared to traditional sprayer application.

Similar studies on such soils in Southern California desert areas showed the rates are critical on sandy-textured soils. The one-eighth-ounce rate was quite successful and had good selectivity, but the one-fourth-ounce rate killed both the weeds and the crop.

Goal 2XL has traditionally been a major onion herbicide. The active ingredient of Goal 2XL is oxyfluorfen and is currently only available in an emulsifiable concentrate form, which causes significant injury to onions if applied before the two leaf stage. However, A product we are working on this year here at DREC and across the state to develop data leading to a label for a new formulation of oxyfluorfen, called Goal 4F, that appears to cause less injury to the onions and can be applied at the first true leaf at low rates while the weeds are small and easier to control. Goal Tender (4F) is registered for use at 6 to 8 ounces on onions at the one-leaf stage. This would enable earlier treatments instead of waiting until the two-leaf stage and applying Goal 2XL.

Research data last year on direct-seeded, red fresh-market onions by Hembree indicated there was about twice the safety factor with the Goal 4F formulation. It is less volatile than 2XL, holds to
the soil better, and gives a slightly better weed control. There is a little initial injury to the crop, which we expected, but the onions came out of it pretty quickly. Concurrent studies by UC Advisor Grant Poole in Lancaster showed good control of weeds with low onion injury at the four and six ounce rates applied at the first true onion leaf stage. **Note: Goal 4F is not registered for use on onions in California.**

One of the most significant issues facing vegetable crop growers in the Valley is a weed known as yellow nutsedge. Yellow nutsedge is a very prolific weed that easily out competes onions and carrots and can reduce yields beyond 70%. There are currently no herbicides registered in onions or carrots for its control.

A similar study we are involved with at DREC was also conducted by Poole to test the effects of four herbicides; Outlook, Dual Magnum, Basagran, and Shark, at different stages of onions growth to control yellow nutsedge. The best treatment was Outlook applied at the two-leaf onion stage. This treatment provided at least 80% control of yellow nutsedge four to six weeks from the application time. The treatment did not appear to have any effect on the onion growth. **Note: Outlook is not registered for use on onions in California.**
Corky root of Lettuce

Thomas A. Turini

The disease, corky root, is caused by the soil-borne bacterium. It is widespread in costal production areas of California and is present in Imperial County.

Symptoms of this disease begin as yellow lesions on the tap-root and larger laterals. Later, these bands expand and develop a greenish-brown rough appearance and longitudinal corky ridges are apparent. The center portion of the root may become brown and hollow. When the disease is severe, roots become brittle and may be pinched off.

This disease will reduce plant size. Reductions by 30 to 70% have been reported. The disease tends to be more severe when soil temperatures are high. Between 50°F and 87°F, growth of *R. suberifaciens* increases with increases in temperature. Over 97°F, growth ceases.

The disease is worse in fields where lettuce is grown during consecutive seasons. Leaf and head lettuce types are susceptible and the host range includes endive, sowthistle and prickly lettuce. Rotating away from lettuce and controlling susceptible weeds may decrease the chances that this will become a problem.

There has been recent work in development of corky root-resistant varieties. Three currently available romaine varieties that are resistant are Clemente, Outback, and Siskiyou.

It is important to carefully monitor for this disease this season as the presence of this pathogen in a field can cause substantial losses to next seasons crop. If it is detected, rotate out of lettuce or plant resistant varieties.
Black rot of Crucifers

Thomas Turini

Black rot is a disease caused by the bacterium Xanthomonas campestris pv. campestris, which can cause substantial losses on cabbage and cauliflower under warm, humid conditions. Although the growing conditions in the low desert are not optimal for the development of this disease, it can be extremely damaging even in desert areas some seasons.

Recognition of black rot is important but can be difficult because the character of the symptoms of this disease depends upon the environmental conditions. The initial symptoms appear as wedge shaped light green or yellow areas along the leaf margins. As the lesions age, they dry and turn light brown. Black veins in these dry areas are often seen, although they may not always develop. Black discolored vascular tissue will be obvious in the stems and petioles if systemic infection has occurred. Under cool conditions, there may be infection without symptom expression. Occasionally, there may be symptoms such as small brown specks or stem dieback.

Xanthomonas campestris pv. campestris is usually introduced into a field on seed or transplants. However, the bacteria is also capable of surviving in the soil in plant residues that have not decomposed and weeds that are relatives of cauliflower or cabbage, such as mustard, wild radish and shepherd’s purse, can also be important reservoirs of the bacteria.

The pathogen is spread from plant to plant by splashing water from rain or sprinklers or by workers or equipment that come in contact with bacteria-containing dew and then touch uninfected plants. Symptoms can frequently be seen on adjacent plants down a row in a field in which few plants have symptoms. This pattern suggests that the pathogen was introduced into the field in one or a few infested plants or seed and then was spread by equipment or laborers.

Control of this disease is cultural. Use pathogen-free seed or transplants. Seed should be tested to determine if it is infested. Hot water can be used to reduce the level of infestation, but the treatment is not 100% effective and may reduce germination. Diseased transplants should be avoided. If the transplants are infected, clipping transplants before planting can result in widespread contamination of the plants.

If the disease is detected in a field or part of the field, when possible, avoid moving equipment or personnel from the affected area to an unaffected area. When it is not possible to avoid moving equipment or workers through the field, do so when the leaves are dry to reduce the chances of spread.
2006 Western Alfalfa & Forage Conference

Juan N. Guerrero

The 2006 Western Alfalfa and Forage Conference will be held in Reno, Nevada, from December 11 through 13 at John Ascuaga’s Nugget. Eleven western states are combining efforts to sponsor this conference. Attached you will find the conference program and registration form. Bio-energy from forages will be addressed at the conference. I will be presenting desert data regarding the detrimental effects of heat during long term summer storage of hay. Reno is a nice place to visit, and you might learn something as well! Plan to be there.
Monday, December 11, 2006
Field Tour—Agriculture (Departure Time 9:00 a.m. return 5:00 pm). Visit special features of Nevada agriculture, alfalfa, dairy, specialty crops, tourist sites.
PREREGRISTRATION REQUIRED. SPACE IS LIMITED.
5-7 p.m. Pre-Registration (Nugget lobby)
5-8 p.m. Exhibitor Setup

Tuesday, December 12, 2006
6:00 a.m. Registration
Main Session—Industry Trends and Markets:
8:00 Welcome
8:05 Emerging Issues with Alfalfa in the Northwestern States
8:30 Emerging issues with Alfalfa in the Southwestern States
8:55 Dairy Trends in Western States
9:20 Hay Trends and Prices in Western States
9:45 Discussion
10:00 BREAK
10:30 Horse Market Trends in Western States
10:55 Water Politics and Issues related to forages
11:20 Keeping your head above water in the hay industry (Grower Speakers)

12:05-1:30 p.m. Day 1 LUNCH
Breakout Sessions—Pests, Irrigation, Soils, Other Forages

I. Pest Management (Does not repeat)
1:30 Toxic Weeds
1:50 What we’ve learned about RR alfalfa
2:10 Weed Resistance and Weed Shifts with RR Alfalfa.
2:30 Weed Control in Grass Hay
2:50 Discussion
3:00 BREAK
3:30 Weevils and Worms—recent studies and control measures
3:50 Controlling Rodents in Alfalfa Fields
4:10 Alfalfa diseases and what to do about them
4:30 An Alfalfa Year-long IPM Program
4:50 Discussion
5:00 Adjourn to Reception and Auction

II. Utilizing a Wide Range of Forage Crops (repeats)
1:30 Cool Season Grasses for Hay
1:50 Warm Season for Forage and Biomass
2:10 Summer Annuals (Sudan, Pearl Millet, Sorghum-Sudan)
2:30 Management Small Grain Forages
2:50 Discussion

**3:00 BREAK**

3:30-5:00 (Repeats)

5:00 Adjourn to Reception and Auction

III. Irrigation and Soils (repeats)
1:20 Potassium management in Alfalfa
1:40 Specially Fertilizers and Micronutrients, Do they Pay?
2:10 Allocation Strategies in Water Short Years
2:30 Management of Center Pivot Irrigation
2:50 Discussion
3:30-5:00 (Repeats)
5:00 Adjourn to Reception and Auction

5:00 - 7:00 p.m. Exhibitor's reception (Food, Cash Bar)

5:30 – 7:00 p.m. Auction for Hay Grower's groups. Auction will feature many items
 donated by exhibitors, attendees, and growers. Proceeds will benefit State-based
 Haygrower Organizations from the Western states.

**Wednesday, December 13, 2006**

*Main Session—Future Trends in Varieties, Energy Crops, Harvesting and Quality:*

8:00 What's around the bend? Future trends in genetic traits in Alfalfa
8:25 Energy crops and their implications for Forage Crops
8:50 Future Trends in Alfalfa Establishment Methods
9:15 Future Trends in Forage Quality Analysis
9:40 Discussion

**10:00 BREAK**

10:25 Rate of Quality Change in Alfalfa
10:50 Cutting Schedule Strategies for Alfalfa
11:15 Protecting Hay Quality during Storage
11:40 Innovations in Harvesting Equipment

**12:00 Noon Lunch (on your own)**

*Main Session—Risk Management Workshop*

1:00-3:45 Workshop on Estate Planning, Crop and Farm Insurance issues, Risk
Management. 5 Speakers.
Western Alfalfa & Forage Conference  
December 11-13, 2006, Reno, Nevada  
John Ascuaga’s Nugget, 1100 Nugget Ave., Reno (Sparks), Nevada  

General Registration Form  
Please print or type clearly and use one form for each person attending.

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<tr>
<th>Description</th>
<th>Cost</th>
<th>Total</th>
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<tr>
<td>Pre-Conference Tour on December 11th (includes lunch)</td>
<td>$ 40.00</td>
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<tr>
<td>Pre-Registration (before November 20, 2006)</td>
<td>$120.00</td>
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<td>Registration includes admission for both days, a copy of the proceedings,</td>
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<tr>
<td>a banquet lunch (with early registration), refreshments.</td>
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<tr>
<td>Late Registration (after November 20, 2006, including walkup)</td>
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<tr>
<td>Registration Single Day Only (12/12/06)</td>
<td>$ 90.00</td>
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<td>Registration Single Day Only (12/13/06)</td>
<td>$ 75.00</td>
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<td>Extra: Banquet Lunch for guest(s) (Tuesday, 12/12/06 only)</td>
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<td>Name(s) of lunch guest(s):</td>
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<tr>
<td>Extra: Additional copies of proceedings (one included with registration)</td>
<td>$ 12.00 ea.</td>
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<tr>
<td>Total Enclosed (make out check to “UC Regents”, U.S. dollars only)</td>
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☐ YES, I plan to attend the California Alfalfa & Forage Association Breakfast December 13, 6:15 a.m. (no charge).

Name _______________________________________________________________________

Company/Ranch Name _______________________________________________________________________

Mailing Address _______________________________________________________________________

City, State, Zip Code _______________________________________________________________________

Phone __________________ Fax __________________ E-mail address __________________

Mail this form: including your check or money order made payable to “UC Regents,” to: Janice Corner, Alfalfa Conference, Department of Plant Sciences, MS-4, University of California, One Shields Avenue, Davis, CA 95616

Paying via Credit Card? Don’t use this form, go to http://alfalfa.ucdavis.edu and use the on-line form.

Registrations will be considered final only after we receive your check. Contact Janice Corner at 530-752-7091 or (jecorner@ucdavis.edu) for further information.

Hotel: Reservations at John Ascuaga’s Nugget Resort and Casino are available online at http://www.janugget.com/hotel/reservations.cfm group code (GALF6), or by calling 800-648-1177 (be sure to mention the Western Alfalfa & Forage Conference). The conference rate is $80.00 for single/double occupancy with a $5.00/room/night resort fee. Hotel Registration Deadline: November 20, 2006.

Note: Please provide individual e-mail address – registration and payment confirmation will be by e-mail only.
CONGRATULATIONS TO
THOMAS A. TURINI

The National Association of Farm Advisors & Specialists awarded Tom Turini the 2006 Achievement Award, which is given to members who have served less than 10 years in CE. The award recognizes professional excellence. Turini, an Imperial County farm advisor, specializes in plant pathology of vegetable and field crops and has conducted research on 15 diseases.

Meeting Announcement

The Natural Science Association at the University of CA Desert Research and Extension Center, Building 1, Highway 80 and Meloland Road, 1004 Holton Road, El Centro will meet at 3:00 p.m. Thursday, November 16, 2006. Cooperative Extension Entomology Farm Advisor, Eric Natwick, will lead a discussion on Exotic and Invasive Insect Pests on or Threatening Imperial Valley Agriculture. For information, contact Bob Flock at 352-6092.
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 October 1 to December 31 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, Irrigation Management 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 (visit [http://tmdl.ucdavis.edu](http://tmdl.ucdavis.edu) and click on the CIMIS link).

<table>
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<th>Station</th>
<th>October 1-15</th>
<th>October 16-31</th>
<th>November 1-15</th>
<th>November 15-30</th>
<th>December 1-15</th>
<th>December 16-31</th>
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<tr>
<td>El Centro (Seeley)</td>
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* Irrigation Management Unit, Imperial Irrigation District.