Imperial County Agricultural Briefs

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Features from your Farm Advisors

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BEET ARMYWORM MANAGEMENT in ALFALFA

Eric T. Natwick, Entomology Advisor, UCCE Imperial County

The beet armyworm, *Spodoptera exigua* (Hübner) is a common pest in desert alfalfa from June through September. Occasionally it damages alfalfa in April or May in the low desert valleys of Southern California. White, cottony scale covered egg masses are deposited on the upper side of leaves. Eggs hatch in a few days and larvae reach full size in 2 to 3 weeks. Larvae pupate on or under the soil surface. Adults are brown nocturnal moths with a 1¼ wing span. Moths emerge to re-infest alfalfa or may infest other crops. There are at least 5 generations of beet armyworm per year in the low desert; the final generation overwinters as pupae in the soil. Beet armyworm larvae are smooth-skinned and are usually olive green, but color varies from bright green to purplish green. Larvae have very fine dark stripes on their backs and pale yellow stripes on each side. An intense black spot on the lateral margins of the second thoracic segment above the second set of true legs is a distinguishing characteristic. First instar larvae web terminal leaves together and skeletonize the webbed leaves. Later instar larvae dispersing throughout the crop canopy. Spiders and various species of predacious bugs prey on the armyworm larvae. *Hyposoter exigua* wasps prey on beet armyworm by depositing an egg in the larvae. A *Hyposoter exigua* larva hatches from the egg and consumes the internal contents of the armyworm larva (Anonymous 1985).

Management guidelines for beet armyworm in alfalfa begin with sweep net monitoring. Monitor fields weekly by taking 5 sweeps and counting the beet armyworm larvae and other pests from each of 4 to 5 locations per field using a standard sweep net. Also sample for *Hyposoter exigua* parasitism of beet armyworm larvae by pulling the heads from ½ inch long armyworms, squeeze the body contents out from the anal end toward the head end; larvae will be pushed out of parasitized armyworms. Check fields 2 to 3 times per week when heavy populations begin to develop. Treat with an insecticide when there are 15 non-parasitized ½ inch armyworms per sweep (Anonymous 2006). Some insecticides that may be used for alfalfa caterpillar control are listed in **Table 1**.

Anonymous 2006. UC IPM Pest Management Guidelines, Alfalfa.
http://www.ipm.ucdavis.edu/PMG/selectnewpest.alfalfa-hay.html.

Table 1. Active ingredients (AI), products, IRAC MoA, formulations, application rates, re-entry intervals (REI) and pre-harvest intervals (PHI) for insecticides labeled for beet armyworm control in alfalfa.

AI (Product)	IRAC MoA	Formulation	Rate / acre	REI	PHI
Bacillus thuringiensis ssp. Aizawai (XenTari, Agree)	11A	DF WG	0.5 lb – 2 lb	4 hours	0 days
Chlorantraniliprole (Coragen)	28	1.67 SE	3 – 5 fl oz	4 hours	0 days
Flubendiamide (Belt)	28	4 SC	2 – 4 fl oz	12 hours	0 days
Indoxocarb (Steward)	22A	1.25 EC	6.7 - 11.3 fl oz	12 hours	7 days
Methomyl (Lannate)	1A	90 SP 2.4 LV	0.5 – 1 lb 1.5pt – 3 pt	48 hours	7 days
Methoxyfenozide (Intrepid)	18	2F	4 – 10 fl oz	4 hours	7 days

LOW DESERT WHEAT LODGING IS A SERIOUS PROBLEM

Oli Bachie, Agronomy Advisor, UCCE Imperial County

Brent Boutwell, Senior Research Associate, UCCE Imperial County

During one of our surveys of crop growth and productivity on Imperial Valley farms, we observed widespread lodging of wheat (Figure 1) in many growers fields. This short article is as a result of this observation and is intended to provide some information on what lodging is, its effects and how to avoid or minimize wheat field lodging. Lodging is the bending over of crop stems near the ground level. It is also used to describe regions of crop fields (or sometimes whole fields) that fall flat. Lodging can be caused by a large growth on the lower part of a plant stalk brought about by overgrowth, high nitrogen level, abundant watering, and / or shading. Climbing weeds and crop diseases that affect shoot and root growth can also cause lodging.

Figure 1: lodged wheat field

Wheat fields with dense canopy (often caused by excessive early nitrogen rates or soils with high volumes of residual nitrogen) between stem elongation and heading crop stages are more prone to lodging than normal crop density fields. Dense canopy plants cannot support themselves, particularly in the presence of heavy rain or high wind. Wheat crops most often lodge at the end of milk stage and the beginning of soft dough stage. While some lodged plants may recover and stand back up, crop yield has already been affected. In addition to yield loss, lodging makes harvesting very slow and no-tilling cultural practices very difficult. Grains from a lodged crop may be abnormal in shapes, unsanitary, and of lower nutrient content. Furthermore, lodging causes uneven grain maturity and hence undesirable productivity (Figure 2, uneven maturity sections of the field regardless of same planting date). Therefore, crop lodging is a costly phenomenon. Some researchers have

Figure 2: Uneven maturity of wheat crop field

measured as much as 50% grain yield reduction in lodged wheat fields compared to normal fields, especially for fields that lodge during early grain-filling stages. Yield loss in lodged fields is mainly due to stem curling, twisting, or bending when the plants fall over, but is also related to reduced photosynthesis and increased pressure from pathogens or other crop pests that take opportunistic attacks on stressed plants.

Lodging can be reduced or almost eliminated with careful crop management techniques. In some cases, growers count the number of tillers per square yard early in the spring and determine if fields are too thick. If wheat fields have more than 750 tillers per square yard at the mid-tillering stage, a split application of nitrogen may help reduce stand populations at harvest. Splitting nitrogen application contributes to maintain plant health and enhance crop standability compared with an early single application. Crop standability may also depend on varieties. Hence, growers can avoid lodging by selecting wheat varieties that are shorter and with stiffer straw, but still high yielding. Another approach useful in minimizing wheat field lodging is through enhancement of crop field uniformity. Crop fields applied with poor nitrogen distribution uniformity usually exhibit patterned fields and alternating lodging strips. Therefore, improving nitrogen distribution / spread uniformity with the use of appropriate calibrated equipment could maintain crop field uniformity and minimize lodging. Wheat crops generally need 300-400 pounds of actual nitrogen per acre (split into pre-plant, at tillering and boot stage), depending on rotational crops prior to wheat. Less nitrogen is needed when wheat follows early winter vegetables or alfalfa. Growers can maintain uniform fertilizer application with the use of spinning-disk spreaders and avoiding fertilizer spreading under windy conditions.

Crop standability can also be managed through proper irrigation practices. While wheat emergence irrigation is usually heavy, subsequent irrigations should only be sufficient to maintain good growth and avoid plant stress. Some researchers suggested that control of wheat stem-based diseases (that may damage and compromise wheat standability) helps to suppress wheat lodging. Stem-based diseases may be common in wheat fields grown year after year without rotations. Therefore, rotating wheat fields with other crops can minimize the likelihood of such disease and the incidence of lodging. Another alternative approach in preventing wheat lodging is the use of growth regulators (that control plant height and improve stem thickness). Growth regulators[1] such as Cerone (Ethephone), chlormequat chloride (Cycocel), and Trinexapac-ethyl (Palisade) have been used on wheat and barley to control lodging especially in Europe and some parts of the U.S. Growers may consult with their PCAs if interested in such or related products and check if they are available for use under the low desert conditions.

[1] Please note that this list is not meant to endorse any of the products

IT'S TIME TO CHECK YOUR SPRINKLER SYSTEM

Khaled M. Bali, Irrigation & Water Mgmt Advisor, Director UCCE Imperial County

Fall is a great time to check your sprinkler irrigation system to insure maximum efficiency and to conserve water. Sprinkler irrigation is mainly used for seed germination and for irrigating vegetable crops in the Imperial Valley. Hand-move systems are commonly used in the Imperial Valley and throughout California. Sprinkler irrigation was mainly used in the Valley for seed germination, however, in the last few years, more growers have been using sprinkler irrigation to germinate and grow vegetable crops in the Valley. Sprinkler irrigation is suitable for most vegetable crops in the Valley. Another big advantage of sprinkler irrigation systems in the Imperial Valley is ability to cool and control soil temperature for late summer or early fall planting.

One of the advantages of sprinkler irrigation over surface irrigation is the ability to apply water uniformly at low rates. Application rates for commercial crops vary from 0.10 to 0.30 in/hr. The application rate depends on nozzle size, sprinkler spacing and operating pressure. Frequent irrigations of low application rates are needed on light or sandy soils. The application rate should not exceed the basic intake or infiltration rate on heavy soils to prevent surface runoff. Table 1 can be used for maximum application rate values for hand-move systems. The application rate of the system should not exceed the values presented in Table 1 to prevent runoff. Reducing or eliminating surface runoff increases the efficiency of the system (water and energy savings). In general, soil infiltration rates decrease after the initial irrigation. If water is filling up your runoff ditch and you have runoff in your drop box, it is time to turn the system off.

The amount of water applied with a sprinkler system depends on the application rate and on the length of irrigation event. The application rate needs to be determined first before any irrigation-scheduling question can be answered. Application rate can be simply determined using the catch can method or a simple procedure in which you run your system for a specific period of time (15 to 60 minutes), determined the amount of water that has been used (using a flow meter) and then calculate the application rate. The application rate (AR) can be calculated from

$$AR = 720\ V/(T\ A)$$

Where AR is the application rate (inches per hour), V is the volume of water applied (acre-feet), T is the time of application (minutes), and A is the area of application (acres).

Example: What is the application rate of a sprinkler system where 0.5 ac-ft of water was applied over 40 acres in 60 minutes.

V= 5 ac-ft
T= 60 min.
A= 40 ac.

AR= 720 x 0.5/(60 x 40)
AR= 0.15 in/hr

If you need to apply 0.75 inches of water to meet the crop water demands over a specific period of time, then you need to run the system for 5 hours (0.75 inches/ 0.15 inches per hour). Irrigation time should be adjusted to account for irrigation efficiency/uniformity. Note that if you change the spacing between sprinklers and/or laterals, the application rate needs to be adjusted to account for the new configuration.

To prevent leaching of nutrients, apply no more than 1 to 1.2 inches per application, if you exceed 1" per application, you maybe leaching nutrients out of the root zone. If you are applying fertilizers with the irrigation system, apply the fertilizer toward the end of the run time to prevent leaching of nutrients. For example, if you are planning to irrigate for 6 hours and apply fertilizers, run the system for 3 hours then inject the fertilizer toward the end of the run (for 2 hours), then use the last hour to flush the fertilizer from the system.

Sprinkler Irrigation check list:

- Flow meter- to estimate the average depth of application and total applied water over the season
- Pressure gage: to monitor pressure and maintain the system pressurized within the range recommended by the manufacturer of the system. Low pressure results in poor distribution uniformity and under irrigation. High pressure results in over irrigation and wastes water and energy.
- Match application rate with crop water use or CIMIS (California Irrigation Management System) reference evapotranspiration (ETo) during early crop stages.

Table 1. Maximum application rates for sprinklers (Slope less than 5%)

Soil Texture	Maximum Application Rate (in/hr)
Sandy soils	1.50
Sandy loam soils	0.75
Silty loam soils	0.50
Clay and clay loam soils	0.15

CIMIS REPORT AND UC DROUGHT RESOURCES

Khaled M. Bali, Irrigation & Water Mgmt Advisor, Director UCCE Imperial County
Sharon Sparks, Imperial Irrigation District*

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 July 1 to September 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	July		August		September	
	1-15	16-31	1-15	15-31	1-15	16-30
Calipatria	0.39	0.38	0.35	0.32	0.30	0.27
El Centro (Seeley)	0.38	0.37	0.32	0.29	0.29	0.26
Holtville (Meloland)	0.39	0.38	0.34	0.31	0.30	0.27

*** 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. UC scientists, with support from the California Department of Water Resources, have recorded video presentations on high-priority drought webpages.

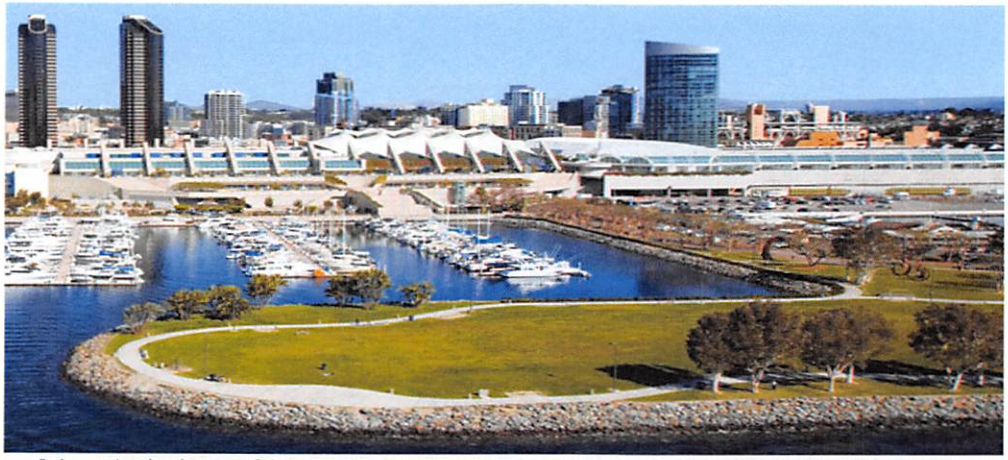
Each presentation is about one half hour in length and is available at the link below:

http://ciwr.ucanr.edu/

Then click on the drought resources link.

24th Annual Cal-IPC Symposium
San Diego Convention Center
October 28-31, 2015

plus a special conference on:
Habitat Conservation Planning
October 29, 2015



Join us in the heart of San Diego, between San Diego Bay and the historic Gaslamp Quarter!

Registration is now open!

Early-bird registration through 9/28!

The **2015 Symposium** will be held October 28-31 at the San Diego Convention Center, located on San Diego Bay near the historic Gaslamp Quarter. Join fellow land managers, researchers, and conservationists to catch up on the latest findings in invasive plant biology and management. In addition to the customary focus on effective program planning and tools of the trade, our 24th annual Symposium will feature a parallel one-day conference on "Invasive Plant Management and Habitat Conservation Planning". Stay tuned for more details in June.

The Symposium will feature a broad range of presentations, discussion groups, trainings and field trips, with activities like our photo contest and awards mixed in. Trainings and a session on Pesticide Laws and Regulations will be held on Wednesday; sessions will be on Thursday and Friday, with the one-day parallel HCP conference on Thursday; and field trips on Saturday (Halloween!). We anticipate continuing education credits from DPR (12 hours "Other" and 2 hours "Laws & Regs". (Trainings and field trips will have additional continuing education credits.)

Website: California Invasive Plant Council