# *Imperial County* Agricultural Briefs

**Feature**

**From your Farm Advisors**

*July, 2006*

# Alfalfa Cutworm Management

## Eric T. Natwick

Cutworms are frequent pests in low desert alfalfa planted on beds, but can also infest alfalfa planted between borders. Alfalfa planted between borders and flood irrigated suffers less from cutworm damage because the worms must move or drown. When the cutworms move ahead of the advancing water, several species of birds can be observed feeding on the worms including, egrets, ibis, gulls and black birds.

Granulate cutworm, *Agrotis subterranea* (Fabricius), and the variegated cutworm, *Peridroma sausia* (Hübner), are the two species that most commonly attack desert alfalfa. Cutworm adults are night-flying moths in the Family: Noctuidae. The white or greenish eggs of the female cutworm moths are laid singly or in irregular masses, on alfalfa leaves or stems often near the base of the plant. As the eggs approach hatching, the developing head capsule causes them to darken. Larvae can grow up to 2 inches long. The heavy-bodied larvae appear as smooth-skinned caterpillars of various colors and patterns. Larvae frequently roll into a C-shape when disturbed. Cutworm larvae hide under loose soil, in soil cracks or under duff during the day, and move to the plants at night to feed.

Variegated cutworm populations may develop in weedy areas and migrate into seedling stands or mature stands, but granulate cutworm moths usually deposit their eggs directly on alfalfa plants. Seedling alfalfa stands can be severely damaged by cutworms cutting the seedlings off at or just below the soil surface. Established fields are damaged when cutworms cut off new shoots of re-growth and when they climb into the canopy to feed on the alfalfa foliage.

Granulate cutworm is a devastating pest of bed planted alfalfa. Low desert alfalfa fields are most commonly attacked by granulate cutworm from May through October, but the pest is resident in fields throughout the year. Established alfalfa fields can be severely injured when re-growth is stopped by cutworms cutting off new shoots at or below ground level following hay harvest. The pest often goes undetected after cutting and hay removal. The problem becomes apparent when the field is watered back and there is little or no re-growth in irregular areas of the field due to cutworms feeding. Cutworms feeding on shoots, holding back re-growth, deplete starch reserves in the crowns, weakening the plants, making them susceptible to disease. Granulate cutworm is nocturnal, but will move from daytime hiding places and climb into the alfalfa canopy to feed in the evening.

**Management guidelines**: Cutworms are most injurious in fields with high plant residue. Pre-plant tillage and abatement of weedy refuge areas around fields help prevent cutworm infestations, especially variegated cutworm. Flood irrigation will drown many cutworm larvae. Flood irrigation during daylight hours will attract Egrets, Ibis, gulls and other birds that prey on the cutworm as the advancing water forces the larvae from hiding. Monitoring and treatment guidelines have not been established for cutworms in desert alfalfa. However, cutworms can be detected by looking under duff and carefully digging to a depth of one inch deep in loose soil near alfalfa crowns. When cutworm numbers exceed one or two per foot of row or severe damage is apparent, treatment with an insecticide is usually warranted. It is important to detect cutworm infestations early. Larger cutworms in the fourth or fifth instar of development cause most of the damage and are more difficult to control. Several pyrethroid insecticides and Steward are insecticides that control granulate cutworm in the low deserts.

Cutworm

Cutworm with damage

# Beet Mild Curly Top Virus Detected in Imperial Valley, 2006

## Thomas Turini

In May 2006, sugarbeet leaf samples exhibiting vein clearing and subtle cupping symptoms, which were from slightly stunted plants as compared to symptom-less plants in the same field, were sent to Dr. Robert Gilbertson, UC Davis Department of Plant Pathology, who confirmed the presence of *Beet mild curly top virus* (BMCTV) in the sample. In sugarbeets, BMCTV causes no striking symptoms, would typically not be noticed and causes little or no economic loss; however, symptoms may be more severe on other crops.

Based on genetic differences, three strains of what was formerly Beet curly top virus (BCTV), are now considered distinct species. They are *Beet severe curly top virus* (BSCTV), BMCTV and BCTV. The names of BSCTV and BMCTV are based on symptom expression on beets and do not necessarily reflect symptom severity in other host plants. BSCTV and BMCTV are commonly detected in California, which includes detection of both of these species in pepper in Coachella in 2005.

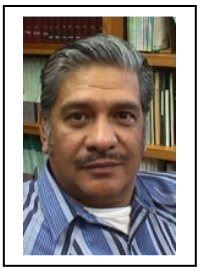
These viruses are transmitted by the beet leafhopper, *Circulifer tenellus*. The beet leafhopper can acquire the virus in as little as one hour of feeding and may be capable of transmitting the virus for life. The leafhopper has a high reproductive capacity, and can migrate long distances from other crops or weeds. The leafhopper survives on a wide range of annual and perennial weeds. In spring, it migrates to agricultural lands when the weed host plants dry out.

The viruses infect more than 300 plant species. In addition to sugarbeets and peppers, tomato, spinach and Swiss chard and beans are affected. On tomato, the viruses cause plants to turn yellow to bronze in color with purple-tinged leaves. Plants become stiff and soon die. Immature fruit will turn red, regardless of age. Infected pepper plants may be severely stunted, have shortened internodes, curled yellow leaves and reduced fruit set. Pepper plants infected at early stages of development may die. On spinach, younger leaves appear yellow, curled and rigid, and the plant usually dies a few weeks after symptoms are expressed.

A series of control measures have been used to reduce this disease. Weed hosts may be treated with insecticide to reduce movement of the beet leafhopper carrying the virus into crops. Resistant varieties of some crops exist.

## Livestock Drinking Water

## Juan N. Guerrero



As the daily temperatures start to increase, it is important to assure good water quality for all our livestock and for pets. Colorado River water usually contains from 750 to 850 mg/l (or parts per million) of total dissolved salts. Although this level may be somewhat salty tasting (for some people), it is quite satisfactory for all livestock and for pets as well. The upper limit of total dissolved salts that is recommended for livestock is 1000 mg/l . Even water that has 2999 mg/l of total dissolved salts is satisfactory for livestock. Water of this saltiness level might initially cause diarrhea in unaccustomed animals, but as the animals learn to tolerate the water, they become accustomed and will perform normally. Water that has greater than 3000 mg/l of total dissolved salts will cause problems for livestock.

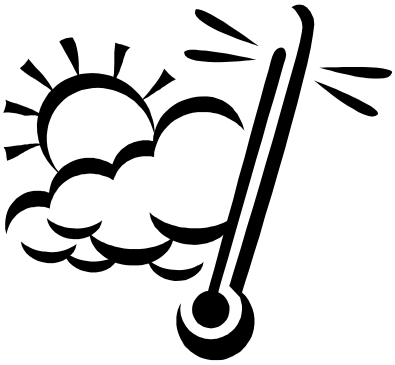
Because of the desert heat, water sometimes becomes too warm. The warm temperature of the water *per se* is not the problem, but rather the warm water permits algae and possibly toxic bacteria to grow. During the summer, if water is provided in a large receptacle and not changed frequently, algae starts to grow in the water quite quickly. Sometimes the algae growth in stagnant water grows to intolerable levels making the water very turbid and green in color. When filaments of algae are present in the water, then the water should be changed quickly.

Closely associated with uncontrolled algae growth in livestock drinkers, is the possibility of cyanobacteria (blue-green algae) poisoning. Cyanobacteria are ubiquitous and grow quickly on hot, sunny, days and in warm, and nutrient rich waters. The presence of these bacteria may give the water a slightly blue coloration. At very high levels of cyanobacteria populations, the water may appear dark green or brownish green. Toxins from cyanobacteria are poisonous to cattle, horses, sheep, pigs, poultry, rabbits and dogs. Not all cyanobacteria are toxic, nor do all cyanobacteria that can produce toxins do so under all conditions. Algal poisoning appears quickly and has no known antidotes.

If for some reason algal growth in livestock drinkers cannot be controlled with constantly replenished fresh water, then copper sulfate may be added to the water for algae control. The usual rate of copper sulfate concentration is 1 ppm, or about 8 lb of copper sulfate in

1,000,000 gallons of water. Copper sulfate is toxic to fish and should not be allowed to flow into drains or other waterways.

A mature 1000 lb bovine, during the desert summer, may drink from 25 to 30 gallons of water per day, a mature horse from 15 to 20 gallons. Exercise makes water consumption increase. It is always a good idea to provide shade over the drinking area. Shade over the drinking area permits the animals comfort during the day and helps maintain the water cooler. Plastic shade cloth is a good way to provide temporary shade for animals during the summer. Large drinkers for a few animals are not a good idea. A practical solution is to provide smaller drinkers with a float valve so fresh water is being replenished as the livestock drink their water. Nipple drinkers work well for swine and dogs.



## Know Your Fertility Needs Following a Non-Legume Forage Crop

**Rick Bottoms**

Mineralization refers to the process of microbial decomposition of organic material that releases mineral nutrients into the soil. Plants take up nutrients only in the mineral form. For example, microbes break down proteins and other forms of organic nitrogen into the mineral form, ammonium. Other microbes further convert ammonium into nitrate (see Fig. 1).

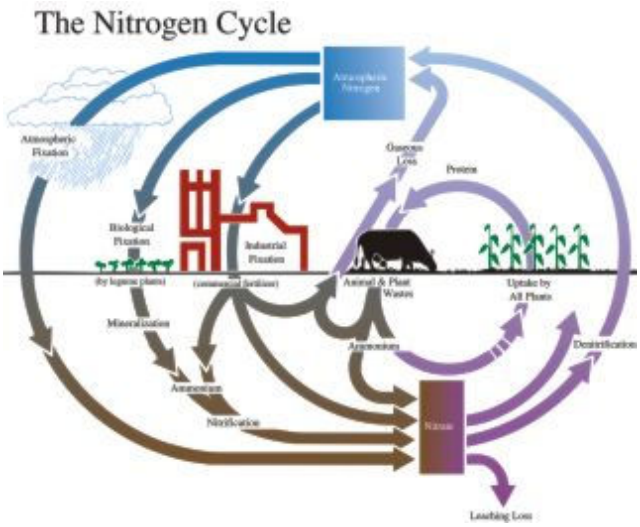



***Fig 1. Nitrogen cycle.*** *Adapted from D.M. Ball, C.S. Hoveland and G.D. Lacefield. 1991. Southern Forages. Potash and Phosphate Institute and Foundation for Agronomic Research, Norcross, GA. 2*

The mineralization rate is dependent largely on the carbon to nitrogen (C:N) ratio in the soil organic matter. In agricultural soils, the C:N ratio in the organic matter ranges from 10:1 to 15:1. The majority of the soil organic matter is very stable so the organic matter content of the soil does not change much from year to year. Similarly, organic amendments that contain at least 25 times more carbon than nitrogen do not easily break down. The stable organic matter becomes the humus fraction of the soil and improves the physical properties and cation exchange of the soil. Organic matter is more stable and tends to accumulate more in clay than in sandy soil. The reason is that clay soil is less aerated and has more surface area to adsorb organic colloids.

Only the much smaller 'degradable' pool easily mineralizes and provides fresh nutrients. The rate of mineralization is strongly enhanced by a history of green manure, manure and fertilizer application. Mineralization is more active in well drained than poorly drained soils, especially when they are warm. For unknown reasons, freshly generated populations of microorganisms (e.g. after drought or freezing events) mineralize organic matter more aggressively than stable older populations. Many species of protozoa, fungi, nematodes, and earthworms are active in mineralization.

Earlier evidence that applied nitrogen is immobilized (tied up) came to me a number of years ago while formerly serving as an agronomy specialist in the mid-west. A producer planted wheat following a grass hay crop. The producer applied enough N to accommodate a normal growth for a wheat crop. However, because the grass hay crop residue was not removed from the field by baling, grazing or burning and used as a green manure crop, the excessive carbon from forage tied up the N to be used for mineralization of the grass hay forage originally intended for the wheat crop growth. Only small out-crops of the field appeared to show a normal green color pattern due to the infrequent deposition from grazing cattle earlier in the late fall.

Both forms of inorganic nitrogen (nitrate and ammonium) can be either absorbed by grass or assimilated into new microbes. Mineral nitrogen captured by microbes is said to be immobilized. When nitrogen is applied to grass there is fierce competition between crop and microbes and the crop does not totally win. The grass hay/wheat producer needed to add an additional 80 lbs. of N in order to compensate for the abnormal excessive C:N ratio. This delayed effect was surely due to the nitrogen being immobilized through the season by soil microorganisms. Such responses demonstrate that nitrogen transformations within agricultural soils are very dynamic.

## Comparison of Phoenix and Beta 8520 Sugarbeet Varieties in Cyst Nematode (*Heterodera schachtii*) Infested Fields in Imperial Valley 2004-2005

**Thomas Turini, Rebecca Westerdahl, Herman Meister and Edward Caswel-Chen**

In Fall 2004, two trials were established in commercial fields to compare the performance of Beta 8520N, a putative nematode tolerant sugarbeet variety, with Phoenix, which is a commercial standard. The trials were located in the El Centro area, and in the Brawley area. The soil at both sites is an Imperial-Glenbar silty clay loam.

To assess nematode population densities, ten 12-inch deep 1 inch diameter soil samples were taken from each plot prior to planting. Nematodes were extracted and the number of *Heterodera schachtii* eggs per liter of soil was determined. The nematode sampling, first irrigation and harvest dates for both experiments are presented in Table 1. Prior to planting, cyst nematode was present in both fields and egg densities did not differ among the areas to which treatments would be applied, P≤0.05 (Tables 2-3). The average cyst nematode egg counts 3018 eggs/liter of soil at the Brawley site and 1269 eggs/liter of soil at the trial in the El Centro area.


**Sugarbeet cyst nematodes**

Under the conditions of the experiment at the Brawley location, percent sugar was higher in the Phoenix (18.5%) than in Beta 8520N (16.45%): P=.002 (Table 2). However,beet yield of Phoenix (16.56 tons/acre) was lower than Beta 8520N (33.06 tons/acre): P=0.001. Gross sugar was higher for the Beta 8520 (10,977 lbs/acre) than in Phoenix (6,284 lbs/acre):P=0.004.

At the El Centro area location, Phoenix and Beta 8520N performed similarly (Table 3).

**Table 1.** Dates of selected activities.

| | **El Centro** | **Brawley** |
|---|---|---|
| Pre-plant samples | 17 Sep 2004 | 15 Oct 2004 |
| First water | 17 Sep 2004 | 18 Oct 2004 |
| Harvested | 27 June 2005 | 20 May 2005 |

**Table 2**. 2004-05 sugarbeet variety comparison at commercial field in Brawley area
.

| **Variety** | **Pre-plant Cyst nematode (eggs/L)** | **Sugar (%)** | **Yield (tons/ acre)** | **Gross sugar (lbs/ acre)** |
|---|---|---|---|---|
| Phoenix | 3099 | 18.59 | 16.56 | 6284 |
| Beta 8520N | 2936 | 16.45 | 33.06 | 10977 |
| Probability | NS | 0.002 | 0.001 | 0.004 |

**Table 3**. 2004-05 sugarbeet variety comparison at commercial field in El Centro area
.

| **Variety** | **Pre-plant Cyst nematode (eggs/L)** | **Sugar (%)** | **Yield (tons/ acre)** | **Gross sugar (lbs/ acre)** |
|---|---|---|---|---|
| Phoenix | 1166 | 15.69 | 70.1 | 21997 |
| Beta 8520N | 1371 | 15.74 | 74.4 | 23421 |
| Probability | NS | NS | NS | NS |

# MEETINGS/ANNOUNCEMENTS

## DESERT RESEARCH & EXTENSION CENTER RECOGNITION

On Thursday, June 15, 2006, the Desert Research & Extension Center recognized the service and commitment of two long term employees. Ernie Fusi, Farm Machine Mechanic, was recognized for his 10 years of service. Ernie works in the cattle facility in conjunction with Dr. Richard Zinn's Animal Nutrition Research.
Fernando Miramontes, Principal Agricultural Technician was recognized for his 25 years of service. Fernando works in all aspects of research trials.
We wish to thank and commend these employees for the years of dedication and service to the Research Center.

## RETIREMENT ANNOUNCEMENT

The University of California Cooperative Extension would like to extend and invitation to you to attend a Retirement Party/Dance for **Refugio A. (Cuco) Gonzalez** to be held on July 29, 2006 at the Barbara Worth Resort at 5:00 P.M. If you would like to receive an invitation to this event, please contact us at (760)352-9474 or e-mail to: atietz@ucdavis.edu to reserve your spot on the invitation list. No reservations /monies will be taken after July 14, 2006. The cost of the dinner is $30.00 per person.

## IMPERIAL COUNTY SOLARIZATION FIELD DAY

**When: Thursday, July 6, 2006** **Cost:** Free
Where**: Heartshorn between Bridenstein and Webb (Pine 20A)** **Holtville, CA 92250**

**2.5 hours California and Arizona CEU applied for.**

**Solarization Workshop:**

| | | |
|---|---|---|
| 7:00-7:30 | Registration | |
| 7:30-7:40 | Introduction | Thomas Turini |
| 7:40-8:40 | What does solarization control and how to solarize | Dr. Jim Stapleton |
| 8:40- 9:00 | Plastic products for solarization | Mark Lauman |
| 9:00-9:20 | Grower perspective: Does solarization work? | Jim Clayton |
| 9:20-9:40 | Break & refreshments | |
| 9:40-10:30 | Viewing of equipment & application demonstration | |

For more information contact Thomas Turini at 760-352-9474

Thomas Turini

Please notify Thomas Turini at the Imperial County Cooperative Extension office, if you require special arrangements.

**CIMIS REPORT**

**Khaled Bali and Steve Burch***

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 June 1 to August 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 and click on the CIMIS link).

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 |

* Irrigation Management Unit, Imperial Irrigation District.