Imperial County Agricultural Briefs

Features

From your Farm Advisors

July, 2007

Baling Recommendations
Juan N. Guerrero

All hay crops at the present time are worth good money, therefore it is quite important not to do anything that might decrease hay yields. During this extremely busy time of year, it is important to remember the principles of good hay making.

1. Time of Day – Theoretically afternoon swathing should yield the highest quality hay. During the day plant carbohydrates accumulate in the plant and these same carbohydrates are respired at night. Swathing in the afternoon will maximize soluble carbohydrates in the plant, decrease the ADF% (very good), and increase the hay quality test. However, during this very busy time of year it is often difficult to only swath in the afternoon. Changing swathing schedules from 11AM to 7PM might do the trick, if feasible.

2. Wide Swaths – Wide swaths promote faster drying rates.

3. Raking – Raking at 40 to 50% hay moisture is recommended. Raking promotes drying rate.
Raking at 50% moisture will result in only a 3% loss in dry matter and only a 5% loss in leaves.
Raking at 20 to 25% moisture can be tragic. Raking at 20% moisture will result in dry matter losses of about 12% and leaf loss of about 21%! At this time of year it might mean that hay is swathed today and raked tomorrow, difficult to do if another hay field has to be swathed tomorrow also.

4. Bale Moisture – As the year progresses, the baling window in the day decreases. Sometimes during June and July, there is only enough atmospheric moisture that hay baling is only possible for several hours in the early morning. Bale moisture monitoring meters are available that read bale moisture in the baling chamber of the baler. Theoretically, alfalfa hay should be baled at 14 to 18% moisture. Baling at higher than 20% moisture might result in moldy bales. Baling at lower than 12% moisture results in leaf loss, lower quality hay, and hay that becomes very brittle. Baling hay at the appropriate moisture (14 to 18%) with plenty of leaves means little if it stored roadside for several months. Untarped hay over four months can shrink down to 5% moisture by the end of September. Tarping hay is not only for protection against rain damage. Tarping hay during summer roadside storage will retard hay shrink, enough to pay the tarp bill.
On field experiments, we took hay yields with quadrats (small wire squares used to estimate yield), took bale counts and weighed individual bales. Sometimes the difference between the quadrat estimates (estimating total field biomass) and between harvested hay bales has been as high as 25%; that is to say 25% of the possible hay yield was left behind! Paying attention to details matters!

SOIL SOLARIZATION HEATS UP IN THE LOW DESERT

Jim Stapleton, UC Statewide IPM Program, Kearney Agricultural Center; Tom Turini, UCCE, Imperial/Fresno County; Rick Bottoms, Desert Research & Extension Center and UCCE, Imperial County

Solarization - broad spectrum disinfestation via passive solar heating of moist soil - has been around for several years now. Although originally targeted by researchers to serve as an alternative to chemical fumigation, it has mostly been adopted in the U.S. as a technique for home gardeners and small scale organic operations. Recently, however, vegetable growers in the Imperial and Yuma Valleys have been catching on to solarization as a viable alternative to soil fumigation and herbicide use. And why not? Summer air temperatures in the low desert often hit 115 ^{0}F plus during the summer – way too hot for most vegetable production, but perfect for knocking out soilborne pests between crops (Figure 1).

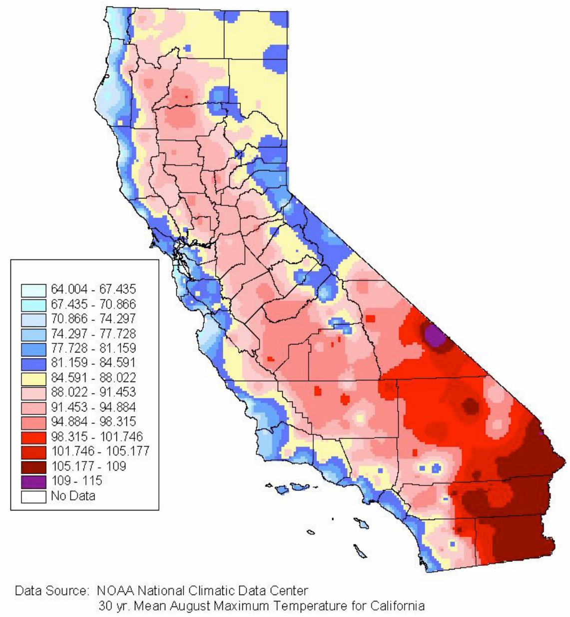

Figure 1. Month-by-month maximum air temperature maps are available on the UCKAC Soil Solarization Informational Website (http://solar.uckac.edu)

In the low desert, solarization is used mostly for control of weeds in both organic and conventionally-produced spring mix crops – leafy vegetables grown on wide beds and harvested by repeated mowing (Figure 2). Under this culture, there is a “zero tolerance” for weeds growing on the bedtops, and escapes must be rogued by expensive hand weeding crews. Since solarization works by “top-down” heating, the maximal effect is near the soil surface, where many of the weed propagules of concern are located.

In warmer areas, such as the Imperial and Central Valleys of California, and the Yuma Valley in Arizona, solarization can heat soil to more than 130 ^{0}F at 3 inches depth, and more than 120 ^{0}F at 6 inches (Figure 3).

Figure 2. A spring mix crop of arugula just getting started on wide beds for harvest by repeated mowing in the Imperial Valley.

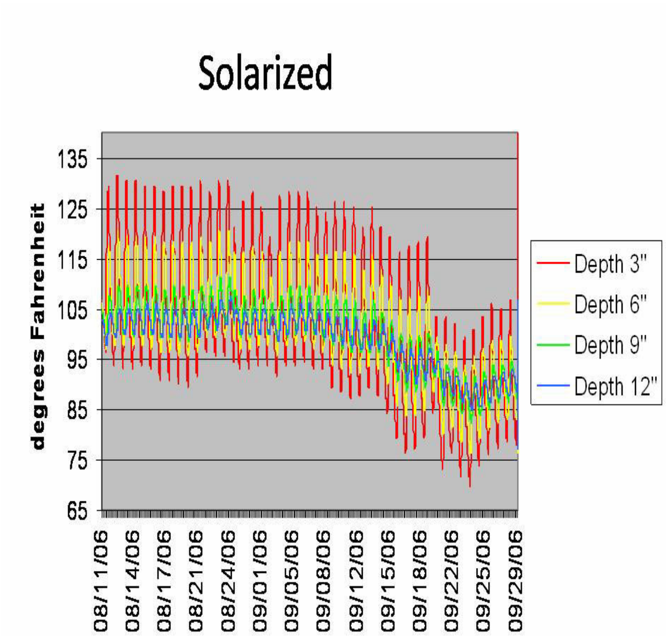

Figure 3. Soil temperature data from a recent, late-season (August-September) experimental plot at the UC Desert Research & Extension Center near El Centro.

Heating, and thus control, diminishes with greater depth. Numerous studies have confirmed that excellent weed control can be achieved using solarization. Most growers form beds (and lay drip tape, if drip irrigation is to be used) before they solarize, (Figure 4) rather than laying plastic on the flat field and bedding up later. By solarizing after forming the beds, a grower may plant immediately after treatment, and there is no need for subsequent cultivation which may bring up viable weed propagules from deeper in the soil. It should be emphasized that solarization is appropriate for use in warmer climatic areas – application in cooler and coastal areas may not predictably provide the same, desirable results.

Solarization is not just a weed control treatment – soilborne pathogens and nematodes are also susceptible to the high temperature effects. In fact, in parts of the world where solarization is used primarily in conjunction with greenhouse production, soilborne fungal diseases are the main targets of the treatment, and there is a long list of pathogens successfully controlled. However, fungi, bacteria, and nematodes can cause problems to crops from origins deeper in soil than most weed seeds can successfully emerge – and sometimes deeper than solarization can effectively reach. Also, there are certain pest species that are resistant to the effects of solarization – such as purple nutsedge (*Cyperus rotundus*) and the melon vine decline fungus (*Monosporascus cannonballus*). In such cases, solarization may be combined with pesticides, biological control agents, or organic amendments to provide additional control. For example, experiments are underway to test the combined effects of solarization and dazomet to control vine decline in Imperial Valley melons. This disease is resistant to both solarization and chemical intervention by themselves, but there are indications that the combined treatments may provide economic disease control.

At this point in time, solarization should be considered as much a knowledge-based treatment as one based on product efficacy. So then, what resources are available for PCAs to acquire solarization know-how? Along with a call to the local UC Farm Advisor, one might start by taking a look at the UC Kearney Solarization Informational Website (http://solar.uckac.edu), which provides links to references, temperature maps, weed seed inactivation graphs, contact information for solarization plastic suppliers, and more.

Resources for solarization users:

Soil Solarization Informational Website (2007). University of California. Available online at: http://solar.uckac.edu

Elmore, C.L., Stapleton, J.J., Bell, C.E., and DeVay, J.E. (1997). Soil solarization: A nonpesticidal method for controlling diseases, nematodes, and weeds. DANR Publication 21377, University of California, Oakland, 14 pages. Available online at: http://solar.uckac.edu/

J.J. Stapleton, J.E. DeVay, and C.L. Elmore, Eds. (1998). Soil Solarization and Integrated Management of Soilborne Pests. FAO Plant Production and Protection Paper 147, United Nations, Rome. 680 pages. May be ordered online at http://www.fao.org/catalog/giphome.htm

INSECT PESTS OF BERMUDAGRASS SEED PRODUCTION

Eric T. Natwick and Michael Rethwisch

The planthopper, *Toya propinqua,* is often called a fulgorid by PCA's. Planthoppers are often abundant on bermudagrass florets and leaves from spring through fall. These tan colored planthopper are small insects about 0.13 inch long. The adults hop or fly when disturbed and nymphs resemble adults, but are wingless, run quickly or may hop when disturbed.

Planthoppers feeding reduces plant vigor and they can contaminate seed heads with honeydew deposits, making the seed difficult to clean. Insecticide treatments to prevent this damage are often needed during the spring and fall seed production seasons. Monitor for planthoppers in seed fields using a standard sweep net when florets are developing and continue until seed harvest. Treatment threshold have not been established, but treat when planthopper population buildup is observed.

The mirid or plant bug, *Trigonotylus tenuis*, is a small light-green colored, narrow, stilt-legged plant bug that may be abundant on bermudagrass florets and leaves. Both adults and nymphs may be found in bermudagrass at any time during the spring through fall. Their feeding can reduce plant vigor, stunting growth and delaying the development of florets. Monitor for plant bugs from re-growth through bloom and treat with an insecticide when plant bug counts reach 100 per sweep.

Thrips, *Chirothrips spp.*, are small insects, about 0.04 inches long that may be abundant on bermudagrass florets and leaves during warm month from spring through fall. Adults have are dark gray or brown and two pairs of narrow wings fringed with hairs while larvae are wingless and yellowish in color. Adult females deposit eggs in plant tissue and eggs hatch in about 5 days; the immature stages take about 5 to 7 days to complete development.

Thrips are of concern when plants are in bloom because feeding within florets blast flowers reducing seed set. Control weed in and around bermudagrass fields including surrounding crops. Monitor seed fields for thrips when florets are developing. A treatment threshold has not been established. Treat when thrips buildup is observed during bloom.

Spider mites, *Tetranychus spp.* and *Oligonychus pratensis* (Banks), can be observed by examining leaf blades with a hand lens. Infestations often include a mixture of spider mite species. Adult mites are about 0.06 inch in length, have four pairs of legs, are greenish to pink or cream colored, and have various sized black spots on the body. Under warm conditions, spider mites move rapidly within the colony area. Spider mites have four stages of development: (1) the oval, somewhat translucent egg, (2) a six-legged translucent immature stage, (3) an eight-legged immature stage and, (4) the eight-legged adult stage. A generation may pass in as few as 5 to 7 days in mid-summer, or in a month during cool periods. Spider mites produce webbing that is often filled with cast skins, dust, and other debris. Mite feeding results in the destruction of chlorophyll; leaves become pale, stippled, and in later stages of infestation dry up and die. Loss of color is pronounced on the under surface of leaves before it becomes apparent on the upper side. Light infestations can be tolerated, but when heavy, can result in lowered seed yield.

Spider Mite Biological Control: Several predators play an important role in regulating spider mite populations, including the western predatory mite (*Galandromus* [*Metaseiulus*] *occidentalis*), sixspotted thrips (*Scolothrips sexmaculatus*), western flower thrips (*Frankliniella occidentalis*), lady beetles (*Stethorus* sp.), minute pirate bug (*Orius tristicolor*), and lacewing larvae (*Chrysoperla carnea*). The western predatory mite is the same size as spider mites but lacks spots and ranges in color from cream to amber red. Sixspotted thrips and western flower thrips are also effective predators, but naturally-occurring populations of these insects generally do not develop to high enough levels that they can provide significant control until damage has already taken place. Both species are tiny, slender insects about 1 mm or less in length. Six-spotted thrips has three dark spots on each forewing; western flower thrips ranges in color from clear lemon yellow to dark brown. Monitor western predatory mites and the two species of thrips to determine if they are present in the field and their relative population density in comparison with pest mites.

Spider mites can be managed culturally by minimizing dust and encourage predators and parasites by limiting chemical rates and the number of applications. Control field bindweed growing in or at the edges of a bermudagrass field. Good water management increases plant tolerance to these pests. A treatment threshold has not been established, but when buildup is observed, either spot or completely treat the field before webbing occurs providing no predatory thrips or predaceous mites are present.

The grass whitefly, *Aleurocybotus occiduus*, is the only economically important species of several species of whiteflies found in bermudagrass. Proper identification of the whitefly species is important because the grass whitefly is the only economically important whitefly infesting bermudagrass. Silverleaf whitefly and bandedwinged whitefly adults are commonly found in bermudagrass fields during the summer and fall, but few if any nymphs will establish on bermudagrass. Distinguishing whitefly species is difficult; use a hand lens to examine both immatures and adults. Grass whitefly nymphs have parallel sides giving them an elongate cigar shape rather than the oval shape of most other whitefly species and they do not have a wax fringe as do most whitefly species. Grass whitefly eggs are scattered on leaf blades. The tiny, oval eggs hatch into first instar nymphs called crawlers. The crawlers colonize bermudagrass leaf blades and molt loosing their legs and antennae to become scale like during the remainder of the nymphal stage. The last nymphal instar, often called the pupa or the red-eyed nymph, is the stage that is easiest to identify. In light infestations of grass whitefly, leaves show no distinctive symptoms as a result of their feeding. Desiccation of plants occurs with moderate to heavy populations and the production of copious quantities of honeydew contaminates seed heads making harvest and seed cleaning difficult.

Several wasps, including species in the *Encarsia* and *Eretmocerus* genera, parasitize whiteflies. Bigeyed bugs, lacewing larvae, and lady beetles also prey upon whitefly nymphs. Monitor seed fields for whitefly adults with sticky traps and a sweep net. Monitor nymphal populations by examining leaf blades with a hand lens. No threshold is established, but treat when honeydew first be comes noticeable on leaf blades.

Thrips photo courtesy of UC IPM On Line

Spider Mites photo courtesy of UC IPM On Line

Mirid photo courtesy of UC IPM On Line

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.