Small Fruits & Vegetables
IPM Advisory

Weekly Pest and Production Update, Utah State University Extension, **May 21, 2010**

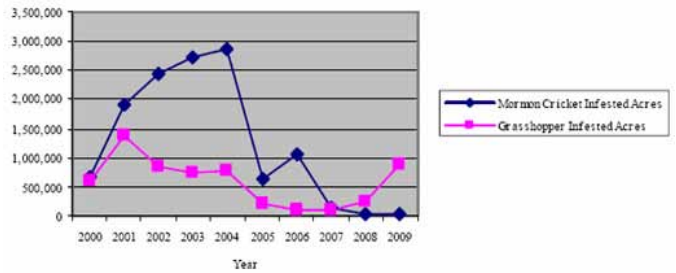
Insect/Disease Information

VEGETABLES

Grasshopper Outlook 2010

By Cory Vorel, USU CAPS Coordinator

The Utah Department of Agriculture and Food's Mormon Cricket/Grasshopper Decision & Action Committee recently discussed grasshopper predictions for 2010. Based on seasonal monitoring, the grasshopper levels for 2010 are expected to surpass those in 2009 on cropland and rangeland. In 2009, grasshopper infested acreage increased by 276% from the previous year (see below). Of the approximately 871,086 infested acres, 65% were private lands. Utah's outbreak is predicted to last 3-5 years.



Number of acres infested by grasshoppers and Mormon crickets over the past 10 years (adapted from 2009 Insect Report, UDAF).

There are about 400 grasshopper species in the 17 western states, 70 of which can cause economic damage. Utah has seven species of concern, with the two species most affecting croplands being the migratory grasshopper, *Melanoplus sanguinipes*, and the clearwinged grasshopper, *Camnula pellucida*. Because Utah is large and has a diversity of habitats and climates, and because different species hatch at different times, grasshopper season can be complex and drawn out. In southern Utah, grasshoppers begin hatching at the end of March. Grasshoppers may still be hatching at the end of June in cooler areas and at higher elevations. If current weather patterns hold, this year's grasshoppers are expected to begin hatching in May throughout much of the state.

Forethought is important when considering when to spray for grasshoppers. It is wise to monitor populations, and treat when the nymph population becomes large. More information can be found in the Utah Pests grasshopper fact sheet.

There are two grasshopper and Mormon cricket control programs for privately owned range and crop lands in Utah. With the state cost share program, the Utah Department of Agriculture and Food (UDAF) pays 75% of the cost (up to $12 per acre for aerial application and up to $14 per acre for ground application) to control grasshoppers and Mormon crickets. Participants that qualify for this program spray their own land or pay an applicator, then submit a contract for reimbursement. It is important that landowners only spray when it is necessary, even though they can take advantage of the cost share program. Spraying can be expensive, and it is important that the funding for this program be stretched as far as possible, because it will not be funded indefinitely. Those that participated in the cost share program last year will notice a decrease in the amount that UDAF is able cover. This is a direct reflection of budget constraints, and illustrates the need for prudent spraying so that funding is not exhausted.

The second program is the USDA/APHIS-PPQ Cooperative Mormon Cricket Grasshopper Control Program, which pays 100% of the cost to treat federally managed lands. If funding is available, USDA also pays 50% of the cost to treat state owned land and 33% of the cost to treat private rangeland.

For more information about these programs, about the availability of bait from UDAF, and about the Mormon Cricket/

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Grasshopper Decision & Action Committee, contact Clint Burfitt at UDAF's Plant Industry Division (http://ag.utah.gov/divisions/plant/index.html).

Treatment options for grasshopper: Start early in the season as nymphs are easier to kill than adults. Also, cover as large an area as possible (get neighbors involved). carbaryl+bait (Corry's Bug Bait[H], Eco Bran, Lilly Miller Grasshopper Bait, Sevin 5 Bait), carbaryl (Sevin[H], many others), permethrin (Basic Solutions, Bonide Eight[H], Gordons[H], Spectracide[H], etc.), bifenthrin (Tundra, Allectus, Brigade, Sniper, Talstar), acephate (Orthene[H]), malathion[H]
[H]homeowner use

Flea Beetles

Adult flea beetles have emerged from overwintering and are feeding now on cole crops. They are tiny black beetles that may jump when disturbed. They can also be found on tomatoes and sweet corn. They are active in cool weather, but as temperatures warm in spring, they multiply quickly. They chew holes in the leaves and can be a problem on young plants. They are found mostly on the undersides of leaves.

Monitor young seedlings carefully until they have mature leaves. The best time is mid-day when they are most active. Note that older plants can tolerate 20-30% damage on leaves before a reduction in yield.

Treatment: spinosad (Entrust, Success, Monterey[H], Ferti-Lome[H], etc.) insecticidal soap[H], diatomaceous earth, neem oil[H], carbaryl (Sevin[H]), permethrin (Ambush, Pounce)
[H]homeowner use

Leafminer on Spinach, Beets

Leafminers are active now, laying eggs on the undersides of spinach, beet and chard leaves. The adult is a fly and the oblong eggs are white, and easily visible. The maggots burrow inside the leaves, eating cell contents between the upper and lower epidermis. The visible symptom is a winding trail that may enlarge to gray blotches on the leaves.

Maggots feed for a few weeks before pupating in the soil. There are 3 to 4 generations per season. Late May is the first peak period of activity.

Treatment: Look for eggs or the start of new mines to determine when to start treatment. Repeat treatment in 7-10 days. Options include: Agri-mek (abamectin), Coragen (chlorantraniliprole), Beleaf (flonicomid), Provado (imidaclo-prid), malathion[H], insecticidal soap[H], pyrethrin[H], spinosad[H]
[H]homeowner use

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Plant Associations for Improved Yield and Pest Management

Physical, chemical, and biological mechanisms of certain plant associations that can lead to minor pest suppression and greater crop yields. Some examples are:

TRAP CROPPING. A plant variety or crop is used to attract a pest, and is either treated or removed after infestation, thus reducing pest pressure on the desired crop. An example is using Petunia 'Carpet Blue' to attract thrips away from tomatoes or peas.

NITROGEN FIXATION. Roots of legumes (peas, clover) add nitrogen to the soil, reducing the need for nitrogen fertilizer, which is helpful for vegetables like corn, tomato, or cabbage.

NURSE CROPPING. Tall or dense plants can protect tender plants through shading and wind breaking. Oats, for example, are used to help establish alfalfa by preventing weeds from establishing.

PEST SUPPRESSION. This can occur through a variety of mechanisms:

a) *Chemical exudates* from parts of certain plants may have pesticidal properties. In two studies examining the chemical compounds of marigold (*Tagetes* spp.), one found that naturally occurring compounds in flowers and foliage were lethal to Mexican bean weevil, and another found that root compounds were lethal to cabbage maggot larvae.

b) *Mixing plant species* may cause an interference with visual or olfactory orientation of pests to their host plants.

c) *Mixing plant varieties* of the same species circumvents insects' ability to adapt to natural plant defenses. For example, mixing field-planted barley cultivars results in reduced aphid feeding.

c) *Refugia* (beneficial habitats) provide desirable environments of plant material and shelter for predator and parasitic insect species such as syrphid flies, parasitic wasps, lacewings, and robber flies.

Some gardeners have reported benefits in mixing certain plant species while others see no difference. Understanding how plant associations work can improve their use and consistency of effects. Lists of plant associations can be found at: http://attra.ncat.org/attra-pub/complant.html.

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