Cooperative Extension: Colorado State University, Fort Collins, Colorado 80523

Pest Alert

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The Pest Alert is now found on the World Wide Web at http://www.colostate.edu/programs/pestalert

JULY 31 VEGNET REPORT

During the last week of July - 2000, rainfall totals varied from 0 to 0.42 inches throughout Colorado, western Nebraska, western Kansas and eastern Wyoming. Temperatures averaged in the upper 80s to mid 90s throughout the region. The regional weather forecast predicts below average to average rainfall and above average temperatures for the first week of August.

Scattered disease reports continue to filter in to VegNet. The Sugar Beet industry is concerned about the initiation of Cercospora Leaf Spot, as their in-field disease forecast model reached the infection threshold a couple of weeks ago. Infection has been reported from numerous fields in western Nebraska and eastern Colorado during the last 7 days.

Please share sightings of pest problems by calling the CSU VegNet Team at 970-491-6987 (Howard Schwartz), 491-7846 (Mark McMillan), or 491-0256 (Kris Otto).

POTATO

Many of the earlier planted fields are finished for the season, but continue to scout later planted fields for early blight and late blight.

Maintain the Early Blight Protection Program throughout the Front Range and northeastern areas of Colorado with protectant fungicides such as the EBDCs (e.g., maneb, mancozeb, penncozeb, dithane, polyram, Quadris), super tin.

Disease Model: with a May 1 emergence date, the early blight model (threshold of 300) is averaging 560 to 600 and with a May 15 emergence (regrowth) date, the early blight model is averaging 500 - 525 throughout eastern Colorado as of July 30.

The late blight model (threshold of 18, with disease possible in 7 to 14 days) increased greatly a week ago but not in recent days, and is holding at 9 to 17 in the Front Range, 19 at Fort Morgan, and 18 to 26 at northeastern sites (Wray, Yuma), with a May 1 emergence date. A mid-May emergence date lowers the disease values 1 or 2 points, only. There are still no reports of Late Blight in the state as of July 30.

Maintain an aggressive scouting program, and use the earlier emergence date to schedule more aggressive protection programs for early blight and late blight, if it shows up this year especially on later planted fields of potatoes.

DRY BEAN

Conditions in eastern Colorado and western Nebraska a week ago could favor foliar disease outbreaks on susceptible varieties of beans. Scout fields for early signs of rust, white mold or bacterial diseases such as common bacterial blight, bacterial brown spot, and/or halo blight.

If rust is detected in susceptible varieties, protectant fungicides such as Bravo at a 14-day phi and Maneb at a 30-day phi have been effective in recent university trials. [Note: There is no Section 18 label for Tilt available for bean producers to use in Colorado or Nebraska during 2000.]

The mid-season copper-based bactericide program (with products such as Kocide, Champ, NuCop, etc) continued during flowering to early pod fill periods can reduce common blight (bacterial brown spot, halo blight) severity later during pod bump. Maintain the protection until pod bump if disease threatens.

White mold is managed by application of fungicides such as Topsin and Benlate at 100 % to full bloom with good coverage of the blossoms to reduce infection sites for the pathogen. Manage irrigation water to dry out plant canopies and soil surfaces between waterings.

Western flower thrips feed in developing flowers and can cause flower and pod abortion. Five flower thrips per blossom can reduce the number of seeds per pod and number of pods per plant. Treatment with products such as Orthene can reduced western flower thrips losses.

ONION

Most onion transplants have been or are being harvested. Most seeded fields are bulbing well, and may benefit from a protectant bactericide/fungicide application (copper + EBDC product such as maneb, mancozeb, dithane, penncozeb) for the bacterial disease complex. There are still no reports of serious bacterial (or foliar fungal) problems in transplanted or seeded onion, other than a few plants affected by bacterial soft rot, purple blotch and possibly

a trace amount of downy mildew in the Front Range. Botrytis blast may appear at this stage of the season as small, whitish, sunken lesions usually beginning near leaf tips and progressing downwards.

Front Range scouts have reported some onion leaf tip death, but no evidence of fungal infection has been observed in our lab. It appears that air pollution (i.e., ozone) may have contributed to this stress and death of leaf tips with some white stippling or spotting of the foliage; especially with the high temperatures during recent weeks. There was concern that this problem was caused by Botrytis, however, we still have not observed any of the typical symptoms (small, oval, sunken, scattered, white lesions on leaf tips progressing downward to the base of the leaf) nor have we been able to recover the pathogen in our lab.

Maintain the copper-based bactericide program, tank-mixed with an EBDC product on a 7 to 10 day interval to reduce problems with bacterial diseases and any fungal diseases (Purple Blotch, Botrytis Blast) that could develop as the plants continue to develop and mature in the next few weeks. Rovral could be added for enhanced protection against Purple Botch and/or Botrytis if detected. Ridomil/Copper can be added for enhanced protection against Downy Mildew if detected.

If one uses an April 1 emergence date for seeded onions, the Purple Blotch disease model (threshold value of 300) is averaging 410 to 480 in the Front Range and Fort Morgan areas, 370 to 410 in the Arkansas Valley and West Slope areas. Therefore, our onion areas have exceeded the threshold and require aggressive scouting programs to detect early infection in the next 7 to 14 days in seeded fields.

SOUTHWESTERN CORN BORER (SWCB) MOTHS

Golden Plains Pest Survey reports catching a few southwestern corn borer (SWCB) moths in pheromone traps at Kirk, Wray and Wuaneta. This is an insect that we expect to move north following mild winters, but as they are saying in Nebraska, "not this far north!"

What follows is the text of a KSU informal publication on SWCB. The document complete with illustrations is available at: http://www.oznet.ksu.edu/library/entml1/SWCB.pdf

Registered chemicals are found in the High Plains Integrated Pest Management Guide.

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SOUTHWESTERN CORN BORER

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Introduction

The southwestern corn borer was originally described from a specimen collected in Mexico in 1911. It was first noted in Kansas in 1931 in Morton and Stevens counties. By the mid-40s it had been identified as far north as southern Nebraska and east nearly to the Missouri border. Heaviest infestations generally have been associated with sandy soils south of the Arkansas and Cimarron Rivers in Southwest and South Central Kansas.

Description

Southwestern corn borer moths are white with light tan scales along the veins in the wings and about 3/4 inch (19 mm) long. Other than slightly darker scales along the veins, they have no distinct markings on the wings. The wings are folded about the body when not in use, thus giving the moths a tented or cylindrical appearance.

Moths are primarily active at night but can be found during the day under leaves or behind leaf sheaths. Fresh eggs are creamy-white in color and oval in shape, with a slightly raised or convex upper surface. Each egg is a little less than 1/8 inch in diameter. Although single eggs can sometimes be found, eggs generally are laid in groups of two to five, overlapping slightly. Eggs may be laid anywhere on the plant, but most are laid in the upper surfaces of leaves. The eggs change color as they mature, developing three parallel rows of reddish-orange lines prior to hatching, which is commonly referred to as the redder stage.

There are two distinct color phases of Southwestern corn borer larvae. During the summer, larvae are white with distinctive dark brown to black spots. During the fall and winter, the larvae lose their spots and become nearly all white in color. One distinguishing characteristic of Southwestern corn larvae that can be seen even in small instars using a hand lens or microscope is that the hooks on the bottom of the prolegs form a complete circle (other larvae commonly found on corn have a straight line or incomplete circle of hooks on soles of the prolegs).

The pupae are about 1 inch long, medium to dark brown in color, with a blunt tail end ringed with a row of blunt projections.

Life Cycle

The Southwestern corn borer has two, and sometimes three, generations per year. It overwinters as a full-grown larva in the crown or base of the corn plant just below ground level. These larvae pupate in late May through June. The pupal stage lasts about 10 days, after which the moths emerge, mate and lay eggs which produce the first generation of borers. Eggs of the first generation are laid from mid-June through early July.

Larvae infesting young corn move to the inner whorl where feeding damage will appear as shot holes in the leaves. Once the larvae are about half grown they will begin to tunnel into the stalks. By mid-July some larvae will begin to pupate and moths will emerge to begin a second generation by late July or early August.

The majority of the eggs of the second generation will be laid in the ear zone. Small larvae feeding on tassel-stage corn usually can be found between the husk layers of the primary ears and ear shoots and later may feed on the cob and ear shank. When the larvae are several days old, they bore into the stalk and begin tunneling. Sometimes, larvae will bore out of the stalk and back into it one or more times making visible exit and entry holes.

The mature borers of the second generation tunnel down the stalks to the base of the plant, below the soil line. In the lower portion of this tunnel, a long cell is hollowed out and lined with a thin layer of silk. As this cell is being constructed, the larvae move back up the stalk above the soil surface and ream the inside of the stalk until only a very thin outer shell remains. It is during this period that the larvae molt and lose their dark-colored spots and become an

almost uniform white color. The hibernation cell is then completed by closing the upper part of the tunnel with a silken plug.

Damage to Corn

Losses from Southwestern corn borer can occur from "dead heart" (or death of the growing tip) resulting from first generation larvae feeding in the whorls of young corn plants, from larvae tunneling in the stalk and ear, and from larval girdling which frequently results in lodged plants.

Girdling is a behavior pattern in which larvae, in preparation for overwintering in the plant stub, chew a groove around the inside of the stalk a few inches (several centimeters) above the soil surface. Girdled plants are weakened and susceptible to lodging.

This girdling behavior is more closely associated with day length than plant maturity.

Control Strategies

Cultural practices play an important role in managing the Southwestern corn borer. Farmers can take advantage of the fact that the crown of the corn plant serves as the overwintering site for this pest. With fall or winter stalk destruction by disking, chiseling, or "middle-busting," the borers are exposed to lethal freezing and drying conditions. To be most effective in reducing overwintering borer population, this should be done in all cornfields throughout an area of several counties or more. Even one or two fields left undisturbed through the winter may produce enough moths to cause borer problems throughout the neighboring areas. At best, the population will have been reduced to more nearly manageable levels.

On an individual farm basis, planting date is one of the main factors, which can be manipulated to reduce losses from this species. Early-planted corn usually is less susceptible to lodging than late-planted corn. This is because early planting allows harvesting at an earlier date before girdling occurs or at least before the corn is exposed to prolonged periods of wind, rain, and snow after maturing.

Other helpful cultural practices include using a moderate plant population along with proper fertilization and timely and adequate irrigation. This ensures strong, healthy stalks that will withstand lodging conditions better than those that have been weakened by various stresses. The use of early-maturing varieties, harvest of high-moisture corn, and harvest with equipment designed to pick up lodged stalks all aid in reducing yield loss.

Some beneficial insects, including predators and parasites, feed on Southwestern corn borers. These include lady beetles, lacewings, spiders, and at least one species of extremely tiny wasps, which parasitizes borer eggs. Flickers and other birds destroy many overwintering Southwestern corn borers in Louisiana and Mississippi, but such predation is a rarity on the wide expanse of the High Plains.

The Cooperative Extension Services in some states recommend chemical control of the Southwestern corn borer when certain infestation levels are present. Generally, it is the second generation of the season at which control efforts are aimed, because it is these larvae that will girdle the corn stalks. (Where there is a partial third generation the larvae often are overtaken by winter or corn harvest before they reach the stage of maturity in which girdling behavior is common.)

Proper timing of insecticide application is very important since for greatest effectiveness, the larvae must be treated after hatching from the eggs but before they enter the stalk. Light-trap catches of moths and the use of computerized prediction of borer development are helpful in determining when insecticide applications should be made. More than one treatment will probably be required because of the several-week-long period over which this generation of moths is laying eggs (although an individual moth lives only a few days). If a decision is made to apply an insecticide, avoid automatic spray schedules and base the need for additional treatments on individual field infestations of borer egg masses and newly hatched larvae. Be aware that some insecticides may increase spider mite populations later on in the season.

Scouting Methods

You should scout cornfields for first generation southwestern corn borers from mid-May through June depending on the latitude and the year. Carefully check the leaves for egg masses and small larvae. Also look for plants with early signs of shot-hole feeding injury on leaves and search the whorls and leaf axils of these plants for small larvae. Note that relatively small plants have no immunity or lack of attractiveness to the Southwestern corn borer (as they do to the European corn borer). In fact, plants under 15 inches (38 cm) tall are especially susceptible to serious injury or death from "dead heart" induced by Southwestern corn borers. Scout for the second-generation Southwestern corn borers from about mid-July through August or until effective control measures have been employed. Most eggs of this generation will be found on the upper surface of leaves in the middle portion (ear zone) of plants which have reached the tasseling stage. Levels of infestation should be determined for each cornfield. Inspecting corn plants for these very small egg masses requires meticulous attention and is quite time consuming.

Economic Thresholds

Thresholds for first generation control are not well established. While yield reduction can occur from damage caused by first generation larvae, it is not generally assumed to be serious unless the majority of the plants are infested. In absence of better knowledge the European corn borer threshold of 50 percent of the plants infested with live larvae could probably be utilized.

Fortunately, first generation infestations have generally been light in most fields in Kansas in recent years. Most insecticide treatments are directed against second-generation larvae. Insecticides should be applied when 20 to 25 percent of the plants are infested with eggs or newly hatched larvae.

If using the Kansas State University Southwestern corn borer computer model predictions, scouting should begin when 25 percent emergence is predicted. If you find 20 percent or more of the plants infested with eggs at that time, then treatment is recommended when 50 percent emergence is expected and again 7 to 10 days later. If you find some eggs but not enough to justify treatment rescout the field in 3 to 5 days. Then consider treatment if the sum of the two counts is over 25 percent. In this case, you may still need two applications. If populations were low on the first two samplings, a third sampling should be made 7 to 10 days after the first sampling date. This time, sum the results of all three sampling dates and recommend treatment if the total exceeds the 25 percent threshold. With this light pressure one application a week or so after the predicted date of 50 percent emergence should provide adequate control.

New corn borer resistant corn lines including Bt-corn may require adjustments to the treatment threshold for corn borer. Expect to see more information on this development in the near future. For current control recommendations see the most recent version of the recommendation guide "Insect Management for Corn," publication number MF-810.

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ONION BACTERIAL & STORAGE DISEASE MANAGEMENT in Colorado

By Dr. Howard F. Schwartz, Professor of Plant Pathology (08/01/00)
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A complex of bacterial pathogens and their diseases were favored by unusually prolonged periods of rain, high humidity and dew that accompanied the weather patterns apparently induced by 'El Nino' events that flowed into Colorado during recent years, especially during 1997. Storm damage, high winds, irrigation water, equipment and workers all presumably contributed to the secondary movement of bacterial pathogens and severity of diseases which affected onions in various fields and production areas in Colorado.

The bacterial complex included: Xanthomonas Leaf Blight - *Xanthomonas campestris*, Bacterial Soft Rot - *Erwinia carotovora* subsp. *carotovora* and other species, Sour Skin - *Burkholdaria (= Pseudomonas) cepacia*, Slippery Skin - *B. gladioli* pv. *alliicola*, Pseudomonas Leaf Streak - *P. viridiflava*, Bulb Decay - *Enterobacter cloacae*, and Pantoea Blight/Soft Rot - *Pantoea ananitas*.

The potential for carryover of these pathogens and their threat to future crops is considered to be very high under favorable (moist) environmental conditions. Therefore, the pest management program at Colorado State University has urged the onion industry to aggressively pursue sanitation programs that incorporate old onion crop debris and culls to reduce contamination of equipment, soil and water sources before each new crop cycle begins; in addition to timely and thorough application of appropriate pesticides. This strategy combined with warmer and drier growing conditions will help onion producers market an economical and high quality crop to consumers nationwide.

Integrated Pest Management Strategy:
The following Integrated Pest Management Strategy is being promoted to reduce disease and yield losses from the bacterial complex in Colorado during 2000 and future years:

- adhere to a three-year or longer crop rotation
- strict sanitation of onion crop debris, culls and volunteer plants
- plant less susceptible varieties if available

- treat seed with streptomycin and plant clean transplants free of pathogens (bacterial, Pink Root, Fusarium, Botrytis) and insects (thrips)
- use a moderate fertility program (avoid nitrogen after storm damage)
- monitor irrigation scheduling to prevent overwatering
- do not re-use irrigation runoff water
- only work in the field when the plant canopy is dry
- follow a Preventive Program with copper-based bactericides (initiate prebulb, continue on a 5 - 7 day to 7 - 10 day schedule depending on conditions in reference to CSU VegNet - IPM or other local scouting programs, reports and recommendations)
- use high labeled rates of the copper product of choice (e.g., Kocide, Champ, NuCop), use an adjuvant, and tank mix with an EBDC fungicide (e.g., maneb, manex, manzate, penncozeb, Dithane)
- ensure thorough coverage of foliage
- rely upon ground-rig systems when feasible, but minimize canopy damage
- do not cut when tops are too green or wet
- roll tops of undercut onions only after they have cured for a few days
- air-cure bacterial-affected onions in the field and storage shed at ambient air temperature until neck tissue and outer bulb scales are thoroughly dried
- during harvest, curing and storage operations, use a general disinfectant such as Effersan (Sodium Dichloro-s-Triazinetrione) to treat water sources used to cleanse equipment, conveyers, truck beds, and storage bins. Laboratory tests at Colorado State University have shown that the timely application of a disinfectant such as Effersan (100 ppm) can kill common bacterial cells and fungal spores before they contact exposed onion surfaces during handling

GOOD YEAR FOR TOBACCO BUDWORM

Back-to-back mild winters seem to have allowed for excellent survival of the tobacco budworm (a.k.a. "geranium budworm"). During outbreak years, such as this, they can do extensive damage to flower beds and may be injurious over a much broader range than normal.

Geranium, petunia, and nicotiana are typically most commonly damaged by this insect, but many other plants may be incidentally fed upon by the caterpillars which primarily attack the flower buds and ovaries of developing flowers. The damaged buds fail to open and a failure of flowering ("failure to color") is often the first sign of injury observed. Petals of emerged flowers are also chewed, giving the flowers a ragged appearance. The amount of damage the insects cause progresses through the growing season, becoming most noticeable in late summer.

The adult stage of the tobacco budworm is a "miller-sized" moth with light green wings with a series of light bands. They fly and lay eggs, singly around the buds, during early evening. The larvae that emerge are marked with several stripes but can be quite variable in overall color. Dark forms are common but red and green larvae may also be seen. The differences in color, in part, are related to the color of the flowers on which the insects are feeding.

Control: In small plantings, hand picking the caterpillars should be considered as it is often the most practical control. Tobacco budworm larvae are most active during dusk and are best discovered at this time. During day light hours they often hide around the base of the plant.

The tobacco budworm is a difficult insect to control, resistant to most insecticides. There are few effective options available and the most commonly available garden insecticides (e.g., Sevin, Diazinon) are minimally effective at best. However, synthetic pyrethrins (pyrethoid) insecticides can provide good control. These include products that contain ingredients such as permethrin or esfenvalerate, which may be found in some retail outlets.

Developing varieties of bedding plants resistant to tobacco budworm may provide a long-term means of managing tobacco budworm. For example some variation in susceptibility to this insect has been observed among petunia cultivars. Salmon, pink and rose colored cultivars are particularly favored. Least commonly damaged are yellow petunias. Red, white, violet, and blue cultivars are usually intermediate in susceptibility to this insect. Among geraniums, ivy geranium (*P. paltattum*) is much less frequently damaged than are "standard" (*P. hortatum*).

There has been an Extension Fact Sheet (no. 5.581), Tobacco (Geranium) Budworm, produced on this insect. It is available in electronic format only, on the Extension CD-ROM. (Cranshaw)

ON FLYING ANTS

The periodic emergence of swarming flying ants for some reason is often a disturbing phenomenon for many to observe, particularly when it occurs with a structure. However, it is a very normal part of ant colony life history and often does not indicate any serious problem and the swarming incidents are short-lived.

Some background on ant biology is in order. First, these are obviously social insects, meaning they establish a colony and different members of the colony may differ in form and function. The vast majority of the colony is made of wingless **workers**, which are sterile females. They may differ in size with some being minor workers; larger ones the major workers. Tens of thousands of workers may populate a mature ant colony.

The **queen** is the primary reproductive form, a fertile female. Often there is only one queen per colony, although multiple queens are known with some ants.

The queen is one of the **reproductive forms**, which originate as winged individuals. When a colony has been well established, often several years after it is initiated, some energy goes into producing these winged, reproductive stages. They consist primarily of males, with some females, the latter being potential queens.
When conditions are favorable these winged forms issue forth from the colony for mating flights. (Sometimes they move out on their own, sometimes the workers drag them out.) The emergence of winged forms occurs in pulses, usually only once but sometimes a couple of times a year. For many of the ants found regionally these "swarms" most commonly occur during a sunny warm afternoon or early evening some 2-3 days after there has been a heavy rainstorm. Therefore swarming by many colonies may occur simultaneously.

The winged stages leave the colony, permanently. The males often aggregate at prominent points or other "action sites" waiting for females. Mating with the females occurs in these

areas, with females being involved in multiple matings, which provide the sperm for egg fertilization used for the rest of her life.

The males are short-lived and die a few days after emergence from the colony. The mated females try to establish a colony - they are now the new potential queens. They typically dig a small pit into the soil or find some similar suitable nesting site and drop their wings after a few days. The muscles of the wings serve as her primary source of stored energy, which she needs to establish the colony. Very few, less than 0.1% ever succeed, but those that do make the new colonies. These very few provide the replacement for the constant turnover that exists amongst all ant colonies.

A bottom line point: When you see an emergent swarm of ants it is an indication of a colony that has existed for several years; it is not an indication of a new infestation.

Regarding control: Ant control, whether you are observing a swarm or just for general control, is the same. It is described in detail in several Extension publications, notably Fact Sheet 5.518 (*Ants in the Home*) and the section in Extension Bulletin 557A (Household Insects of the Rocky Mountain Region). Basically, dusts or granular insecticides (typically containing permethrin or diazinon) can be applied to nest entrances. However, these often fail to kill colonies. Baits are usually a better method, which first involve determining what foods are best visited. Most ants typically have either a preference for sweets (e.g., honey, sugar) or fats (e.g., Crisco, peanut butter), although a few have different preferences such as the harvester ants that are seed feeders. Once the feeding preference has been determined, an appropriate bait can be used - several are available commercially. (Cranshaw)

THE "GOLDEN LADY BEETLE" - NOT!

One of the more striking insects found in summer are moderate sized beetles of brilliant gold hue that are most commonly described as a "golden lady beetle". Although they have some superficial resemblance in size and shade, these beetles are actually in a different insect family (Chrysomelidae, the leaf beetles) and are properly known as "golden tortoise beetles". The most common species in the region is *Deloyala guttata*, which can range from a bright gold to a burnished coppery color.

Like other members of their family they feed on leaves, both in the adult and larval stages. However, the golden tortoise beetles are specialists of plants of the family Convulvulaceae. This is the morning glory family and the beetles feed on morning glory, sweetpotato and field bindweed - unfortunately having little, if any, impact on the latter. Small, nearly circular holes in the leaf interior advertise their presence.

The tortoise beetles spend the winter under debris in the vicinity of the garden, returning in late spring to lay eggs on morning glory and other host plants. Thorny spines cover the body of the young grubs, which feed inconspicuously on the underside of the leaves. Further contributing to their cryptic habit is that they pack old shed skins and excrement on their back, sometimes being called "peddlers" as a result. On the hand the adults can be vibrantly colored and can control their coloration to some extent by the manner in which they pump their blood. This can alter the cuticle of the insect in a manner that can change light refracting from it, allowing them to appear golden or sometimes quite dull. (Cranshaw)

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Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.

Sincerely,

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