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CropWatch No. 2003-15, June 20, 2003

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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

University of Nebraska Lincoln

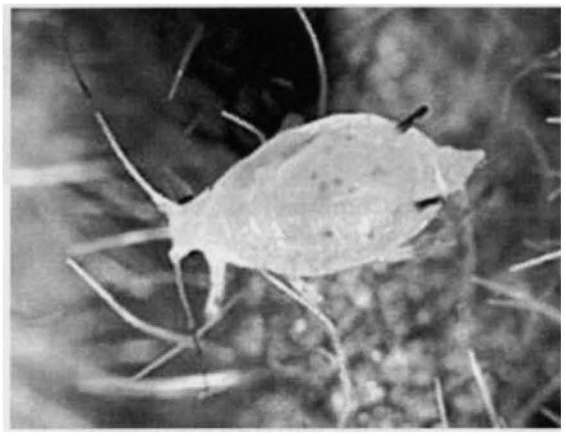
No. 2003-15, June 20, 2003

Soybean aphids spotted in southeast Nebraska

On June 16 members of the Soybean Aphid Survey and Early Warning Program sponsored by the Nebraska Soybean Board found four soybean aphids in the southeast corner of Nebraska. Out of ten fields scouted, aphids were found in two.

Two aphids were found in a field near Peru in Nemaha County and two were found in a field south of Union in Otoe County. Three of the aphids were winged, indicating they likely had just arrived. While numbers may be low at this time and aphids have not been found in the rest of the state, farmers should consider this an early warning signal to gear up their scouting efforts for this insect.

The aphid is light green to pale yellow, less than 1/16-inch long, and has two black-tipped cornicles (cornicles look like tailpipes) on the rear of the abdomen. It has piercing-sucking mouthparts and typically feeds on new tissue near the top of soybean plants or on the undersides of mature leaves. Later in the season aphids can be found on all parts of the plant. It is the only aphid in North America that forms colonies on soybean.



Soybean aphid

Soybean aphids reproduce more quickly in cool environments -- optimum conditions are 72°-77°F with a relative humidity below 78%. Development slows when temperatures exceed 81°F. High temperatures may have been what kept the aphid populations at low levels last year in Nebraska.

Soybean aphids have been found to be economically damaging when at high numbers during the late vegetative and early reproductive soybean stages. From now through June, farmers should scout their fields to see if aphids are present.

In next week's *CropWatch* I will present more information on soybean aphid biology and management.

Tom Hunt, Extension Entomologist, Haskell Agricultural Laboratory, NEREC

Inside

The clock's ticking and it's nearing high noon for grasshopper decisions

Grasshopper numbers are building across much of the state and farmers and landowners are reminded to be actively scouting and deciding whether treatment is necessary. The most effective control is achieved when grasshoppers are at the 3rd to 4th instar nymphal stage, when the hoppers are still 1/2 to 3/4 inch long. This usually occurs from mid June through early July when young hoppers are concentrated in and near hatching beds and will be more susceptible to insecticides. Growers who delay treatment until grasshoppers are larger will have difficulty achieving control. Acreage owners and urban homeowners also need to be scouting for grasshoppers now to avoid later damage to ornamentals, gardens, and other plants. Timely control efforts also will help curb

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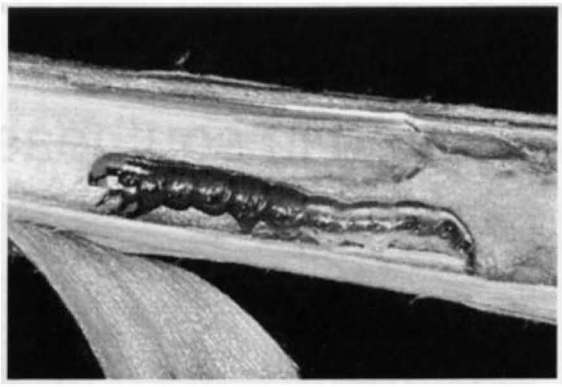
Updates

Karen DeBoer, Extension Educator in Cheyenne County: The wheat in the southern Panhandle is turning color and harvest will probably begin around July 4 in the eastern part. In general, the wheat looks good. We have had a few reports of insects, disease and hail and some stands were thin coming out of the winter. Spring planted crops look good. Producers are finishing up proso millet and sunflower planting. The moisture situation is good over most of the area.

Ronald Seymour, Extension Educator in Adams County: Most crops look very good but plant developmental stage is variable, particularly for corn. Corn growth stages range from the 3-leaf to the 8-leaf stage. A few European corn borer moths continue to be caught in the area, but egg laying has been minimal. Most of the soybean crop is in the 1st and 2nd node stage. Bean leaf beetle feeding has been noted but with little significant damage.

Winter wheat is ripening and a few fields have some minor rust infections. The first cutting of alfalfa is complete with excellent regrowth. Grasshoppers are continuing to hatch immediately outside of fields, particularly those with a high weed population.



Common stalk borer

Keith Jarvi, Extension IPM Assistant at the Northeast REC: Common stalk borers have been moving into corn from nearby grassy areas and damage is now visible. At first, large shotholes can be seen, and later, as the stalk borers burrow into the plant, the plant looks very ragged and stunted. Common stalk borer damage is occasionally confused with corn borer damage (see the June 13 issue of *CropWatch* for more information) but it is usually confined to a few rows that border grassy areas. The larva is pale white, with dark brown to purplish stripes that converge to form a saddle shape along the middle of the body.

Corn rootworms should be in the second instar stage by now in most of Nebraska. All continuous corn fields should be scouted for rootworm larvae. If three or more larvae are found on average per plant, a rescue treatment may be necessary. This threshold is very subjective and allowance should be made for the skill of the scout. *(Check the June 13 CropWatch for further information on scouting for rootworms.)*

Cultivation application of granules, or post applications of Furadan 4F should be applied now for optimum corn rootworm control. Lorsban 4E applications through a center pivot should occur near when the first second instar is found. When applying Lorsban through a pivot, remember to use enough water to wet the soil to at least 4 inches down to move the Lorsban through the root zone. Once the initial movement has stopped, the Lorsban will bind tightly and will not be moved much further with additional moisture.

Correction

In a June 13, 2003 *CropWatch* article, "Distinguish the many product faces of glyphosate to select what you need," we mentioned that there were three salts of glyphosate being marketed. Actually this year there are four salts. Roundup WeatherMax contains a new potassium salt of glyphosate instead of the isopropyl amine salt used in many of the previous Roundup formulations.

CROP WATCH

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Lisa Jasa, Editor; Email: ljasa1@unl.edu

With a record harvest expected

Prepare bins, equipment for quality wheat storage

Many Nebraska growers are anticipating a larger than average wheat harvest, based on more acres planted last fall and generally improved growing conditions this spring. Many wheat farmers may be planning to store their harvest on-farm as they anticipate higher market prices in the future. To maintain and protect initial grain quality, bins and equipment will need to be cleaned and protected from insects which may infest and damage stored grain.

In our state insect problems in stored grain originate from infested grain trapped in harvesting equipment, in the bin itself, or nearby, but not in the field. Proper equipment and bin preparation can help ensure that grain quality is maintained in storage.

Cleaning bins, equipment

Grain harvesting and handling equipment such as combines and augers must be thoroughly cleaned so that insect-damaged or moldy grain is not dumped into the first new crop grain passing through the equipment. Carefully inspect and remove all traces of old grain from combines, truck beds, grain carts, augers, and any other equipment used for harvesting, transporting, and handling grain. Clean grain bins thoroughly, disposing of spilled, cracked and broken grain and grain flour, along with the insects feeding on this material. A simple broom, bucket, and a vacuum cleaner are essential pieces of equipment in cleaning grain bins.

Around the bins, be sure to remove old equipment, junk and clutter to reduce attractiveness to insects and rodents. Make sure that the bin is insect- and rodent-proofed by plugging holes, sealing bins, caulking and making general repairs. Grain spilled near the bin attracts insects and draws mice and rats. Clean up and dispose of any spilled grain a few weeks before harvest. If rats have tunneled under foundations, use baits or traps to reduce or eliminate them.

Tall weeds can harbor insects and provide cover for rodents. Mow around the bin site to remove tall grass and weeds to reduce the potential for insect and rodent infestation. If necessary, re-grade the site so that water readily drains away from bin foundations. In the midst of harvest you won't want to wait for wet soil to dry out.

Make certain that travel lanes have enough rock or gravel to bear the weight of heavy trucks and grain carts. Using geotextile fabric will increase the effectiveness of gravel and crushed rock for the travel lanes and around the bin perimeters. The fabric is inexpensive and can extend the life of gravel by up to 10 times. Landscaping should be maintained well away from grain storage facilities. Leave a 4-foot wide strip of bare gravel around the perimeter of storage bins.

Treating empty bins

Once empty bins have been thoroughly cleaned, a residual treatment may be applied to bin surfaces to protect incoming grain from insect infestation. Follow label instructions carefully. Note that the following recommendations are for bins that will store wheat. (A later issue of *CropWatch* will address recommendations for preparing bins for corn and soybean storage.)

The following materials can be applied as residual sprays to empty wheat bin surfaces: silicon dioxide, silica gel plus pyrethrins, pyrethrins, malathion and diatomaceous earth. Note that pyrethrins would provide a relatively short residual and that malathion is not effective for some stored grain insects due to resistance. For bins with false floors, which are inaccessible for cleaning, chloropicrin, a bin "clean-out" fumigant, is legal to use prior to binning the wheat. Other fumigants that could be used on empty bins are magnesium phosphide and methyl bromide. Caution! Fumigants are dangerous, restricted use pesticides and may require gas monitoring devices and respirator protection for the applicator. It is highly recommended that fumigation be done by a commercial pesticide applicator who has been trained and EPA/NDA-certified in safe fumigant handling and application techniques. Refer to current labels for specific details and instructions.

Grain storage and temperature

After cleaning the bins and equipment, the next step is to ensure the quality of the grain going into storage. It must be clean, sound and dry and it's essential that it be relatively free of fines (cracked grain), trash and foreign material. Never put new crop grain on top of old grain in the bin.

Stored grain insects cannot live on extremely dry grain (less than 10% moisture), however it is impractical to reduce grain moisture much below minimum moisture levels necessary for long-term storage. The safe storage moisture level for wheat is about 13%. Insect activity and reproduction are favored by high grain moisture, especially when condensation and molds occur and fermentation raises the grain temperature. Spoilage and internal heating allow insects to remain active -- even in winter.

Proper bin aeration can help manage grain temperature. Since insects are "cold-blooded", they are less active at lower temperatures.

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Wheat storage

(Continued from page 143)

Maintaining "cool" grain can be particularly important in reducing insect reproduction. Condensation of moisture in the grain mass is prevented by slow cooling and gradual reduction of the gradient between the grain mass temperature and the outside (ambient) temperature. In summer, keeping the grain cool is a challenge, so timely aeration is important.

Typical harvest temperatures may produce a grain mass that starts off at 95°F or higher. In a 1994 study, Kansas entomologists found that proper aeration and cooling after harvest could eliminate the need for grain protectants in many cases.

Treating stored wheat

Diatomaceous earth or natural pyrethrins can be applied directly to wheat as it goes into the bin. Once wheat is in storage, surface infestations of Indianmeal moth may be prevented with *Bacillus thuringiensis kurstaki* (Dipel, etc.). If found to be seriously infested with insects later in the summer, the grain mass can be fumigated. Fumigants approved for use on wheat include: magnesium phosphide and aluminum phosphide. Other stored wheat treatments include: diatomaceous earth, silicon dioxide and pyrethrins.

David Keith
Extension Entomologist
Tom Dorn
Extension Educator
Lancaster County
William Campbell
Ag. Systems Specialist

***CropWatch* is also available on the Web at**

cropwatch.unl.edu/weather.htm

Rescue weed treatments in corn

If you've been kept out of the field and weeds have gotten a foothold, several rescue treatments are available for corn taller than 12 inches. Remember that some products are better at controlling smaller weeks and may not have much of an impact on large weeds. When deciding whether to spray, consider the potential for successful weed control and the chance of crop injury. This information is for use as a guide only, always read and follow label directions.

Late season weed control in corn greater than 12 inches

Accent – up to 36-inch corn. If greater than 20 inches, use drop nozzles.
Aim – up to 8-leaf corn (approximately 30 inches)
Callisto – up to 8-leaf corn (approximately 30 inches)
Clarity – up to 36-inch corn. Use caution with nearby sensitive broadleaf crops. Use directed application if possible.
Distinct – up to 24-inch corn. Use at 4 oz /A rate
Exceed – up to 30-inch corn. Greater than 20 inches, use drop nozzles.
Glyphosate – up to 30-inch corn. If greater than 24" use drop nozzles. Requires Roundup Ready corn
Liberty – up to 36-inch corn. Requires Liberty Link corn
Lightning –45 days before harvest – Requires Imi/Clearfield corn
Northstar – up to 36-inch corn. Greater than 20 inches, use drop nozzles.
Option – up to 36-inch corn. If greater than 16 inches, use drop nozzles.
Roundup WeatherMax – up to 30" corn. If greater than 24 inches, use drop nozzles. Requires Roundup Ready corn.
2,4-D amine – up to tasseling. Use drop nozzles for corn more than 8 inches. Use caution with nearby sensitive broadleaf crops.
Yukon– up to 36-inch corn. Weeds 1-6 inches tall.

Brady Kappler, Weed Science Educator

EPA watching for atrazine in water

The EPA in January announced that it has adopted aggressive measures to test for and protect drinking water from the herbicide atrazine. Atrazine was first registered in 1958 and is estimated to be the most heavily used herbicide in the United States. The program involves intensive, targeted monitoring of raw water entering certain community water systems in areas of atrazine use. Under conditions spelled out by EPA, when atrazine is detected in levels above its standards, the use will be prohibited in that specific watershed area. These and other measures are contained in EPA's "Interim Reregistration Eligibility Decision" (IRED).

Provisions of IRED have been incorporated into an agreement with the principal registrant of atrazine, Syngenta, who is required to conduct a specialized, weekly testing program in vulnerable watersheds to monitor "raw" drinking water during high periods of atrazine use. If levels in raw drinking water exceed EPA's standards, atrazine use is canceled in that geographic area. In this way EPA is allowing flexibility to account for local conditions while assuring that their standards are met. The costs involved in this program will be the responsibility of atrazine manufacturers as part of their product stewardship. For more information on this topic, check "The Label", a UNL newsletter available on-line at *http://pested.unl.edu/thelabel/tlfeb03.htm*

Larry Schulze, Extension Pesticide Education Specialist

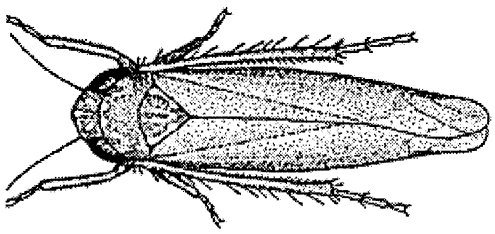
Riding air currents from the south

Potato leafhoppers have arrived; scout alfalfa

Potato leafhoppers have had ample opportunity the last couple of weeks to ride southerly air masses into Nebraska. Checks of an alfalfa weevil plot near Winside indicate that the leafhoppers are present and should be scouted for. These pests do not overwinter in Nebraska and reestablish themselves annually.

These small (1/8 inch long), bright green, wedge-shaped insects may cause severe damage to alfalfa by injecting a toxin into the plant as they feed. This feeding results in a distinctive yellow or purple triangle shape at the tip of the leaf. First year spring-planted alfalfa fields are particularly attractive to and vulnerable to potato leafhoppers, as are fields planted last year. In older fields, these insects usually more of a problem for second and third cuttings. New resistant alfalfa varieties provide some protection; however, alfalfa in the seedling stage may still be damaged. All fields should still be scouted, as large numbers of leafhoppers may still cause a problem in resistant variety fields.

Treatment decisions are based on numbers captured by sweep net. A sweep net is the only reliable way to scout for potato leafhoppers. Use the tables to help determine the need for treatment. Note that it doesn't take too many potato leafhoppers to cause an economic problem. Most insecticides registered for potato leafhopper will give good control. See *Table 4* on *page 145* for a partial list of registered insecticides.



Potato leafhopper

Keith Jarvi
Extension IPM Assistant

Table 1. Dynamic treatment thresholds for potato leafhoppers (average number per sweep) on alfalfa that is 1 to 4 inches tall.

Value of hay	Cost of insecticide application (per acre)					
(per ton)	**$8**	**$10**	**$12**	**$14**	**$16**	**$20**
$ 60	0.40	0.50	0.60	0.70	0.80	1.00
$ 80	0.30	0.40	0.50	0.50	0.60	0.75
$100	0.25	0.30	0.40	0.40	0.50	0.60
$120	0.20	0.25	0.30	0.35	0.40	0.50
$140	0.20	0.20	0.25	0.30	0.30	0.40
$160	0.15	0.20	0.30	0.30	0.30	0.40

Table 2. Dynamic treatment thresholds for potato leafhoppers (average number per sweep) on alfalfa that is 4 to 8 inches tall.

Value of hay	Cost of insecticide application (per acre)					
(per ton)	**$8**	**$10**	**$12**	**$14**	**$16**	**$20**
$ 60	0.70	0.80	1.00	1.00	1.30	1.70
$ 80	0.60	0.60	0.75	0.90	1.00	1.30
$100	0.40	0.50	0.60	0.70	0.80	1.00
$120	0.30	0.40	0.50	0.60	0.70	0.80
$140	0.30	0.35	0.40	0.50	0.60	0.70
$160	0.25	0.30	0.40	0.40	0.50	0.60

Table 3. Dynamic treatment thresholds for potato leafhoppers (average number per sweep) on alfalfa that is 8 to 12 inches tall.

Value of hay	Cost of insecticide application (per acre)					
(per ton)	**$8**	**$10**	**$12**	**$14**	**$16**	**$20**
$ 60	2.00	2.40	2.80	3.00	3.90	5.00
$ 80	1.80	1.90	2.20	2.70	3.00	4.00
$100	1.20	1.50	1.80	2.10	2.40	3.00
$120	0.90	1.20	1.50	1.80	2.10	2.40
$140	0.90	1.00	1.20	1.50	1.80	2.00
$160	0.80	0.90	1.00	1.20	1.50	1.80

Prices received by farmers

The preliminary U.S. All Farm Products Index of Prices Received in May is 107, based on 1990-92=100, up six points (5.9%) from the April index. Higher prices for lettuce, hogs, broilers, and soybeans more than offset lower prices for eggs, asparagus, onions, and tomatoes. The seasonal change in the mix of commodities farmers sell, based on the average of the past three years, also affects the overall index.

Tax deductions allowed for groundwater depletion

In December 1982 the Internal Revenue Service ruled that irrigators withdrawing ground water from the Ogallala aquifer were entitled to take cost depletion if the irrigators could document that their ground water supplies were being depleted. This ruling extended the ground water depletion deduction to ground water irrigators in Oklahoma, Colorado, Kansas and Nebraska. Previously the deduction had been limited to ground water irrigators in Texas and New Mexico.

Taking the depletion deduction involves:

1. calculating what portion of the irrigated land's purchase price constituted the additional value represented by the underlying ground water, and

2. calculating the annual amount of ground water depletion (if any).

For example: Value of ground water = land purchase price less value of improvements less dryland value of land when purchased. E.g., if 100 acres cost $12,000, improvements were worth $2000 and dryland value was $6000, value of ground water equals $4000. If the aquifer (ground water supply) beneath this tract of land were 160 feet thick when the land was purchased, the water is worth $25 per foot.

If in 1980 the ground water level fell 10 feet, the irrigator would have 10 feet of allowable depletion or a $250 deduction (annual depletion times value of water per foot or 10 feet times $25/foot). If the ground water level fell 20 feet in 1981, the irrigator would have 20 feet of allowable depletion or a $500 deduction. If the ground water level rose 10 feet in 1982, the irrigator would have no allowable depletion for 1982, and no depletion deduction. If the ground water level fell 15 feet in 1983, the irrigator would have allowable depletion of 5 feet and a $125 depletion deduction. The allowable depletion is 5 feet because the 1982 ground water rise of 10 feet would be netted with the 1983 ground water level drop of 15 feet for a net drop of 5 feet.

One factor to realize is that the purchase price of the land will be very important in determining the cost of the water subject to depletion. If land was inherited that originally was homesteaded, the land will have a low cost basis if any; thus there will be little water value to be claimed as a depletion deduction. If land was purchased at a high price, e.g. during the late 1970s, then the depletion deduction may be more significant. Because ground water depletion rates in Nebraska generally are slow relative to other Plains states, the cost of the ground water will be important in determining the amount of any ground water depletion deduction. For more information regarding the ground water depletion deduction, consult your income tax advisor.

David Aiken
Extension Water Law Specialist

Table 4. Insecticides registered for control of potato leafhopper

	Product Name	*Common Name*	*Rate*	*Restrictions/ Comments*
R	Ambush 2 E or Ambush 25 W or			
	Ambush 25W WP	permethrin	3.2 -12.8 oz/acre	
			6.4 oz or less	0 phi (phi)
			Over 6.4	14 day phi
R	Baythroid 2	cyfluthrin	0.8 -1.6 oz/acre	7 day phi
	Cythion 5	malathion	1.5 - 2.0 pts/acre	0 phi
	Cythion 8	malathion	1.25 - 1.5 pts/acre	0 phi
R	Furadan 4 F	carbofuran	1.0 - 2.0 pts/acre	
			1.0 pt	14 day phi
			2.0 pt	28 day phi
	Imidan 70-WSB	phosmet	1.3 lbs/acre	7 day phi
	Lorsban 4 E	chlorpyrifos	0.5 - 1.0 pts/acre	
			0.5 pt	7 day phi
			1 pt	14 day phi
	Malathion 57 EC	malathion	1.5 - 2.25 pts/acre	0 phi
R	Penncap-M	methyl parathion	2 - 3 pts/acre	15 day phi
R	Mustang MaxZeta-cypermethrin		2.24 – 4.0 oz/acre	
	phi of 3 days cutting or grazing and 7 days harvesting seed			
R	Pounce 3.2 E	permethrin	4 - 8 oz/acre	
			4 oz	0 phi
			Over 4 oz	14 day phi
R	Pounce 25 WP	permethrin	6.4 to 12.8 oz/acre	
			6.4 oz	0 phi
			Over 6.4 oz	14 day phi
R	Pounce WSB	permethrin	0.1 - 0.2 lb/acre	
			0.1 lb	0 phi
			Over 0.1 lb	14 day phi
	Sevin 4 F	carbaryl	1.0 qt/acre	7 day phi
	Sevin 50 W	carbaryl	2 lbs/acre	7 day phi
	Sevin 80 WSP or 80 S	carbaryl	1.25 lbs/acre	7 day phi
	Sevin XLR	carbaryl	1.0 qt/acre	7 day phi
R	Warrior	lambda-cyhalothrin	1.92 - 3.2 oz/acre	7 day phi

R - Restricted Use *phi = preharvest interval*

Weed profile

Saltcedar moves from an ornamental to a pest

Saltcedar (*Taramix ramosissima),* also known as tamarisk, is a new invasive weed introduced from Eurasia and found in Nebraska's wetland habitats in all soil types.

It is a perennial deciduous or evergreen shrub or small tree from the tamarisk family (Tamaricaceae) that reproduces both by seeds and perennial structures such as taproot and stem. Root system is extensive with primary taproot easily growing at least 15 ft deep. In search for moisture the taproot can grow downwards as deep as 150 feet. Once the water table is reached, secondary root branching becomes profuse.

The plants (trees) can grow as individual trees or in sparse groups. The woody stem is erect, up to 20 feet tall, and the bark is brown or reddish-brown with highly branched saplinks. Leaves are small, scale-like (as in many cedar trees) with many divisions on slender highly branched green stems . In Nebraska, it can flower from June to August, with small pink flowers positioned on the top of the main woody stem and branches (saplinks) in the finger-like clusters. The flowers produce numerous small tufted seeds that can be carried long distances by wind and water. The seeds, however, have a short period of viability and must contact suitable moisture within a few weeks of dispersal to grow.

Saltcedar is sold as an ornamental plant species, but has escaped and became naturalized along streams, canals and reservoirs in the western United States. In addition, in early 1900 saltcedar was purposely planted along stream banks for soil erosion control.

Unfortunately saltcedar is actually detrimental to the natural habitat. The high evapotranspiration rate of saltcedar can lower the water table in streams and canals. The salt excreted from the leaves to the soil surface under the plant inhibits germination and growth of competing species. Thus the name "saltcedar" is derived from the salty residue that collects on the small scale-like leaves that resemble cedar foliage. As a result, many wildlife species are negatively effected by habitat changes and native species displacement due to saltcedar.

In addition, the sticky salty substance exuded by the leaves can damage bird plumage. With loss of habitat most wildlife species move to more diverse native plant communities. Because of its detrimental effect on wildlife habitat and land saltcedar is a concern to many private and government land managers.

Saltcedar management

The guidelines for control include:

1) treat young or regrown plants under 6 ft tall because they are easily sprayed and controlled than taller trees,

2) treat areas previously root plowed, mowed or areas where saltcedar appears to be newly invading,

3) treat area with tree densities fewer than 150 plants per acre,

4) spray foliage to wet (no dripping) especially terminal ends, and allow two full growing seasons before follow-up management.

5) Time herbicide application toward the later part of the season, but not too late. September and August treatments are much better than May, June or October.

6) Broadcast treatments can be applied via airplane, helicopter or high-clearance sprayers with a water volume of a least 15 gallons per acre for better penetration into the dense canopy. Arial application can be effective using a global positioning spray system matched with the survey maps, allowing the pilot to locate saltcedar sites and exclude sensitive areas such as cottonwood groves and other vegetation. For broadcast treatments Arsenal (imazapyr) is recommended at the rate of 3 pints per acre.

7) Individual trees can be also controlled with Arsenal at 1% volume/volume (v/v). Arsenal is absorbed through foliage and roots and is translocated throughout the plants. Complete kill of plants may not occur within a month or two. In addition, a mix of Roundup (0.5% v/v) and Arsenal (0.5% v/v) is also very effective. Roundup is added to the mix to reduce the cost of the treatment since Roundup (or any generic glyphosate) can be as much as four to five times cheaper that Arsenal alone.

8) Do not treat irrigation ditches and water for domestic use. Do not use near desirable trees and near homesteads. Clean equipment with water following spraying.

Stevan Knezevic
Extension Weeds Specialist
Northeast REC

Protect high quality hay

Weathering tends to lower the yield and nutrients available from hay by about 1% for each month of exposed storage. High value, high quality hay that will be sold or fed to high value animals should be stored under cover. A hay shed, a partially used machine shed, or any other shelter with a roof will be better than exposing your hay. The next best protection may be tarps, especially heavy-duty ones that can be tied down without tearing in the wind. Plastic also works, but it takes special care to fasten down.

Bruce Anderson
Extension Forage Specialist

Grasshoppers *(Continued from page 141)*

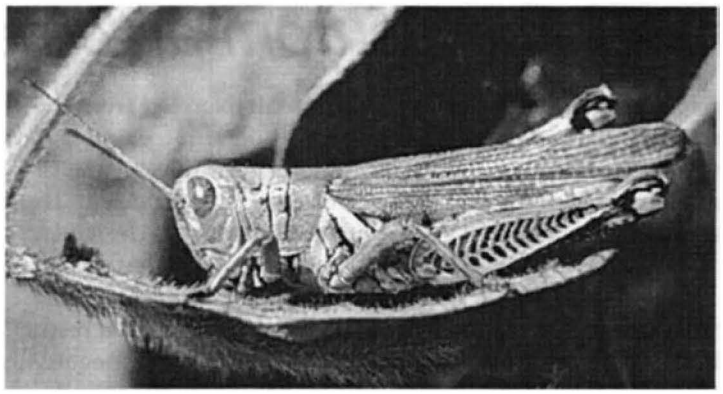
future populations and problems.

Just after egg hatch, when grasshoppers are small, they will be difficult to see and underestimating the true hopper density is common. The best method for determining grasshopper density in field borders or hatching areas is to estimate the number of grasshoppers per square foot in several places. Randomly select a spot several feet away and visualize a one-square-foot area within that defined area. When first learning this method, measure off a one square-foot area to "calibrate" your ability to visualize the counting area.

Walk toward this spot and while watching this square-foot area, count the number of grasshoppers in or jumping out of the area. Repeat this procedure 18 times and divide the total number of grasshoppers by two. This will give you the number of grasshoppers per square yard (9 square feet). Counting sites should be 50-75 feet apart and randomly chosen. Populations of 20 or more young grasshoppers per square yard are considered a moderate infestation, but such numbers should probably be treated to prevent damage.

When scouting look first in untilled areas where grasshoppers would have laid their eggs last fall. These would include roadside ditches, disturbed weedy areas adjacent to fields and property lines, pastures and alfalfa fields. Determine the lifestage, species and number of grasshoppers. Since not all species of grasshoppers are likely to cause significant damage, it's important to try and identify the specific species to avoid unnecessary insecticide applications.

When hoppers are found in "significant" numbers, control should be considered. To prevent grasshoppers from invading fields and acreages, consider treating the hatching and staging areas while the hoppers are small and not eating much. For non-crop borders,



carbaryl (Sevin), dimethoate (Cygon), esfenvalerate (Asana), malathion and diflubenzuron (Dimilin) may be used effectively. In pastures, farmers can use carbaryl (Sevin), malathion and diflubenzuron (Dimilin).

Later, when hoppers have invaded fields, several insecticide options are available. These are listed in the NebFact, *A Guide to Grasshopper Control in Cropland,* NF02-328 (Revised May 2003). It is available on-line at: *http://www.ianr.unl.edu/pubs/insects/nf328.htm*

Please see previous issues of *CropWatch* or one of the resources listed below for specific scouting recommendations and treatment thresholds for pastures and cropland. (*CropWatch* is archived and searchable on the Web at *http://cropwatch.unl.edu.*)

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Extension Entomologist

Grasshopper I.D. and treatment resources

UNL Cooperative Extension offers a variety of resources to aid in the correct identification and management of grasshoppers in range, cropland, and urban environments. These are available at your local Cooperative Extension office or on-line. They include color photos and specific descriptions to aid in the identification of the most damaging species of grasshoppers. The NebFacts include updated and timely information on management options.

- A Guide to Grasshopper Control in Rangeland, NF329, *http://www.ianr.unl.edu/pubs/insects/nf329.htm*
- A Guide to Grasshopper Control in Cropland, NF328, *http://www.ianr.unl.edu/pubs/insects/nf328.htm*
- A Guide to Grasshopper Control in Yards and Gardens, NF327, *http://www.ianr.unl.edu/pubs/insects/nf327.htm*
- Grasshopper Identification Guide for Rangeland and Pasture Fall/Spring Feeding Species, EC03-1567, at *http://www.ianr.unl.edu/pubs/insects/ec1567.htm*
- Grasshopper Identification Guide for Rangeland and Pasture Summer Feeding Species, EC03-1568, at *http://www.ianr.unl.edu/pubs/insects/ec1568.htm*
- Grasshopper Identification Guide for Cropland Grasshoppers, EC03-1569, at *http://www.ianr.unl.edu/pubs/insects/ec1569.htm*

Also visit the UNL Department of Entomology Web site at *http://entomology.unl.edu.* It offers resources on grasshopper management and specific insecticide recommendations for various crops, including fall control in winter wheat and summer control in alfalfa, corn, dry beans, rangeland, sugarbeets, and sunflower..