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# INSECT, PLANT DISEASE, & WEED SCIENCE NEWS [No. 91-15] [July 12, 1991]

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# Insect Science Plant Disease Weed Science NEWS

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No. 91-15 July 12, 1991


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# PLANT DISEASE

## Weakened corn roots result from weather extremes

We received several calls and samples last week concerning poorly-rooted corn plants and plants "falling over". A common characteristic of such plants was an almost non-existent brace root system and poorly developed fibrous root biomass. The permanent root system appeared to be developing at or above the soil surface rather than immediately below it, as it should normally. The roots were short and knobbed and not branched. They had not penetrated the soil and could not support the plant. Most had been inhibited in growth and were dry or becoming dry. Brace roots that were trying to form also had not penetrated the soil, were dry and "burnt" at their tips, and were essentially non-functional.

A combination of factors can cause this condition. First, most of the affected corn is about 12 to 18 inches tall and was subjected to heavy rain shortly after emergence. The heavy rains probably beat down and compressed the soil at or below the crown of the plant where the permanent root system develops. Hence, these roots emerged at or on the soil surface rather than below it. Next came the hot, dry weather. This caused the soil surface to dry and crust, which compounded the problem. Growth of the secondary root system was restricted by the crusty, dry surface — as were the brace roots. Finally, June's high temperatures did not help the situation. Intense solar radiation caused air temperatures to reach the high 90s and soil surface temperatures to exceed 130°F. Brace roots, coming in contact with hot surface soils were literally "cooked" at their tips, killing their growing points.

What can be done? A slow, soaking rain would be the best cure. If possible, cultivating fields to throw soil around the base of the plants will lend physical support and may stimulate root generation and growth.

**David Wysong**


UNIVERSITY OF NEBRASKA-LINCOLN, COOPERATING WITH THE COUNTIES AND THE U.S. DEPARTMENT OF AGRICULTURE

# *Soybean stress injuries masquerade as diseases; examine symptoms carefully*

Noninfectious or stress "diseases" are caused by factors other than pathogenic microorganisms such as bacteria, fungi, nematodes, or viruses. Noninfectious disease factors include excesses, deficiencies, or imbalances of soil nutrients or water; extremes in soil acidity or alkalinity; misapplication or drift of pesticides; temperature extremes; air pollutants; and mechanical or environmental injuries.

The severity and type of injury vary with the soybean growth stage, the time and duration of disturbance, and the plant part involved. Symptoms of noninfectious agents often are confused with those caused by infectious agents. In some cases, the stress condition can predispose soybean plants to attack by infectious agents. Recognizing the cause of the condition can help producers better determine whether treatment is necessary.

## Crusting and compaction

When heavy rains fall on fine-textured soil, a hard crust may form and restrict normal growth, particularly when soybeans are young. The stems of such seedlings become thickened, and in severe cases, the hypocotyl arch is cracked or broken.

## Heat canker

Heat canker results in the girdling of young soybean stems at or just above the soil line. The affected area varies in length from 1/8 to 1/4 inch, with the affected tissues appearing reddish brown and shriveled. Stem tissue directly above or below the constriction appears normal. An affected plant may continue to grow for a day or two, elevating the constricted area a short distance above the soil line. In severe cases, the plant wilts, shrivels, and dies. If the damage is less harsh, the plant may survive and continue growing, but the stem is weakened in the canker region and subject to breakage in winds.

Heat canker is most likely to occur on seedlings subjected to periods of unusually high temperatures. Intense solar radiation can heat the soil surface to temperatures exceeding 140°F and injure the tender, thin-walled and succulent stem tissues of young soybean plants.

## Hail

Leaves injured by hail are torn and ragged; large areas of tissues may be beaten away. Stems may be cut off or broken or may have sunken, dark impaction sites that appear somewhat fibrous at their margins. Pathogenic fungi may colonize hail-damaged areas and produce other sorts of stem-girdling cankers or weaken stems. Most damage is usually on the side of the plant facing the prevailing winds of the storm.

## Lightning

Lightning kills soybeans in nearly circular to widely irregular spots in the field, surrounded by a border of less affected plants. The lower parts of stems may be blackened, with many dead leaves still attached. The pith of such plants appears "cooked" or blanched. Lightning damage is sometimes mistaken for an infectious disease such as a root or stem rot. However, the two are easily distinguished because lightning damage (1) kills both the soybeans and the weeds suddenly, (2) leaves a clearly defined margin around the affected area, (3) does not spread into other parts of the field, and (4) lacks any signs or symptoms of pathogen involvement.

**David Wysong**


## IPW News

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Lisa Brown Jasa, Editor


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# INSECT SCIENCE

## Corn rootworm adults emerging; weekly scouting essential for initiating control

Adults of both western and northern corn rootworms are beginning to emerge in Nebraska corn fields. Both are 1/4 inch long, but western corn rootworm adults are pale yellow-green beetles with a black stripe on each wing cover. Northern corn rootworm beetles are a solid green-tan color. Western corn rootworms are the predominant species throughout Nebraska; northern corn rootworms are most common in northeastern Nebraska. During late July and August these beetles will be laying eggs that overwinter in the soil, producing rootworms in the spring which may damage corn next year if continuous corn is grown. However, more than 60% of Nebraska's continuous corn fields are estimated to not have economic corn rootworm infestations in a given year. *Weekly scouting for corn rootworms beetles is the only way to determine whether economic infestations are likely to occur next year.*

Begin scouting for corn rootworm beetles in mid- to late July and continue scouting weekly until threshold levels are exceeded or beetle activity stops. This usually occurs by late August. Examine 50 plants, taking samples from every quarter of the field. Sampled plants should be several paces apart so that examining one plant doesn't drive beetles off of the next plant to be sampled. Although many beetles will be found in the area near the ear, the most reliable information is obtained if the whole plant is examined. Beetles may hide behind leaf sheaths or in silks in the ear tip, so care is required to observe all beetles present.

Corn rootworm beetle counts in July and August can provide growers with information on the potential for corn rootworm damage this season and next year. First, use 1991 beetle numbers to predict the potential for damage in 1992. Secondly, beetle counts will allow you to determine in which fields it would be profitable to use an adult control program to reduce the number of eggs laid.

If beetle counts exceed 0.75 beetles per plant, damaging populations of corn rootworms are possible in that field next year. To prevent or reduce corn rootworm damage in fields exceeding this threshold, rotate fields out of corn or treat with a soil insecticide if corn is planted again.

*Fields remaining below 0.75 beetles per plant do not need a soil insecticide next year.* This threshold assumes a population of 24,000 plants per acre. If different plant populations are used, modify the thresholds (see NebGuide G86-774, *Western Corn Rootworm Soil Insecticide Treatment Decisions Based on Beetle Numbers.)*

One strategy for corn rootworm control is to kill the adults before they have laid enough eggs to damage next year's crop. For this strategy to work, careful monitoring of corn rootworm beetles must be done before and after treatment. If 10% of the female beetles have mature eggs and 0.75 beetles per plant are present, apply controls. Follow up monitoring after treatment should be continued at weekly intervals until beetle activity stops. If corn rootworm numbers build back up and exceed 0.5 beetle per plant, retreatment is recommended. Late maturing fields are particularly susceptible to corn rootworm beetles moving in during late summer from nearby earlier maturing fields.

Adult control programs can sucessfully reduce damage by corn rootworm larvae next year, but regular scouting of fields is needed. If multiple applications of insecticides are needed to control corn rootworm beetles, consider the cost of the adult control program compared to a single application of an insecticide at planting or cultivation. Also consider the possible impact of multiple applications of insecticides on insect natural enemies, and other nontarget organisms.

For more information, including rates and restrictions of registered insecticides for adult corn rootworm control, refer to EC91-1509, *Insect Management Guide for Nebraska Corn and Sorghum.* It is available at your local University of Nebraska Extension office.

**Bob Wright**

## Newsletter focuses on northeast

Producers in northeast Nebraska can get additional information on crop production and pest management programs through the *Northeast IPM Newsletter.* It is written by staff at the University of Nebraska's Northeast Research and Extension Center at Concord. The newsletter focuses on crop production and pest management in northeastern Nebraska and provides information on crop water use and growing degree days for crops grown in the area. Reporting stations include Concord, West Point, O'Neill and Elgin.

To order the newsletter for the remainder of this year, send $5 (payable to University of Nebraska) to Northeast Research and Extension Center, Box 111, Concord NE 68728.

**Bob Wright**

# *Western bean cutworm eggs found in corn*

Western bean cutworm moths have begun to emerge and eggs have been found in corn. This pest is usually confined to sandy soils in northeast Nebraska, along the Platte River Valley from Grand Island to the Panhandle, and in southwestern counties. Western bean cutworm moths prefer to lay eggs on corn in the late whorl stage. Individual eggs are about the size of a common pinhead and are laid in masses ranging from 5 to 200 eggs. The eggs are initially round and pearly white, but by hatching (after four to seven days), they are dark blue or black.

When eggs hatch before tasseling, newly-hatched worms migrate to the developing tassel to feed. After tasseling and pollen-shed, larvae move to leaf axils and later to the ear where they feed on emerging silks. Once the ear has formed, worms enter the ear through the silk channels or through holes cut in husks and feed on developing kernels.

Treatment is justified if 8% of the plants have eggs on leaves and/or small larvae in the tassels and the crop is at least 95% tasseled. Timing of the insecticide application is important. If the tassel has emerged from the whorl, best results are obtained when treating at 70-90% egg hatch. Control of western bean cutworms will be poor once worms have entered the developing ear, so scout fields often to avoid missing the early stages of infestation.

Many products labeled for control of western bean cutworms have been shown to increase the risk of spider mite infestations later in the season. If spider mites are present, even in small numbers, select an insecticide that is less likely to stimulate increases in mite reproduction. Examples include Furadan 4F or Lorsban 4E.

For more information refer to EC91-1509, *Insect Management Guide for Corn and Sorghum,* and NebGuide G75-50, *Spider Mites in Corn.*

**Bob Wright**

# Hoppers hatching; assess damage potential

Grasshoppers have been hatching the last couple weeks in field margins, set aside and CRP acres, and other untilled areas. Assess grasshopper infestations now and determine if the numbers justify control measures.

Several grasshopper species can damage field crops in Nebraska. The most common are the differential, two-striped, and red-legged grasshoppers. These hoppers breed in untilled areas and feed on weeds and grasses early in the year. If adequate food is available, they may remain in these areas for some time. However, if it turns dry, migration from these areas into field crops can occur.

Grasshoppers are in the nymph or immature stage now and unable to fly. These smaller grasshoppers are easier to kill with insecticides and less mobile than the larger adults which will be present in a few weeks.

Estimate grasshopper infestations by counting the number of grasshoppers in a square yard. As you walk, visualize a square yard in front of you and count the number of grasshoppers that jump as you disturb them. Do this in several places in the field or field margins to get an average for the area. Use the table below as a treatment guideline.

Many insecticides are registered for control of grasshoppers in various crops and non-crop areas. For more information, refer to EC91-1509, *Insect Management Guide for Corn and Sorghum,* EC91-1511, *Insect Management Guide for Alfalfa, Soybeans, Wheat, Range and Pasture,* and EC91-1537, *Insect Management Guide for Specialty Crops.* Also refer to the appropriate insecticide labels for detailed information regarding grasshopper management.

**Keith Jarvi and Steve Danielson**

**Determine treatment based on number of nymphs or adult grasshoppers per square yard of cropland***

| *Classification* | *Field* | *Field Margin* | *Is treatment necessary* |
|---|---|---|---|
| Non-economic | 0 to 2 | 5 to 10 | Usually not |
| Light | 3 to 7 | 11 to 20 | Questionable |
| Moderate | 8 to 14 | 21 to 40 | Probably |
| Abundant | 15 or more | 41 or more | Yes |

*Be alert for possible build-up of spider mites after insecticide applications.

# WEED SCIENCE

## Improve weed control after winter wheat

Controlling weeds after winter wheat harvest is an ongoing challenge for Nebraska producers. A survey taken after winter wheat harvest in west central and southwest Nebraska in 1986 showed barnyardgrass and green foxtail were the leading summer annual grasses that infested winter wheat fields. Control of these species was inadequate in many fields (55% to 85%).

The effectiveness of weed control was associated with winter wheat variety, fertilizer practices, planting date, stem density, rotation, spraying when temperatures exceed 95°F, and spraying the day it rained. Other reasons included: weeds were too large, the combine cut off weed tops, streaks caused by sprayers, terraces, dust, and straw, chaff and weed seed distribution.

Many options can be used to improve control of the summer annual grasses besides increasing the rate of herbicides. It takes a total weed management package to obtain maximum weed control. Stands of vigorous winter wheat will compete better with weeds, thus concentrating on the fallow will pay dividends. Timely weed control, fertilizing if needed, proper seeding, planting during the optimum time, and selecting a competitive winter wheat variety will offer the winter wheat the best chances of reducing weed population and vigor after harvest. In addition, it's essential that you watch closely and spray at the proper time to control summer annual grasses. Most labels state that grasses must be treated before they are six inches tall. The grasses in 1986 were almost twice that tall when sprayed. If weeds are under severe drought stress, wait for rain and spray about a week later.

Cyclone offered good control of barnyardgrass that was small or mature. Control of barnyardgrass was poor with Cyclone + atrazine when sprayed during the tillering to boot stage. Large plants are harder to control than small plants. Once the barnyardgrass has headed and stopped growing, Cyclone provides good control; however, spraying after the grass had headed, allows seed production. In addition, the longer the grass weeds grow, the more soil water is used.

Several options are available for using nonselective herbicides with difficult-to-control weeds. With Cyclone be sure to use a minimum of 2 pints of X-77 or equivalent surfactant per 100 gallons of solution. A surfactant needs to be added to Roundup. The label rates are 2 qt/100 gallons of spray solution (0.5% v/v). Landmaster BW has a surfactant included. With Roundup, Fallow Master, and Landmaster BW, add ammonium sulfate (spray grade) at 17 lb per 100 gal of spray solution. Ammonium sulfate is especially helpful when stress conditions are present.

*It takes a total weed management package to obtain maximum control.*

One cannot visually identify stress quick enough; therefore, it is wise to always add ammonium sulfate. Improve control by increasing the rate of Landmaster BW or Fallow Master. A spray volume of 5 to 10 gallons per acre should be used with Roundup, Fallow Master and Landmaster BW.

Our research and field surveys suggest that atrazine combined with either Cyclone or Landmaster BW is an effective treatment if applied before weeds are too large. Use Landmaster BW + atrazine on grasses in boot stage. If weeds are mature, use the Cyclone + atrazine combination. Do not use Roundup, Fallow Master or Landmaster BW on days that it will rain or when temperatures exceed 95°F.

Split treatments have been especially effective. With the split treatment, an application is made in July or early August with a second application containing at least 1 lb of atrazine applied in September with Cyclone, Crop Oil Concentrate, or alone depending on the amount and size of volunteer winter wheat, downy brome and/or jointed goatgrass present. Be careful not to exceed the label rate for atrazine with the two combined treatments. The advantage of the split treatments is that they provide excellent control of volunteer winter wheat and other winter annual grasses.

**Gail Wicks and Robert Klein**

# *Serpents be gone!*

If snakes have become a nuisance around your farmstead, consider using a repellent. Dr. T's Snake-A-Way® is the only repellent formulated specifically for snakes and its repellency is supported by unbiased research data. Studies conducted at the University of Florida show that it repels garter snakes and several other species, but not rat snakes. Studies on Nebraska snakes have not been conducted, although it would be expected to be effective against many common types.

Like any repellent, this one makes the area less desirable for snakes so that a snake is more likely to go elsewhere. Use this product according to label directions and be careful not to overdo it. Excess amounts or continued long-term use might affect soils or plant materials.

Overall, to discourage snakes near the home, the best approach includes removal of the cool moist shelter that attracts them. This may involve rock piles or boards lying on the ground; weedy growth near buildings; or holes under the porch, sidewalk, or house foundation. Move the woodpile back from the house and stack it on a rack about a foot above the ground. Check storage sheds and close openings that allow access underneath.

Garter snakes, the type most commonly seen in backyards, are harmless and generally beneficial except that seeing one frightens some people. Increased understanding of snakes and how to discourage them near activity areas may lead to a bit of tolerance and help establish a new perspective for coexistence.

**Ron Johnson**
**Extension Wildlife Specialist**