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INSECT, PLANT DISEASE, & WEED SCIENCE NEWS [No. 91-16] [July 19, 1991]

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Insect Science Plant Disease Weed Science NEWS

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In this issue

INSECT SCIENCE

Corn leaf aphids abundant in some fields

Several corn and sorghum growers have noticed large numbers of corn leaf aphids in their fields in southcentral and southeast Nebraska. In general, controls for this pest are not justified.

On sorghum, the blue-green corn leaf aphids are on the upper plant. (In contrast, greenbugs are normally on the lower plant leaves and are light green with a dark green stripe down the back.) Corn leaf aphids generally will leave the plants once heading begins and little if any damage occurs. Occasionally, when plants are under drought stress, the corn leaf aphids may cause the boot and flag leaf to discolor and some tissue death may be noticed. If this occurs and heading is delayed, an insecticide treatment may be necessary to reduce aphid numbers and allow heading.

On corn, the aphids are usually in the tassel area near the top of plants. Recent research at Iowa State University provides guidance in sampling for and managing the corn leaf aphid. Economic losses would only be expected under severe drought stress conditions, however.

"Examine the whorls of 10 plants in at least four locations in each field. If 15% of the plants are heavily infested and tassel emergence is still five or more days away, an insecticide may be needed. If large infestations are observed within five days of tassel emergence (or after tassel emergence), chemical control would not be economically feasible because most of the damage will have already occurred. A heavy infestation occurs when aphids are visible on the outside of the whorl and the colony is estimated at more than 500 aphids." (*Iowa State University Crops, Soils, and Pests Newsletter*, July 12, 1991).

These heavy infestations can interfere with pollination especially in very dry, hot years. If pollination has been completed, corn leaf aphids are usually not considered an economic threat.

Steve Danielson

Insecticide betters Ivory soap in field trial

There are continuing reports of damaged sorghum fields adjacent to harvested wheat that was infested with chinch bugs.

Many heavily damaged fields were planted late because of excessive rain this spring. Small sorghum plants are very susceptible to chinch bug feeding. Last week (July 9), we noticed that most chinch bugs were now winged adults. I would anticipate that many of these adults will fly to other locations to feed, mate and lay eggs for a second generation. Generally, the second generation causes less damage because the host plants are larger and more tolerant of injury. However, replanted or very late planted sorghum, corn, sudax, or millet may be damaged by this second generation.

Table I. Number of live chinch bugs on plants before and after treatment and percent reduction by each treatment compared with the posttreatment control

Treatment and Rate	Live Chinch Bugs Per Plant *Pretreatment*	*Posttreatment*	Reduction *(%)*
Ivory soap (44 oz/16 gal H_2O	217.0 A	133.8 B	39.8
Ivory (44 oz/16 gal H_2O) + Sevin XLR (2 lbs ai/acre)	208.3 A	1.6 A	99.3
Sevin XLR (2 lbs ai/acre)	300.5 A	1.9 A	99.1
No treatment control	305.8 A	220.7 C	0.0

Column means followed by different letters indicate significant differences between means at $P \leq 0.05$.

Should Ivory Soap be a Control Measure?

Every year, we hear reports of growers using unorthodox treatments to control chinch bugs. The latest proposed remedy is a spray treatment of liquid Ivory dish soap and water at slow tractor speeds. A few individuals who have used this treatment say that sprayed chinch bugs get stuck to the plants and die. Others have used a tank mixture of Ivory soap and insecticide (Sevin XLR®).

In cooperation with Randy Pryor, Saline County Extension agent, and Richard Jiskra, a sorghum producer from Swanton, we conducted a field experiment in Saline County to determine the efficacy of Ivory soap, Ivory soap + Sevin XLR, Sevin XLR, and a no treatment control. For all treatments, we used drop nozzles directed at the base of the plant, standard flat fan nozzles, a fairly high spray output (20.7 gal/acre), and slow tractor speed (approximately 1 mph). The no-treatment control consisted of running the tractor and spray equipment down the infested rows, but *no* treatment, not even water, was imposed. Chinch bugs were counted before the infested field border was sprayed. To determine treatment effectiveness, posttreatment bug counts were taken the next day. Bug counts consisted of live and dead chinch bugs on four plants in each treatment. Each block of treatments was replicated three times (*Table I*).

Sevin XLR reduced the total number of chinch bugs (dead and alive) on plants by about 90% and the number of live bugs by more than 99%; adding Ivory soap did not enhance its insecticidal activity. The Ivory soap treatment was significantly better than no treatment, but was not nearly as effective as the treatments containing Sevin XLR.

In retrospect, I think we should have sprayed water on the plants in the no-treatment control plots. If we had, we might have seen a reduction in live bugs similar to the soap treatment, perhaps from movement away from sprayed plants or from drowning.

Barb Spike
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IPW News

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Lisa Brown Jasa, Editor

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Scout, evaluate second generation borers

European corn borer (ECB) moths have begun to emerge and are laying eggs in much of the state. (See *Computer predicts corn borer egg-laying* on page 93.)

Fields that have green silks and are shedding pollen during the peak moth flight are most susceptible to second generation infestation. The white, flat eggs overlap each other like fish scales and are laid in masses of 5-40 eggs. Eggs are most likely found on the underside of the leaf, near the mid-rib, on the ear leaf, or on the three leaves above or below the ear leaf. Black spots are visible on the eggs for about 24 hours before they hatch. This spot is the head of the developing caterpillar, and this stage often is referred to as the "black head" stage.

Begin scouting fields now to determine when egg laying begins. To determine whether control is necessary, examine 25 plants at four sites per field (100 plants total). Record the number of egg masses and the number of plants sampled and work through the following worksheet to determine if an economic infestation is present. You will need to know:

- crop stage
- expected yield
- expected value of corn
- expected percent control with insecticide
- cost of control (chemical + application costs)

Use this worksheet to more closely evaluate the many factors influencing the cost/benefit relationships of treating second generation European corn borers. Average values are suggested and may need to be modified in certain situations.

(1) Borer survival is suggested to be 15%. Larval survival will vary with weather conditions and field type (dry land vs. irrigated corn). In irrigated corn, larval survival is likely to be 20% or more, while in dryland corn it is likely to be 10% or less. Egg survival decreases greatly in hot, dry weather.

(2) Yield loss may be about 4% per borer for infestations before silks turn brown and 3% per borer after silks turn brown, but before blister stage. These are reasonable averages based on published research data. However, these values only account for physiological yield loss (reduced yield from corn borer damage to water and nutrient uptake through the stalk) and do not consider yield loss from stalk breakage or ear drop. These factors are difficult to predict and vary with hybrid, cultural practices, and weather conditions, as well as the length of second generation egg laying by European corn borer moths.

(3) Percent control with insecticides may equal 75%. This is a good average value for second generation control, although you should change this value if you have data to suggest different control levels.

Infestations are most damaging when borers enter the stalk early in the reproductive cycle of corn. There is a short time between first egg hatch and significant stalk tunneling activity when borers are best controlled. Concentrate scouting efforts in this early egg-laying period and repeat every three to five days. Although later hatching larvae do not directly reduce grain yield as much, they may still cause stalk breakage or ear drop. Early harvest of fields damaged by corn borers and selection of varieties with good

Continued on Page 92

Management worksheet for second generation European corn borer

_____ Number of egg masses/plant x 20 eggs/egg mass x 15% survival* = _____ borers/plant

_____ borers/plant x 4% yield loss/borer** =_____% yield loss

_____ % yield loss x _____expected yield (bu/A) =_____ bu/A loss

_____ bu/A loss x $_____sale price/bu = $_____ loss/A

$_____ loss/A x 75% control = $_____ preventable loss/A

$_____ preventable loss/A

–$_____ cost of control (chemical+application costs)

= $_____ profit (+) or loss (-)/A if treatment is applied

If preventable loss exceeds cost of control, insecticide treatment is likely to result in economic benefit.

* Assumes 15% survival rate; may vary with weather.

** Use 3% loss per borer/plant if infestation occurs after silks are brown. The potential economic benefits of treatments decline rapidly if infestations occur after corn reaches the blister stage.

European corn borers *(Continued from page 91)*

stalk strength and resistance to stalk rot can reduce this loss.

An alternative method for determining whether treatment is profitable is to use the Nebraska European Corn Borer Software program (see *IPW News* 91-6 for more information). The worksheet on page 91 and computer model may produce slightly different results because different assumptions are used for each procedure. The computer software program requires more information than the worksheet. For both procedures, the validity of the results depends on the accuracy of the scouting information.

If treatment is needed, time insecticide applications to coincide with the beginning of egg hatch to achieve acceptable control. Generally, liquid and granular formulations of the same insecticide are equally effective against second generation corn borer larvae. However, if other insects (except spider mites) are present or corn borer moth numbers are high, liquid formulations are preferred over granules because of their broader spectrum of activity and ability to obtain some moth control. As the plant matures beyond the blister stage, potential economic benefits from insecticide applications rapidly decline.

Always be alert to the possibility of spider mite build-up after insecticide applications. If mites are expected to be a problem, using *Bacillus thuringiensis* (e.g., Dipel) for European corn borer control would be least likely to cause mite build-up, with Furadan, Counter and Lorsban having only a slight tendency to cause mite build-up. Additional information on control of second generation European corn borers, including a list of recommended insecticides, their rates and restrictions is available in EC 91-1509, *Insect Management Guide for Corn and Sorghum*, available at your local University of Nebraska Extension office.

Bob Wright

Be alert to potato leafhopper return in alfalfa

The potato leafhopper is still damaging alfalfa (and soybeans) in eastern Nebraska. Refer to *IPW News* 91-14 (June 28) for information on sampling and managing this pest. Insecticide treatments will kill most leafhoppers in an infested field, however, migrants from other fields may reinfest a treated field within a few days. Growers also should be aware that severely damaged alfalfa plants are stunted and may not produce new, vigorous growth until the damaged top growth is removed by cutting.

This pest will likely be with us until late August, so there will be some fields where several insecticide treatments are required to prevent severe losses.

In eastern states where the potato leafhopper is a perennial alfalfa pest, fields are sampled at least once a week from April through September with a sweep net. The goal is to detect high leafhopper infestations before damage is visible so an insecticide treatment or cutting can be initiated early enough to prevent economic losses. Once damage is visible, economic damage has already occurred and young plants may have been killed.

Steve Danielson

Greenbug numbers growing in sorghum

Increasing numbers of greenbugs have been reported in south central Nebraska sorghum fields, although the reports from southeast Nebraska indicate relatively low infestation levels. Until recently, greenbugs were present in low numbers statewide. Sorghum growers should be alert to possible increases in greenbug numbers and damaage during the next few weeks. Numbers of beneficial insects are high in some fields and may effectively limit greenbug numbers in some cases.

In grain sorghum from 6 inches tall to preboot stage, consider treatment when greenbug colonies are beginning to cause red or yellow leaf spotting on the lower leaves of most plants. In grain sorghum fields where the plants are from boot to soft dough stage, consider treatment if greenbug colonies are present on most plants, before one lower leaf has been killed, and if parasite numbers are low (less than 20 percent of greenbugs are parasitized). Parasitized greenbugs are dead, swollen, and brown or tan in color. In forage sorghum, consider treatment when 25 percent of the lower leaves have greenbug colonies and are showing signs of damage.

Refer to the Extension publication *1991 Insect Management Guide for Nebraska Corn and Sorghum*, EC91-1509, for a list of insecticides registered for controlling greenbugs in sorghum.

Steve Danielson

Computer predicts corn borer egg-laying

The Nebraska European Corn Borer Software program predicts when second generation European corn borer moths will lay eggs in an area, based on weather data and a sample of corn borers from the first generation. (For more information on the program and how to order it, see *IPW News* 91-6.)

Data has been collected from several locations in Nebraska and using 30-year average weather data for each location, predictions have been made. This information can be used to better time scouting efforts for second generation corn borers. (See *Scout, evaluate second generation borers* on page 91 for information on scouting methods and treatment guidelines for second generation corn borers.)

The following data were used to make the predictions:

			Number of corn borers in each stage					
County	*Site*	*Date*	*1st*	*2nd*	*3rd*	*4th*	*5th*	*pupa*
Dixon	Concord	7/9	0	1	7	13	31	5
Saunders	Mead	7/5	0	0	11	12	66	18
Lincoln	No. Platte	7/2	0	0	7	22	51	0
Antelope	Brunswick	7/11	0	0	3	3	30	1
Fillmore	Exeter	6/27	0	4	23	29	10	1
Hamilton	Giltner & Henderson	7/1	0	1	8	29	16	1

Using the above information and 30-year average weather data for each county, the program predicted the following egg-laying dates:

	Percentage egg-laying completed predicted by the indicated date				
County	*5%*	*25%*	*50%*	*75%*	*95%*
Dixon	7/25	7/28	8/1	8/8	9/1
Saunders	7/15	7/20	7/24	7/27	8/4
Lincoln	7/19	7/22	7/25	7/30	8/6
Fillmore	7/14	7/20	7/23	7/27	8/1
Hamilton	7/17	7/22	7/25	7/28	8/3
Antelope	7/26	7/29	7/31	8/4	8/15*

*These predictions are based on less than 50 borers collected during the first generation, and are therefore somewhat less reliable than the other predictions due to the small sample size.

Scouting should be targeted for the dates between 25 and 50% predicted egg-laying. The predictive ability of this software has been field tested in Nebraska for two years, and was previously field validated in Kansas where this program was originally developed. Generally, the predictions for 25-50% egg-laying tended to be two to three days ahead of field occurence. Also, since these predictions are based on 30-year average weather data, if weather conditions differ greatly from long term average conditions, actual egg-laying will be somewhat different.

To use the computer software to compute an economic threshold, enter the information on the development of first generation corn borers. If you did not collect this information in your area you can use the data above from the site closest to you to run the program.

Bob Wright

Mexican bean beetles appearing in dry beans

Dry bean growers in western Nebraska are urged to scout for Mexican bean beetles. These beetle adults recently began to congregate in and damage bean fields. Beans that have not begun to flower can withstand a fair amount of defoliation; however, once beans have begun to flower, defoliation will have a greater effect. Currently, the adults are feeding and beginning to lay eggs on the beans. If possible, delay insecticide treatments until eggs have hatched and small larvae are present. If treatments are applied before egg hatch, the larvae that hatch afterward will not be controlled and an additional treatment may be necessary. Closely monitor the beans to determine when the egg masses hatch.

Check fields once or twice a week, particularly if beans have begun flowering. When scouting for Mexican bean beetles, scout the entire field because damage will likely be more severe at the edges. Move throughout the field and stop in at least 20 sites to count the egg masses on five plants per site. If one or more egg masses are found per six plants (17% infested with egg masses) an insecticide treatment may be justified. As you move through the field make a visual estimate of the amount of defoliation resulting from the adult or larval feeding. Accurate defoliation thresholds for dry beans are not available. But, for pre-flowering beans, defoliation levels of 30-40% may be needed to justify a treatment. However, if the beans are in the flowering or pod-filling stages, threshold levels will be lower, perhaps in the 10-20% range.

Several chemicals are registered for control of Mexican bean beetle. Contact your local extension agent or refer to the Extension publication, EC90-1537, *Insect Management Guide for Sugarbeets, Dry Beans, Sunflowers, Vetch, Potatoes, and Onions* for more information.

Gary Hein

PLANT DISEASE

Wheat diseases significantly affect yields

Diseases had a significant impact on the 1991 Nebraska wheat crop. Although there were no "surprise" diseases, some were severe enough to remind us of their potential for reducing wheat yields and overall production.

Common root rot. Although most wheat escaped early stand loss due to common root rot, this disease reappeared as the crop matured. The ability of wheat to tiller and produce large heads with plump kernels depends critically on a healthy root system for support of each additional stem and head. When a diseased root system fails to deliver the necessary amounts of nutrients, water, and growth factors to the heads during critical stages, plants fail to tiller and produce small, poorly filled heads. Root diseases can affect wheat at any stage of growth and development. This year these effects became evident when the crop matured rather than early in the season. Affected fields produced crops with small heads and few tillers. Many fields escaped serious infection; affected fields were scattered from southeastern to northeastern Nebraska. Common root rot is difficult to diagnose after the crop has matured, but plants with small heads and few tillers will probably show a discolored, poorly-developed root system.

Take-all. Another root disease that reared its ugly head this year was take-all. Take-all illustrates how a period of soil moisture suitable for infection and disease development can lead to a significant effect on yield. Unlike common root rot which occurred statewide, take-all occurred primarily in eastern and central Nebraska. In some of those fields, it literally took everything.

Leaf diseases. Leaf diseases were abundant in 1991. They started with powdery mildew in southeast Nebraska in early May and finished with severe leaf rust as far west as the Nebraska Panhandle. Tan spot, Septoria leaf blotch, and in some fields, Septoria glume blotch were widespread and occasionally were more severe than leaf rust. Wheat leaf rust readings were made on the cultivar tests in Dundy, Custer, and Keith counties. Even as far west as Keith county, cultivars like TAM 107 rated 70-80% rust severity on the flag leaves. The effect of the leaf diseases on yield and test weight have not been determined. Data from the foliar fungicide trial at the South Central Research and Extension Center and from the various cultivar evaluation trials should provide information on losses for 1991.

Viruses. About the only major group of wheat disease that was not widespread and severe this season were the viruses. Only scattered incidents of serious wheat streak mosaic were reported. Barley yellow dwarf was present in many fields, but the incidence was light. The same was true for soilborne wheat mosaic, and to a limited extent, wheat spindle streak. They were early but not severe.

Scab. Finally, we need to mention scab. This disease was widespread in Nebraska; but fortunately, the incidence was relatively light in most fields. Because of scab, growers need to be extra careful in using bin-run seed for planting this fall. Select a certified seed source or clean and treat seed with a fungicide before planting.

John Watkins

Sample packaging warrants a pat on the back

As most of you know, the Plant Disease Diagnostic Clinic has been operating the last two months without a dedicated clinician. Luanne Coziahr, our former diagnostician, left to work in the forestry division of the Omaha Public Power District.

In Coziahr's absence, I have been handling most of the plant disease samples. This has given me the opportunity to see the condition of plant specimens upon receipt. Accurate diagnosis of a plant disease problem depends on three things: (1) a sufficiently large sample that includes the signs and symptoms representative of the problem, (2) a sufficiently fresh sample packaged in a manner that reduces the risk of deterioration in transit, and (3) enough written information that adequately describes the conditions under which the host is growing.

And now, the "pat on the back." More than 95% of the samples I have examined have arrived in excellent condition! You are to be commended for the care you've taken to collect fresh material, to package it in a manner that minimizes "transit rots", and to mail it quickly. It makes diagnostic work much easier and reduces the turn-around time between sample submission and response.

Regarding clinic activities, you might be interested to know that we have processed about 120 more samples this year than we had by this time last year. Historically, 45% to 50% of the year's samples are processed in June and July. That averages to about 20 samples per day, with Mondays being fairly light but the Wednesday/Thursday sample load being quite heavy. More than 60% of the problems are on trees, turfgrass, vegetable crops, and ornamentals.

Do we miss Luanne? You bet we do! Would you miss the educational benefits such diagnoses provide you if we have to scale back because of a potential position freeze? I would be happy to receive your comments.

David Wysong