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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

University of Nebraska Lincoln

No. 2005-23, October 14, 2005

New Bt corn hybrids for rootworm management

The U.S. Environmental Protection Agency has registered two new Bt corn hybrids with the Bt proteins, Cry34Ab1 and Cry35Ab1, for use against corn rootworm larvae. They will be sold under the trade name Herculex RW by Pioneer Hi-Bred International, Inc. and Mycogen Seeds/DowAgroSciences LLC, which jointly developed the genetic material.

These are different Bt proteins than those used in YieldGard Rootworm hybrids or any other Bt corn to date. Company and university research indicates that they effectively protect roots from rootworm feeding injury.

Similar to previous Bt corn hybrids, EPA has required registrants to implement a resistance management plan as a condition of registration. The resistance management plan for Herculex RW hybrids is similar to that for YieldGard Rootworm hybrids:

1) No more than 80% of the acreage on a farm can be planted to Herculex RW hybrids,

2) A minimum of 20% of the acreage on a farm must be planted to a hybrid not containing a Bt protein active against rootworms, and

3) The refuge must be within or adjacent to the Herculex RW field.

Additional refuge details are outlined below.

Adding another source of Bt corn with a different type of Bt protein for rootworm management will provide growers another option to increase the diversity of controls available for this important insect.

Refuge requirements

Grower agreements (also known as stewardship agreements) will specify that growers must adhere to the refuge requirements as described in the grower guide/product use guide and/or in supplements to the grower guide/product use guide.

1. Refuge size. The use of Cry34/35 corn from event DAS 59122-7 requires an accompanying 20% refuge.

2. Refuge location. The rootworm refuge is required to be planted within or adjacent (e.g.

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Inside

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Sugar prices move up dramatically as harvest begins in western Nebraska

Sugar prices in the Midwest increased by more than 50% to $44.00/cwt after Hurricane Katrina, but have dropped back to $34.50/cwt as sugarbeet harvest begins in Nebraska. Producers for the Western Sugar Company will see higher prices for the crop they are harvesting, while the farmer-owned cooperative has an opportunity to retire some debt with prices near $35.00/cwt.

United States sugar supply was projected to be tight for the 2005/06 crop prior to the hurricane, and the situation became much tighter as damage from Katrina was determined. Two Louisiana refineries were taken off line, and one remains unable to operate. In addition, the crop along the Gulf Coast has seen the impact of not just one, but two major hurricanes in the past five weeks, causing untold amounts of crop damage. Combined with projections of a lower than expected crop from the Red River Valley in North Dakota and Minnesota, Nebraska producers are looking forward to an average crop with well above average prices. The USDA has increased import quotas by 276,000 short tons to help mitigate the shortage of domestic sugar anticipated for this crop year.

Paul Burgener
Agricultural Economics
Research Coordinator

Field updates & ag briefs

John Hay, Extension Educator in Pierce, Madison and Wayne counties: Northeast Nebraska has again dodged the drought bullet. Yields in general are better than expected which makes them closer to the long-term average. Soil type makes a big difference with the western parts of northeast Nebraska having more sandy soils that produce more modest yields. Yields in northern Pierce County and much of Wayne County have been good with dryland beans from 35-60 bu/ac. Bean harvest is in full swing with only a few fields of corn out. Beans are very dry with many reports of 8-11% moisture. In general producers are disappointed with prices more than with yields. When all the corn is out of the bin, it will be interesting to see where it's stored.

John Wilson, Extension Educator in Burt County: Harvest is in full swing, but showers Tuesday and Wednesday (October 11-12) could slow things down for a couple of days. Many farmers are done with soybeans and making significant progress on corn harvest. Soybean yields have been quite variable, depending on soil type and timely summer showers. The better ground is providing average to above average yields while heavier soils (gumbo) are well below average. Early reports on corn yields show most fields producing better than most farmers expected. Excellent harvest weather conditions have dried corn in the field so little supplemental drying will be required, just aeration to cool grain as air temperatures drop.

Gary W Lesoing, Extension Educator in Nemaha County: Harvest is proceeding along at a steady pace. The lack of rain has allowed farmers to keep harvesting, but a rain is badly needed. We received 0.20-0.40 inches last week. This is about all we have had since mid-August. Overall both soybean and corn yields are very good, better than expected in Nemaha County. The western part of the county was drier so yields are not as good. I have heard reports of corn around 100 bushels per acre and soybeans 30-40 bushels per acre in the northwest part of the county with yields increasing as you move east. Corn was yielding 130 bushels per acre or more and there were some excellent soybean yields of 55 bushels per acre. On better soil and where timely rains fell, reports of corn yields were higher, with some yields over 200 bushels per acre. Grain storage is tight in the area. Pastures are essentially dried up.

USDA's National Agricultural Statistics Service Nebraska Field Office: Hard freezing temperatures and dry conditions across most of the state lowered crop moisture levels and allowed soybean harvest to progress rapidly.

Corn condition rated 4% very poor, 8% poor, 20% fair, 44% good, and 24% excellent. Irrigated fields rated 84% good or excellent while dryland fields rated 43% good or excellent. Ninety-three percent of the crop had matured, ahead of 82% last year and 92% for the average. Corn harvest advanced to 28% complete, ahead of last year at 18% but three days behind the average.

Soybean harvest continued to progress rapidly to 75%, ahead of 59% last year and nearly one week ahead of 54% average.

Sorghum conditions rated 3% very poor, 11% poor, 27% fair, 43% good, and 16% excellent. Ninety-two percent of the crop had matured, ahead of 73% last year and 88% for the average. Sorghum harvest moved to 23% complete, behind the average at 34%.

Wheat seeding progressed to 92% complete, ahead of 90% last year and near the average at 93%. Seventy percent of the wheat crop had emerged, similar to average.

Eighty-five percent of the **dry bean** crop had been harvested, ahead of 47% last year and the average at 79%.

Proso millet harvest was 84% complete, ahead of last year at 60%.

Alfalfa conditions rated 6% very poor, 16% poor, 34% fair, 40% good, and 4% excellent.

CROP WATCH

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Answering grower questions on manure use

This is the third in a series of stories related to applying manure on cropland. In previous articles, the author addressed the value of using manure, how to measure available nutrients, and regulations affecting its use. This week he addresses some of the questions and solutions related to manure application.

Who applies the manure?

Most crop producers do not have manure application equipment. Large animal feeding operations (CAFOs) may be willing to transport and apply the manure. In some cases, however, the feeding operation may ask the crop producer to arrange for transport and application as this relieves the CAFO of some regulatory requirements. The crop producer might then rent the equipment from the CAFO or engage a commercial applicator.

Will manure application give a uniform supply of nutrients?

Uniform application of manure is a major concern. Common problems are that application passes are too wide, leaving strips across the field with inadequate nutrient supply, delayed start of application at the start of a pass, and running low or out of manure before a pass is completed. Avalanching of dry manures during application may result in excessive application in some places followed by areas of no application. Much of the problem is due to operator error. The application equipment also may not be the best for the manure being applied. The crop producer should supervise application until all problems are corrected. The crop producer can gain additional confidence by asking other farmers using this manure source and/or application equipment about their experiences.

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New Bt corn hybrids *(Continued from page 211)*

across the road) to the Cry34/35 corn field.

3. Refuge management options. The rootworm refuge may be managed in such a way that there is little or no yield loss to rootworms, but must be managed in a way that it is sufficiently productive of susceptible rootworm adults. The in-field refuge options may be planted as a single block or as a series of strips measuring at least four crop rows wide.

- Seed mixtures of Cry34/35 and refuge corn are not permitted.
- If the refuge is planted on rotated ground, then Cry34/35 corn also must be planted on rotated ground.
- If the refuge is planted in continuous corn, the Cry34/35 field may be planted on either continuous or rotated land (option encouraged where western corn rootworm rotation-resistant biotype [soybean variant] may be present).
- Application of soil insecticide is permitted in the refuge.
- Seed treatment is permitted in the refuge, either for rootworm protection or for controlling secondary soil pests.
- If aerial insecticides are applied to the refuge for control of CRW adults, the same treatment also must be applied in the same time-frame to Cry34/35 corn.
- Pests other than adult corn rootworms can only be treated with CRW-labeled insecticide on the refuge acres without treating the Cry34/35 acres if treatment occurs when adult corn rootworms are not present. Pests on the Cry34/35 acres can be treated as needed without having to treat the refuge.
- The rootworm refuge can be planted to any corn hybrid that does not express Bt proteins for rootworm control (e.g. lepidopteran-protected Bt corn, herbicide-tolerant corn, or conventional corn).
- The refuge and Cry34/35 corn should be sown on the same date, or with the shortest window possible between planting dates, to ensure that corn root development is similar among varieties.
- Growers are encouraged to plant the rootworm refuge in the same location each year, as it allows the rootworm population to remain high and the durability of the trait is extended. This option may be preferable to growers who wish to only think of their refuge design once and for those who grow continuous corn. However, for those growers who need to employ crop rotation, a fixed refuge would be impractical.

For more information

Bacillus thuringiensis *Cry34Ab1 and Cry35Ab1 proteins and the genetic material necessary for their production (plasmid insert PHP 17662) in Event DAS-59122-7 corn Fact Sheet, published by the U.S. Environmental Protection Agency at www.epa.gov/pesticides/biopesticides/ingredients/factsheets/factsheet_006490.htm*

Murt McLeod, Tom Doerge and Steve Butzen. 2005. Pioneer® Brand Hybrids with the Herculex® RW Trait, Crop Insights Vol. 15, No. 13. *www.pioneer.com/usa/agronomy/insects/hx/hxrw.htm*

Mycogen Seeds Announces New Herculex® RW Grain Corn Hybrids: *www.dowagro.com/mycogen/resource/grain/releases/20051006.htm*

Bob Wright
Extension Entomologist

Spend less in the fall to control winter annuals

In the fall producers typically think that they are too busy harvesting to worry about spraying weeds, but there is still plenty of time to get those nasty little critters.

Winter annual weeds (henbit, horseweed, pennycress, etc.) are quite susceptible to fall herbicide application. Winter annuals emerge in the fall (anytime from early September to November) then in the spring these weeds bolt and produce seeds. The next fall the cycle starts all over again.

Too often producers wait until spring to attempt to control these weeds. Of course if you want the best control you need to spray the weeds before they bolt in the spring. While this sounds simple, unfortunately, several factors are working against you in the spring. First is Mother Nature. In the early spring the weather is even more unpredictable than usual. It can be 80 degrees and sunny one day and 20 degrees with 6 inches of snow on the ground the next. Getting a sprayer over your ground can be difficult enough without considering the fact that herbicide performance may be reduced in cooler weather. Second is the growth stage of winter annual weeds. In spring winter annuals are in the reproductive mode. They bolt quickly, flower and before you know it, they are setting seed. Since the plant is larger and flowering, it is less likely to receive a lethal dose of herbicide from your application.

In the fall, however, the weather is more cooperative and weeds are typically in the rosette (vegetative) stage and more susceptible to herbicides. With rising energy costs and water availability concerns, it only makes sense to control these weeds before they economically impact your field.

The timing of fall applications may not be as critical as you think. Winter annuals can typically be sprayed from late September to early December, weather permitting. Of course if snow is on the ground, don't expect good weed control. Especially with the open falls we've had recently, a late fall application can work quite well. As far as rates are concerned, fall applications typically require less herbicide and thus, less expense.

Typically herbicides such as 2,4-D, dicamba, and glyphosate work well and inexpensively on newly germinated winter annual weeds in the fall. Before using a particular herbicide check to make sure it's labeled for fall application. Atrazine does not have a label for fall application in Nebraska.

Close inspection may be necessary to identify young winter annuals amid the crop residue in your fields, but it's well worth the effort to provide control in the fall before they have a chance to grow and use valuable soil moisture.

Some of the common winter annuals (henbit, horseweed, and pennycress) can be readily controlled with just 1.5 - 2 pt of 2,4-D ester or 1 pt 2,4-D + 4 oz dicamba, 24 oz of glyphosate, or 1 pt 2,4-D + 16 oz glyphosate. Note that atrazine is not labeled for fall application in Nebraska.

Considering all these factors, a fall application will give you more bang for your buck plus it will give you an excuse to get out of the house and into the tractor.

Brady Kappler
Weed Science Educator

Ag at the Crossroads Focuses on Water

The 15th annual University of Nebraska-Lincoln Ag at the Crossroads Conference will address Nebraska water issues.

This year's conference begins at 8 a.m. Nov. 3 at the Nebraska East Union on UNL's East Campus in Lincoln. The conference is sponsored by the Nebraska Ag Relations Council and UNL's Department of Agricultural Economics.

Morning sessions will focus on the history of water use in Nebraska and current water demands. Afternoon sessions will address these demands and water management options. Speakers will include experts from UNL, IANR, the Nebraska Water Task Force, Nebraska Land Trust, NPPD, Nebraska Department of Natural Resources, Upper Big Blue NRD and the attorney general's office.

Registration, required by 5 p.m. Oct. 26, is $35 for members and $45 for non-members. To register, contact the Nebraska Ag Relations Council, P.O. Box 830918, University of Nebraska-Lincoln, Lincoln, 68583-0918, call (402) 472-2821 or fax (402) 472-0025.

Decommission old wells, protect water quality

When you're setting your post-harvest, pre-winter project priorities, make sure to include applying for funding and having any old, unused water wells on your property properly sealed. Decommissioning these wells using an approved process can help prevent groundwater contamination and limit risk to your family's health and safety. The good news is that funds are generally available to help with decommissioning costs.

Groundwater is one of Nebraska's most valuable natural resources. Unused and deserted wells, especially those that are old and/or in disrepair or which don't meet current standards as an inactive well, pose a major threat to groundwater quality and human health and safety because of their direct connection to the underlying aquifer. State law refers to these as "illegal" wells.

These wells can allow surface runoff to flow directly down to the water-bearing zones, often carrying organic wastes, fertilizers, and other chemical residues such as pesticides and petroleum products into the groundwater. Small animals can fall into these wells, further adding to the contamination. Once groundwater is contaminated, it is difficult, if not impossible, to clean, and the process is always expensive. In addition, open wells are especially hazardous to children — a risk to human life that can and should be prevented.

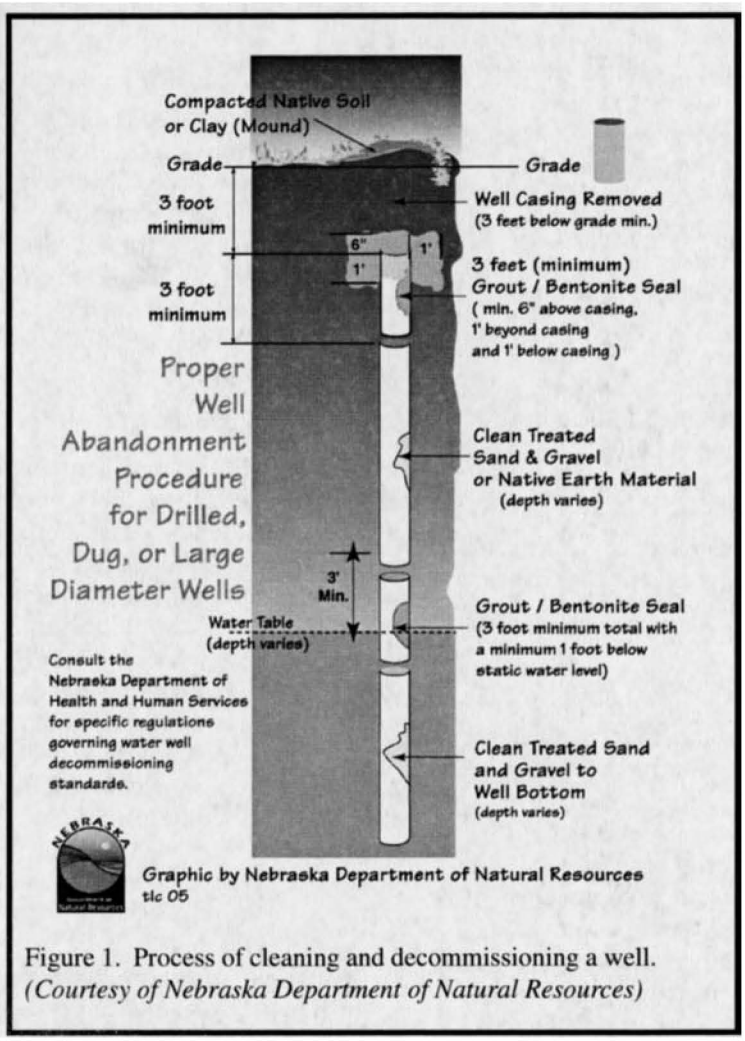
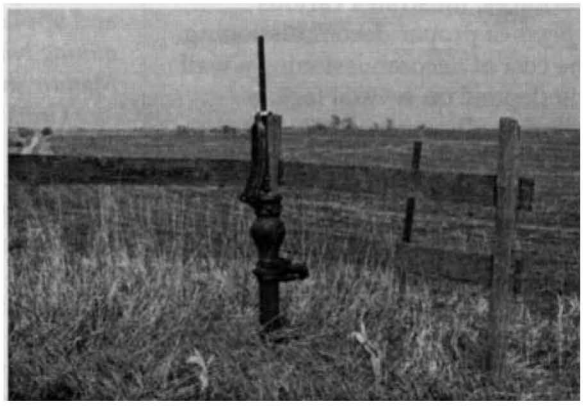


Figure 1. Process of cleaning and decommissioning a well. *(Courtesy of Nebraska Department of Natural Resources)*

Open, abandoned wells can be a safety hazard to small children and animals as well as threaten water quality.



Nebraska law requires that old, unused wells be decomissioned following state guidelines to protect one of the state's greatest natural resources, its water.

There are hundreds if not thousands of illegal wells located throughout the state. In the early development of communities, most households and businesses had an individual water- supply well. Most of these water wells have since been replaced by community water-supply systems, and, in many cases were not properly decommissioned.

Remember to check with the appropriate Natural Resources District for the proper paperwork, procedures, and potential funding before starting your well project.

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Decommissioning wells

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Nebraska regulations require that illegal wells be decommissioned following the requirements of Nebraska Health and Human Services System Title 178, Water Well Standards and Contractor's Licensing Act, Chapter 12, "Regulations Governing Water Well Construction, Pump Installation and Water Well Decommissioning Standards."

The decommissioning process includes removal of well equipment (pump, piping, etc), disinfection, filling and sealing, capping, and reporting. *Figure 1*, provided by the Nebraska Department of Natural Resources, illustrates various aspects of proper decommissioning. The cost of decommissioning a well will depend on several factors including diameter, depth, condition, accessibility, and construction technique and materials.

Fortunately, nearly every Natural Resources District (NRD) offers an attractive cost-share incentive to help well owners decommission illegal wells. Payment rates vary by NRD, but typically are 60-75% of the cost. To learn more about this program, contact the appropriate NRD for an information and application packet that gives program guidelines, forms, and instructions. No cost-share payments can be made unless all procedures are followed.

If there is an unused well on your property, contact the NRD office today to begin the decommissioning process and to do your part in protecting groundwater quality and human health and safety.

For more information about decommissioning water wells, consult UNL Extension NebGuide G02-1471, *Decommissioning Water Wells: An Owner's Guide*, available at local extension offices or on the Web at *ianrpubs.unl.edu/water/g1471.htm.*

David Shelton
Extension Agricultural Engineer
Sharon Skipton
Extension Educator

Manure application

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Will manure supply nutrients as needed for optimal crop performance?

You need to ask the CAFO for a manure analysis report to learn the amount of nutrients applied per ton (or per 1000 gallons). You also need to know the application rate — how many tons (or thousands of gallons) are applied per acre. This implies that the application equipment is well-calibrated. You can then calculate the application rate and availability rate for the nutrients. You can improve the estimate of nitrogen available to the first crop with further calculation considering factors specific for the manure type and application method; see *Determining Nitrogen Availability from Manure* in the Sept. 30 *CropWatch.*

Until you are fully confident of adequate nitrogen availability from manure, consider in-season monitoring of crop and soil nitrogen status. Most valuable may be the presidedress nitrate test where soil at the 0 - 12 inch depth is sampled at the 8-leaf stage of corn and analyzed for nitrate-N; if nitrate-N for soils that received manure application for that year is less than 15 ppm, apply additional nitrogen. Use reference strips to compare areas where manure and additional fertilizer nitrogen were applied. Either a chlorophyll meter or aerial photographs can be used to make the comparison. The stalk nitrate test can be used to determine if nitrogen supply was adequate for the crop.

Does manure need to be injected or incorporated?

The major reasons for injection or incorporation are to reduce odor and fly problems and to reduce loss of ammonium nitrogen. Both of these concerns are especially valid for slurry manures. Nitrogen in feedlot manure and in compost is mostly in organic form; while nitrogen loss can be reduced with incorporation, the loss is much less for feedlot manure than is expected with surface application of slurry manure. If the field is typically tilled, tillage can be done soon after application. If the field is in a no-till system, incorporation of feedlot manure is probably not justified.

Is soil compaction during manure application a problem?

Compaction should be minimal if manure is applied when the surface soil is dry, but is likely to be a problem if manure is applied when the surface soil is not dry. Compaction may be more at the entry points to the field. With proper application, tillage to reduce compaction effects should not be needed. If compaction does occur, it may be sufficient to rip the wheel tracks while leaving the rest of the soil surface undisturbed.

Will the manure contain weed seed?

Raw manure probably will contain viable weed seeds, but in most cases manure application will not introduce new weed species or add significantly to the bank of weed seeds already in the soil. Still, if your field does not have certain species of concern, check with others using this manure source to learn of their experiences.

What are other concerns?

Feedlot manures may contain pieces of concrete; if so, check your fields before or during planting to avoid equipment damage. Large chunks of frozen manure are often applied with winter application; most planting equipment will cut through these but they may need to be broken up. Manure nutrients can be carried into and contaminate surface waters, especially on highly erodible land without effective conservation practices. Generally, however, the risk, is no worse than if the nutrients are applied in inorganic fertilizer.

Charles Wortmann, Extension Nutrient Management Specialist

Directory of extension specialists for crop production and pest management

In this issue of *CropWatch*, we're including a directory of University of Nebraska-Lincoln Extension crop production and pest management faculty, many of whom you'll recognize as regular contributors to this newsletter. Following the name, is their Extension title, area of expertise, location, phone and email. Detailed contact information for each of the Research and Development Centers is also provided. In addition Extension Educators located across the state also have specialities in various subject areas. Your first stop may be your local educator who may have information applying to the question.

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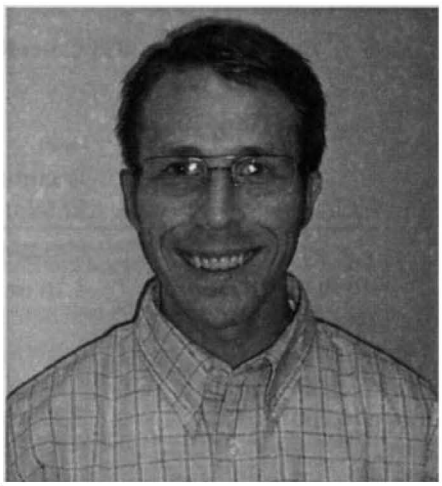
Agronomy welcomes irrigated weed specialist

Mark Bernards joined the UNL Extension Weed Science Team on October 1 as the Irrigated Weed Specialist. He will be based on UNL's East Campus in Lincoln and his research will be centered at the South Central Agricultural Laboratory near Clay Center His appointment is 50% extension and 50% research and his responsibilities include weed management in irrigated cropping systems, off-target movement of herbicides, and the impact of weeds and weed management on efficient irrigation water use.

Mark received his Ph.D. in Crop and Soil Sciences from Michigan State University in 2004. His research emphasis was soybean cropping systems with projects addressing irrigation scheduling in soybean and the effect of manganese fertilizers on glyphosate activity. Following graduation he worked as a research associate at Michigan State University in the Cropping Systems and Weed Science programs.

Mark was raised in Spanish Fork, Utah. He discovered agronomy his freshman year of college, became fascinated with the science, and earned B.S. and M.S. degrees in Agronomy from Brigham Young University.



Mark Bernards

"I am excited to be at the University of Nebraska-Lincoln and part of the Weed Science team," said Bernard. "I look forward to meeting many of you, learning much about agriculture in Nebraska, and working to contribute to its success. I hope you will feel free to contact me with your ideas and questions. I may be reached at (402) 472-1534 or by email at mbernards2@unl.edu."

Corn rootworm efficacy trial results reported

A replicated experiment was conducted at UNL's South Central Agricultural Laboratory near Clay Center to evaluate a variety of control options against corn rootworms, including transgenic Bt corn hybrids, insecticidal seed treatments, and liquid and granular insecticides applied at planting time. The YieldGard rootworm hybrid NC+ 5414RD was evaluated in comparison to its near isoline NC+5413R, with and without additional insecticide treatments.

Plots were planted in an area which was a trap crop area (late planted corn) in 2004 to insure adequate rootworm pressure. At this site western corn rootworm is the predominant species present; very few northern corn rootworms were present. Plots were planted April 25. The plot size was 1 row by 144 feet.

Each treatment was replicated four times in a randomized complete block design. Seed treatments were applied commercially. Liquid insecticides were applied at 5 gallons/acre. All granular insecticides were applied in-furrow because of strong winds at the time of planting. Aztec 4.67G and Force 3G with Poncho 250 treated seed were applied using a SmartBox application system; all other granules were applied using standard insecticide boxes. Additional details of these trials are available at *entomology.unl.edu/fldcrops/trials/crwclaycenter05.pdf*

The site was irrigated by overhead sprinkler irrigation as needed. Initial rootworm egg hatch was observed on May 26, and five randomly selected plants were dug from each plot on July 13 and rated using the 0-3 node injury scale.

There was moderately heavy rootworm pressure at this site; the untreated check had approx. 1.5 nodes of roots pruned back. Based on the 0-3 injury scale, all treatments except for Lorsban 4E had statistically similar levels of root protection. The equivalent 1-6 injury ratings are included for comparison. Yield data will be reported later.

Bob Wright
Extension Entomologist

Table 1. Data from the 2005 Corn Rootworm Trial conducted at Clay Center.

Product(s)	Recommended Rate(s)	Placement	Avg. Root Injury Ratings 0-3 Scale[1] (July 13)	Avg. Root Injury Ratings 1-6 Scale[1] (July 13)
Aztec 2.1G	6.7 oz/1000 row ft	In furrow	0.10 a	2.25 a
Regent 4SC	4.16 oz/acre	Microtube	0.11 a	2.45 a
YieldGard™ Rootworm Corn + Poncho 250	---------- 0.25 mg ai/seed	Transgenic seed Seed trt	0.11 a	2.45 a
Aztec 2.1G + Poncho 250	6.7 oz/1000 row ft 0.25 mg ai/seed	In furrow Seed trt	0.12 a	2.45 a
Aztec 4.67G + Poncho 250	3 oz/1000 row ft 0.25 mg ai/seed	In furrow Seed trt	0.12 a	2.55 ab
Regent 4SC Poncho 250	3.25 oz/acre 0.25 mg ai/seed	Microtube Seed trt	0.13 a	2.49 a
Force 3G + Poncho 250	4 oz/1000 row ft 0.25 mg ai/seed	In furrow Seed trt	0.17 a	2.45 a
Aztec 2.1G Poncho 1250	6.7 oz/1000 row ft 1.25 mg ai/seed	In furrow Seed trt	0.18 a	2.60 ab
Cruiser 5FS	1.25 mg ai/seed	Seed trt	0.18 a	2.70 abc
Force 3G	4 oz/1000 row ft	In furrow	0.21 a	2.65 ab
Poncho 1250	1.25 mg ai/seed	Seed trt	0.23 a	2.70 abc
Lorsban 15G	8 oz/1000 row ft	In furrow	0.30 a	3.00 bc
Lorsban 4E	2.4 oz/1000 row ft	T-band	0.65 b	3.20 c
Untreated check	----------	----------	1.49 c	4.15 d
LSD(0.05)			0.35	0.51
Treatment Probability			<0.0001	<0.0001

[1]Means in column followed by the same lowercase letter are not statistically different using Fisher's protected LSD (∞ = 0.05).