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Bean pod mottle virus increasing in state

In the 2000 production season, the soybean disease most commonly encountered in Nebraska fields was bean pod mottle virus (BPMV). In surveys conducted by a UNL plant pathologist, 69% of 201 fields were found to have this virus. In the North Central Region, most states list the bean pod mottle virus as the most common viral disease of soybean in their states. This viral disease is vectored or moved by the bean leaf beetle.

The bean pod mottle virus was first identified in Nebraska in 1981 and has been commonly encountered since then. The current increase in incidence of the virus has been linked to increasing populations of the bean leaf beetle. In soybean fields surveyed last year, the incidence of bean pod mottle virus was estimated at 70% or higher. The virus has been documented to reduce yield by as much as 52% in other states, however we are not sure of losses for Nebraska producers. Greater yield loss occurs when plants are infected early in their development. Plants with the bean pod mottle virus also can have higher levels of Phomopsis seed infection and produce discolored seed, which can have a significant impact on seed quality. The bean pod mottle virus also is known to cause green stem conditions, which many producers struggle with at harvest.

Bean pod mottle virus symptoms include green to yellow mottling

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Study of glyphosate's effect on nodulation is inconclusive

Some researchers and producers have reported reduced plant growth and nitrogen fixation following glyphosate (Roundup) application on Roundup Ready soybeans. Is this coincidental or the result of the glyphosate application or other factors? The following discussion addresses a recent journal article on this issue, and includes comments on the researchers' proposition and another perspective from Nebraska soybean researchers.

Synopsis of the Agronomy Journal report

Scientists from Arkansas recently reported in Agronomy Journal that glyphosate has a negative effect on bacteria that fix nitrogen in nodules of glyphosate resistant (GR) varieties. The research was conducted in a greenhouse and growth chamber and at two field locations in

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Livestock odors and zoning on April 18 “What’s Shaping”

Concentrating livestock production in confined areas creates problems for the expansion and growth of the industry as well as for neighbors. Odors and zoning regulations will be the subject of the April 18 webcast of “What’s Shaping the Markets”.

The NU Cooperative Extension program will be live on the Internet from 3 p.m. to 3:45 p.m. (CST) on the web site Rural Routes at ruralroutes.unl.edu. The program will be archived for later viewing.

“Research at the University of Nebraska and at other universities is finding new technologies that reduce dust and odor from livestock operations,” said Jim Kendrick, NU marketing specialist emeritus and program host.

“These new methods are important as cities and counties work to establish zoning ordinances,” said Kendrick. “And it’s important not only for livestock producers to know about these new technologies, but the citizens serving on the zoning commissions as well.”

Joining Kendrick in the panel discussion will be Dave Aiken, NU water and ag law specialist; Paul Hay, NU extension educator in Gage County; Rick Koelsch, NU environmental biological systems engineer; and Rick Stowell, NU biological systems engineer.

The program also will feature Dave Fiala, president of Futures One, with an analysis of events shaping the grain and livestock markets, and Al Dutcher, NU state climatologist, with the updated weather forecasts.

Correction

The rating for Canopy XL for ALS kochia and waterhemp are correct in the 2001 Weed Management Guide. The rating for ALS kochia should be 9 and the rating for waterhemp should be 8. The ratings were incorrectly reported on page 32 of the April 6 Crop Watch.
Soybean pod mottle virus (Continued from page 41)

(blotchiness) of younger leaves in the upper canopy. In severe cases leaves may show puckering and distortion and plants can be stunted. The only way to confirm the presence of the virus is with serological testing (Elisa). Resistance to the bean pod mottle virus has not been identified; however, varieties will respond differently to it.

Bean leaf beetle is a vector of the bean pod mottle virus. The beetles first appear in soybean fields in the spring during seedling stages. These are the beetles that have successfully overwintered and appear to be the primary vectors of the virus. Growers also see bean leaf beetles during the late vegetative and reproductive stages of soybean production. The role of these mid-late season beetles in vectoring the virus is not clear and probably not as important as the spring beetles.

Overwintered beetles emerge from leaf litter in early spring and move to other legumes, such as alfalfa, before soybean fields are typically planted. When soybean plants begin to emerge, the beetles move to the seedling soybean. The earliest planted fields are the first to be colonized and usually end up with the largest beetle populations. It appears that as the beetles move around and feed on seedling soybeans, they transfer the virus from plant to plant. Much about the relationship between the beetle, virus, and soybean remains unknown.

Will controlling the spring, overwintered beetles help control bean pod mottle virus? Preliminary studies conducted in Iowa indicate that this may be an effective strategy, but many questions need to be answered, such as “When is the best time to treat the beetles -- at plant emergence, the unifoliolate stage, or in herbicide/insecticide tank-mix?” We don’t know the answers to these questions yet, however studies are underway in Nebraska and other states to address them.

NU plans to address BPMV

We will continue to monitor the amount of bean pod mottle virus throughout the state to further assess the extent of the problem. Management studies focusing on early-season insecticide applications are being planned for the 2001 production season. These studies are being funded, in part, from a grant by the North Central Soybean Research Program. Hopefully, through these efforts we will also get a better idea of the yield loss associated with this disease in Nebraska. In addition to field projects, the Nebraska Soybean Board is funding a project in which we are working with the UNL soybean breeding program to develop varieties with tolerance or resistance to the bean pod mottle virus. At this time varieties are not rated for susceptibility to BPMV.

Loren Giesler
Extension Plant Pathologist

Thomas Hunt
Extension Entomologist

Producing ethanol more efficiently

Producing fuel ethanol from grains at low temperatures may be more feasible, thanks to recent USDA-ARS research.

When grains are processed into ethanol, starch granules are cooked at 105 C (about 223 F) to convert the starch to a form that enzymes can degrade into simple sugars. ARS researchers have developed variants of a natural starch-degrading enzyme that breaks down starch 50 times faster than the original enzyme -- at 37 C (about 99 F). Enzymes with greater activity at low temperatures could facilitate development of more energy-efficient methods of ethanol production.

ARS News Release
one year. The idea behind the work is that glyphosate inhibits an enzyme that is important in plant growth and development. Glyphosate-resistant soybeans contain a form of the enzyme from a soil bacteria that is resistant to glyphosate. Although these soybeans are resistant to glyphosate, the N₂ fixing *Bradyrhizobium japonicum* that inhabits soybean nodules is not resistant. Glyphosate is not readily degraded in plant roots and concentrates in metabolic sinks such as young roots and developing nodules. *B. japonicum* strains vary in their responses to glyphosate with some completely inhibited by glyphosate (5mM). *Bradyrhizobium japonicum* sensitivity and the potential high glyphosate concentration in the roots and nodules could impact the symbiotic relationship. In addition, water deficits affect N₂ fixation more than other physiological processes. Conditions and treatments (like glyphosate) that adversely affect the symbiotic relationship may influence the sensitivity of N₂ fixation to water deficits.

The researchers treated glyphosate-resistant soybean with glyphosate at several stages of development to evaluate N₂ fixation, growth, and yield in a series of greenhouse, growth chamber, and field experiments. Early applications of glyphosate generally delayed N₂ fixation and decreased biomass and nitrogen accumulation in plants harvested 19 days after emergence; but plants had recovered by 40 days after emergence. Biomass and nitrogen content of glyphosate-resistant soybean were also decreased by glyphosate in plants grown with available soil nitrogen. There were differences in sensitivity to glyphosate among glyphosate-resistant cultivars, with biomass decreases ranging from 0 to 30% at 40 days after emergence for the most tolerant and sensitive cultivars evaluated. In growth chamber studies, N₂ fixation was even more sensitive to water deficits with glyphosate. In field studies, there was no measured effect of glyphosate on glyphosate-resistant soybean at one location where there was adequate soil water throughout the growing season; however, glyphosate tended to decrease biomass and seed yields under conditions of limited soil water at another location.

**Comments on the Agronomy Journal article and its application to Nebraska**

No study is perfect and it is often easier to see limitations of another’s work than that of our own. Nevertheless, there are a few things about the study that limit its direct application to field-grown soybeans in Nebraska.

1. **Greenhouse studies:** A high rate (1.68 kg/ha = 1.5 lb ai/acre = 1.12 lb. ae/acre) of glyphosate was used at frequent intervals (five to seven days) in the greenhouse studies. Glyphosate application began at five days after emergence and the plants were sprayed five times in some cases for a total of 8.4 kg/ha; this is well above the maximum of 3.36 kg/ha allowed by label. This in itself is not bad since they were trying to find cultivar differences; however, it doesn’t relate to field practicality. Typically we wouldn’t start spraying for weeds in soybean until about 21 days after emergence (see story, page 49).

2. **Field studies:** Glyphosate application normally would occur at 21 and 35 days after emergence; there was no effect on soybean seed yield in either cultivar at either location when glyphosate was applied at these times in the Arkansas study. Fifty percent more glyphosate (3 pt/A) than normal (2 pt/A) was applied per application. The effect at Arkansas seemed to be caused by application at seven days after emergence and then again later and not from glyphosate at normal ‘labeled’ times.

3. **Field studies:** The scientists showed that glyphosate can affect soybean nodulation under fairly severe treatment regimes. They also showed that the soybean mostly recovered from this unless the glyphosate treatment was continued. Will this reduced nodulation occur with any significant frequency in the field unless there is a highly susceptible strain used? Are there any susceptible strains? King et al. propose that testing a broad range of glyphosate-resistant cultivars with and without glyphosate would provide useful information on the identification of genetic backgrounds that are more suitable for non-irrigated conditions with glyphosate-resistant production systems.

4. **Field studies:** The connection between glyphosate applied under water deficit conditions to reductions in soybean yield and biomass is not strong. There was no direct comparison to test this hypothesis. Location comparisons were confounded by soil type differences, planting system differences (beds vs flat), row space differences (1 m vs 0.96 m), and frost at 104 days after emergence at one location. Both of

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Glyphosate research  (Continued from page 44)

the environments were relatively low yielding (maximum yield at the good site was 2084 kg/ha = 31 bu/acre).

We know that any stress on soybean plants also will stress B. japonicum that inhabit nodules and fix nitrogen. It is possible that other post-emergence herbicides could have the same effect on reducing nitrogen fixation and plant dry matter accumulation for short periods of time.

More work on these questions is necessary. There’s a need to test a range of glyphosate-resistant cultivars with and without irrigation across diverse environments.

Considerations based on Nebraska field reports

First it is too early to blame poor field nodulation on the extensive use of glyphosate and glyphosate-resistant varieties. In a Crop Watch article last year (July 14, 2000, http://cropwatch.unl.edu) Elmore and Ferguson reported on some likely (and unlikely) causes for nodulation failures. We think these are still valid:

1. Most of the reports were from fields with Roundup Ready Soybeans. This is an unlikely cause for the nodulation failure. Researchers in several states have investigated the effects of the Roundup Ready system on soybean nodulation and nitrogen fixation. Roundup Ready varieties and their sister lines have nodulated similarly in all cases (personal communication, Tom Wacik, Urbana Laboratories, and Stewart Smith, LiphaTech).

2. Some seed fungicides are toxic to inoculant bacteria. Make sure that fungicides have dried before inoculants are applied. Even then, some combinations of fungicide and inoculant materials are not compatible. In-furrow inoculants were developed in part to keep inoculants away from chemically treated seed and are recommended when seed treatments are used. When an inoculant and a seed treatment are combined on the seed, keep exposure time as short as possible. Less than four hours is best. Some seed treatments kill B. japonicum immediately. Be sure to check the compatibility charts of inoculant companies for details. Inoculant-seed treatment interaction problems are likely causes in some of the situations reported; however, the most likely cause of poor nodulation is the following . . .

3. High soil temperatures and or dry soil conditions after planting are known to decrease nodule formation and/or growth, reducing nitrogen fixation. This is the most likely cause of the widespread problems last year. Any plant stress will affect the symbiotic relationship between the soybean plant and B. japonicum bacteria that ‘fix’ nitrogen. In May 2000 soil temperatures in south central Nebraska were 5° to 10° above normal for all but the week beginning May 15. This coupled with low soil moisture could have negatively impacted nodule formation especially on new soils. If seed were planted into dry soils and the plants immediately ‘watered up’, the impact of hot-dry soils would be less. However, one study has shown that just seven days of dry soils after planting can seriously impact nodulation and nitrogen fixation (personal communication, Stewart Smith, LiphaTech).

Ensure that quality inoculants are used especially in fields that have never had soybeans (‘new’ soils) or that have never had nodulated soybeans. In addition, handle the inoculant material with care, according to the label directions. In these cases, if high temperatures and dry soils are present at planting on “new” soils, in-furrow peat-based inoculants are probably the best choice, soil-applied liquid inoculant materials are second best, and seed-applied peat-based or seed-applied liquid materials are the last choice.

Roger Elmore
Extension Crops Specialist
Fred Roeth
Extension Weeds Specialist
Both at the South Central REC

Is there more disease in Roundup Ready soybeans?

The question of whether there is increased disease in Roundup Ready soybeans is something which many people are studying. Recently, some preliminary results from the University of Missouri indicated that Roundup Ready (RR) soybean receiving glyphosate (Roundup) at recommended rates had a significantly higher incidence of Fusarium fungi on roots one week after application than plants that did not receive glyphosate. There was no difference in yield among treatments in this study.

In another study, published in 1999 in Phytopathology, a journal produced by the American Phytopathological Society, Iowa State University researchers investigated the response of Roundup Ready varieties to sudden death syndrome (SDS), which is caused by Fusarium solani f. sp. glycines. This should not be confused with a blend of Fusarium spp. examined in the

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Planting soybeans: Seed quality factors to consider this season

Last year’s hot, dry summer and drought conditions severely stressed soybean plants. Many soybean fields did not mature normally, but instead prematurely turned brown and died. Seed from these fields is extremely small, brittle, and low in vigor. Even plants that had normal moisture supplies underwent a faster than normal maturation, leaving the seed susceptible to internal damage.

Many soybeans may appear normal on the outside but have internal stress cracks that will cause abnormal seedlings. These seeds produce a short sprout with either a few spindly roots or no roots. This can contribute to emergence and final stand problems this spring. Many of the seeds that appear to produce a normal plant lack normal vigor for emergence. In over 20 years of germination testing at the Nebraska Crop Improvement Association (NCIA) Laboratory the previous lowest average germination was 87%. This year it is 76%.

Smaller seed size

Is the smaller seed size an issue for planting? Probably not. Most of the published research on soybean seed size was conducted 30 to 40 years ago when soybeans were often planted without grading. Studies in Indiana and Virginia that compared seed size groups screened from the same bulk seed found that larger seeds improved yields over smaller seeds. The Virginia researchers, however, found that initial plant stands, plant mortality, lodging, and average seed size of harvested seed did not differ among seed size categories. Plant heights resulting from large seed were greater than those from small seed. They concluded that seed size uniformity rather than absolute size is the most important factor affecting yield since seed size uniformity leads to plant uniformity.

A study in Mississippi with large and small seeded lines of the same genetic background (isolines) found no differences in grain yield between the pairs. It also found that small seeds (4800 seeds/pound) developed better roots and emerged more rapidly than the large seeded counterparts (2000 seeds/pound). Other researchers have reported that small seed size is associated with better seed quality and better emergence through crusted soils.

We probably don’t need to consider seed size as a performance issue in 2001. In fact, if seed is bought by the pound, small seed has an advantage over large seed of the same variety. If germination rates are similar, it may make sense to purposely plant small seeds. More acres can be planted with a 50-pound bag of small seed than a 50-pound bag of large seed.

Germination tests

Given the reduced germination rates of many seed lots this year, you may want to test your seed or have it tested before calculating seeding rate. Normal seedlings should be about 4 to 5 inches tall and will have the first true leaves emerged and unfurled by the end of the eight-day germination period. In NCIA seed testing this year we have seen many abnormal seedlings which only produce a sprout 3/4- to 1-inch long and never elongate or emerge. Many of these have no leaves and die after the food storage reserves in the cotyledons are depleted.

It may be better to have an official seed laboratory test the germination both before and after cleaning the seed. This is important because handling brittle seed will damage the germination. Even if you are able to buy soybeans labeled with a high germination, check the test date. If the date of test is last fall or in winter, ask the dealer if they have a more recent germination test. Remember that this year’s seed is lower in vigor than normal and has declined rapidly in germination since last fall. Be extra careful when the seed is handled or moved to avoid further seed damage. Use the following formula to calculate how much seed you will need and compensate for the germination.

Seedling rates and planting

Be sure to adjust your seeding rate to account for lower than normal germination rates. (Use the above equation.) General planting rate recommendations in Nebraska are 150,000 live seed per acre at planting. That’s about nine seeds/foot in 30-inch rows. See NebGuide G99-1395, Soybean Seeding Rates, for more information on this. After emergence, a uniform stand of 80,000 or more plants per acre with good weed control offers reasonable yield potential.

Protect yourself by not putting your seed under stress conditions. Delay planting to allow the soil temperatures to warm up. If the soybeans can germinate rapidly and emerge from the soil in a few days there is less chance of crusting of the seed bed which will further stress the seedlings and cause poor emergence.

Larry Prentice, Quality Control Manager, Nebraska Crop Improvement Association
Roger Elmore
Extension Crops Specialist
Disease factors
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Missouri work. (There is a great diversity of Fusarium species found in soil and only one causes sudden death syndrome.)

ISU researchers found that the response of Roundup Ready soybean varieties to SDS under glyphosate applications was the same as with conventional herbicides (imazethapyr (Pursuit) and lactofen (Cobra)). Foliar disease symptoms in field plot treatments with herbicides increased approximately 10% compared to non-sprayed control plots. This difference in foliar symptoms disappeared as the season progressed. In growth chamber studies there was an increase in severity and frequency of sudden death syndrome root isolation after applying imazethapyr and glyphosate compared to control plants not receiving treatment. A lactofen application resulted in decreased disease severity and sudden death syndrome isolation compared to the control of untreated plants. Based on the ISU study it appears that glyphosate tolerance does not translate into a total lack of herbicide induced stress, at least to the level that increased SDS colonization of roots after application of glyphosate to glyphosate tolerant varieties.

So far, sudden death syndrome has not significantly affected Nebraska soybean production; however, the science being studied could potentially apply to other disease problems that Nebraska producers are managing. It is too early to form a conclusion on whether applying glyphosate on Roundup Ready varieties affects disease development.

Loren Giesler
Extension Plant Pathologist

Firm up alfalfa seedbeds before starting to plant

Before planting your alfalfa or grass this spring, take time to evaluate your seedbed. Instead of just pulling into your field and planting, get off your tractor and walk across the field. Look back at your footprints. Do they sink in deeper than the soles of your shoes or boots? If so, your seedbed may be too soft.

Another testing technique may pique your child’s interest. Take a seedbed testing kit -- commonly known as a basketball -- to the field in question. Try to dribble the basketball. It should be easy to bounce on a firm seedbed. If you can’t bounce the ball easily, don’t plant yet. Firm the seedbed with a flat harrow, a roller, or maybe even irritate it.

Why so much effort for a seedbed? When small seeds germinate, their first roots must come into immediate contact with moisture and nutrients in the soil to survive and grow rapidly.

Loose seedbeds can have up to 50% dead airspace in the seedbed zone. The first roots to emerge into that dead airspace often do not live, and your stand will suffer. A firm seedbed reduces this dead airspace, helping provide for thicker stands that develop more rapidly.

Bruce Anderson
Extension Forage Specialist

Forage soybeans offer unique high protein benefits

Soybeans were first brought to the United States to be used as a forage crop. Plant breeders changed the crop into one grown primarily for the oil and protein in its seed. Now, though, some varieties have been transformed back into a forage crop. These varieties differ from typical bean plants by growing over six feet tall and being late in maturity. Because they are later maturing, forage beans produce mostly leaves and stems with relatively little seed. The hay and silage from these forage beans has forage quality quite similar to alfalfa.

Forage soybeans offer several benefits. Planted in a mixture with corn or forage sorghum, silage made from this mix will be several points higher in protein with similar energy and palatability as corn or sorghum alone. Forage soybeans also can be used as a one-year forage crop in rotation with corn. Forage varieties can be drilled in May and just one harvest will provide three to six tons of high protein hay or silage. (And that’s without adding any expensive nitrogen fertilizer!) No other crop can do that in just one year. If you have good moisture in July, you might consider double-cropping these forage beans after wheat.

Growing soybeans as a forage may seem strange, but with low crop prices, high nitrogen prices, and tight forage supplies, they may provide a good option for your operation this year.

Major distributors of forage soybeans are:
• Seedway, Hall, NY
• Wolf River Valley Seed Co., White Lake, WI
• Southern States Cooperatives, Richmond, VA, 804-281-1000

Bruce Anderson
Extension Forage Specialist

CropWatch at:
cropwatch.unl.edu
Early season weed control in soybean

With corn planting just around the corner it may be hard to give any thought to soybeans right now; however, this is a good time to begin planning weed management strategies for soybeans, since often there is no break between corn and soybean planting. Let's look at some of the factors you may want to take into account.

Conventional tillage vs no-till

Depending on how you look at it, weed management strategies for these tillage types will either be very similar or worlds apart. Of course, while the concepts are still the same, the goals are somewhat different. Management strategies for each still focus on the bottom line of yield.

Conventional tillage soybeans

Under a conventional tillage operation, a good portion of weed management is removed from the equation. Many of the early emerging summer annuals, including giant ragweed, kochia, lambsquarters, and Russian thistle are removed during the tillage process, allowing the crop and any new weeds to emerge together.

Under this system, a preemergence can really work well for producers. A preemergence treatment can remove a lot of the weeds that would emerge with the crop and compete heavily with the soybeans. This gives the crop an advantage by several weeks, removing competition during the first portion of the critical period of weed control.

Research at the University of Nebraska has shown that each crop has a critical period during which weeds must be controlled to maintain maximum yields (see figure). For soybeans, this period is from the second trifoliate to approximately the beginning of podset. This is roughly the 10th to the 40th day of crop growth.

One may interpret that weeds in front of this window need not be controlled. However other factors such as reduced soil moisture and unsightly field clutter need to be taken into account. In a drought year, controlling these early season weeds may be very important.

No-till soybeans

In dry years no-till farmers may be ahead of the game, as they are likely to conserve more soil moisture. This moisture could be a yield limiting factor in a drought year. Because of the lack of tillage, early summer annuals are likely to cause problems unless controlled.

Burndown treatments will eliminate soil moisture loss from early summer annuals. Many herbicide strategies exist to accomplish this while still providing some residual control before the crop is planted.

One strategy is to apply an early preplant treatment with the burndown 10 to 30 days before planting. This removes weeds up front while providing the residual control needed for the early part of the season. The advantage of this strategy is that most summer annuals have not emerged yet, rendering the residual herbicide very useful. Another advantage is that more time is given for a rainfall event to occur for herbicide incorporation and activity. Finally, depending on the weed spectrum and the residual herbicide, the early preplant may eliminate the need of an additional burndown, saving money. However one disadvantage is that the herbicide will lose residual activity earlier in the growing season and post treatments must be planned more carefully.

A second strategy is to apply a burndown alone ahead of planting, such as Roundup Ultra at 32oz/a or Touchdown 5 at 26oz/a. When combined with 1.0 pt/a 2,4-D ester Roundup Ultra can be reduced to 24oz/a and Touchdown 5 to 19oz/a. Keep in mind that there is a 7 day interval between application of 1pt of 2,4-D and planting of soybeans. An application greater than 1 pint of 2,4-D requires 30 days before planting. A disadvantage to this strategy is the window between the burndown treatment and the treatment applied at planting. The bigger the gap, the more likely it is for additional weeds to emerge ahead of planting.

Still another technique is to apply a 2/3 rate of residual herbicide with the burndown followed by another 1/3 residual at planting. This allows for a longer window

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Climate factors affecting 2001 production

As we begin to enter the spring production season, many of the issues related to last year’s drought have been eliminated, at least temporarily. Frequent storm activity has helped to replenish upper soil profiles with adequate moisture for crop emergence and initial growth. A brief description of some of the factors that may be influenced by climatic events during the 2001 production season follows.

Precipitation

There is no comparison between the September through March 1999-2000 and 2000-2001 precipitation patterns. Abundant precipitation fell across most of Nebraska during the latter period. Liquid equivalent precipitation and percent of normal precipitation are depicted in the maps, at right.

Only a small area in east central Nebraska remains below 90% of normal precipitation through the period. Although slightly below normal, this area is still within the normal statistical range. If this area drops below 80% of normal from September 1 to the present, we will begin to issue statements concerning the possibility that signs are pointing to a re-emerging drought.

Although western Nebraska had below normal snowfall this winter, heavy rainfall last October and November helped alleviate severe drought concerns. Southwestern Nebraska had rainfall totals approaching 500% of normal from October 15 to November 15. Although eastern Nebraska didn’t receive as much rainfall in terms of percent of normal, snowfall averaged 30% above normal.

Soil moisture

Moisture available for plant growth has shown a remarkable recovery since the end of the 2000 production season. As of April 8, the High Plains Regional Climate Center soil moisture monitoring sites are levels similar to or better than last year at this time. Sensors at most Panhandle, Sandhill, and northeast Nebraska sites indicate there is more moisture in the soil than at any time last year.

There are still areas of concern, particularly in east-central, south-central, and southeast Nebraska. As of April 8, soil moisture levels are at or slightly ahead of the same date last year. What is different this year is where the moisture is located. Last year, most of the available moisture was contained below three feet. This year, available moisture appears most abundant in the upper three feet of the profile.

There should be adequate moisture for emergence and initial growth. A continuation of the present wet pattern would further enhance soil moisture reserves before crop demands significantly increase.

Streamflows – reservoirs

Streamflow rates as of April 1 indicate all but southwestern Nebraska are in the normal to above normal range. Inflows in the Upper Republican Natural Resource District continue to be disappointing. Much of this area is dependent on mountain snowpack and snowfall across northeastern Colorado.

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Soybean aphid in the Midwest, not yet in Nebraska

Soybeans normally are not colonized by aphids, but aphids were discovered last summer in high numbers in Wisconsin, Illinois, Minnesota and Michigan soybeans. Aphids also were found at lower levels in Iowa, Indiana, Missouri, Kentucky, Ohio and West Virginia. Taxonomists identified these as the soybean aphid, *Aphis glycines*.

This aphid originates in Asia. The relatively broad distribution within the Midwest suggests that it may have been present for more than one year.

The soybean aphid is a small yellow aphid with black cornicles ('tail-pipes'). Typically, it feeds on new growth or the undersides of mature leaves. Heavy feeding may produce wilting, leaf distortion and yellowing.

Representatives of the Nebraska Department of Agriculture and Dr. Tom Hunt, UNL Extension entomologist, conducted surveys late last summer in eastern Nebraska and did not detect it.

Entomologists and plant pathologists across the Midwest have ongoing research examining insecticide efficacy, yield effects, virus transmission and biological control of soybean aphids. Surveys will continue in 2001 to document the aphid's distribution and possible spread. If you find colonies of yellow aphids with black cornicles in Nebraska soybeans this summer, please contact:

Tom Hunt, Extension entomologist, at the Haskell Agriculture Lab at Concord (402-584-2863),

Keith Jarvi, Integrated Pest Management, at the Northeast Canola Research and Education Center (402-370-4016),

Bob Wright, Extension entomologist, at the South Central Research and Extension Center near Clay Center (402-762-4439).

Additional information and photos are available on the web:

- Regional Pest Alert; Soybean aphid at [http://ceris.purdue.edu/caps/pests/saphid/pestalert.html](http://ceris.purdue.edu/caps/pests/saphid/pestalert.html)
- New Soybean Insect Pest Discovered in Northern Illinois, Wisconsin, and Michigan at [http://www.ag.uiuc.edu/cespubs/pest/articles/2000020h.html](http://www.ag.uiuc.edu/cespubs/pest/articles/2000020h.html)
- Aphids amuck: soybean aphids discovered in United States at [http://www.msue.msu.edu/ipm/CAT08_17-00.html#1](http://www.msue.msu.edu/ipm/CAT08_17-00.html#1)

Bob Wright, Extension Entomologist, South Central REC

Climatic factors (Continued from page 49)

The Enders and Swanson reservoirs are not expected to recover from last year’s drought and further irrigation limits are expected. In addition, McConaughy reservoir is down significantly from last year. Snowpack in Wyoming is in better shape than northeastern Colorado with at least some of the feeder basins of the Platte having near normal snowpacks. Even so, significant recovery won’t occur this summer, unless heavy precipitation develops.

Hay/Forage

Nebraska Agricultural Statistics Service (NASS) indicated that hay supplies were at their lowest levels since 1987. Hay stocks were at 3.5 million tons as of Dec. 1, but are expected to be closer to 1.0 million tons by May 1. Prices paid for alfalfa hay have steadily increased from $35 per ton in late 1999 to $80 per ton by the end of 2000. NASS indicates that prices paid for alfalfa hay will probably top out at $120-$140.

Recent precipitation patterns bode well for spring growth of alfalfa and native grasses. In order to reverse a three-year downward trend, cool temperatures and abundant precipitation will need to continue for the next few months.

Spring planting

The most recent storm system which crossed Nebraska late last week may be a typical pattern for some time. Numerical models indicate the next 7-14 days may be very stormy. If these forecasts are correct, at least three severe thunderstorm outbreaks are predicted to occur April 10-20.

Because temperatures have consistently averaged below normal during the last four months, soil temperatures are still 5-10°F below normal. Coupled with frequent precipitation, continued planting delays are likely.

Al Dutcher
NU State Climatologist

Weed control (Continued from page 48)

between burndown and planting in case planting gets delayed, plus it provides another dose of residual at planting. This extends your weed control and allows more flexibility in your postemergence herbicide applications.

In each management strategy, producers should keep two things in mind. First, early season weed competition can reduce yield, especially in a dry year. Second, use a strategy that will provide you with the most flexibility according to your management style. Each strategy will have its own shortcomings, so be able to recognize them and adjust as need be.

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