2005

Crop Watch No. 2005-2, March 11, 2005

Lisa Brown Jasa
University of Nebraska-Lincoln, ljasa@unlnotes.unl.edu

CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

University of Nebraska Lincoln

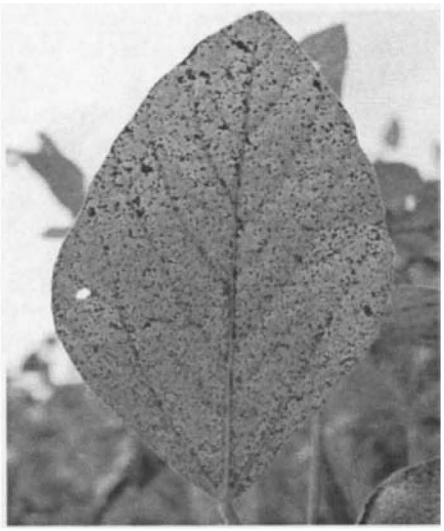
No. 2005-2, March 11, 2005

Soybean rust is on the horizon: Be prepared to scout, assess and plan for management

Soybean rust is a serious foliar disease causing millions of dollars of yield loss in soybean production areas around the world. In November 2004 it was first detected in the United States and since then has been identified in several southeastern states. The disease is not expected to have overwintered at all the sites identified last fall. The first U.S. case of soybean rust to have overwintered was reported in Florida the week of March 1. This, if it is the only location of overwintering, will supply the needed initial inoculum for the disease to spread and develop over the U.S. soybean crop.

Soybean rust, also referred to as Asian soybean rust, is caused by *Phakopsora pachyrhizi* and is an aggressive pathogen that has spread in the past 10 years from Asia to Zimbabwe, South Africa, Paraguay, Brazil, and now the United States. Yield losses can be severe and have ranged from 10% to 80% of a field. In the last few years, Brazilian soybean producers have been significantly affected by soybean rust. In 2002-2003 they spent $600 million for fungicide applications and in 2003-04 it's estimated they spent more than $1 billion. USDA estimates U.S. losses could be in the range of $640 million to $1.3 billion in the first year and $240 million to $2 billion in subsequent years, depending on the severity and extent of spread. I want to make note of a key point: **This disease is manageable.** U.S. producers will adapt to the needed management

(Continued on page 14)



Backlit soybean leaf showing severe soybean rust. (Brazil February 2005)

Focus: Soybean rust Inside

Change sprayer nozzles, pressure for soybean rust applications

When applying fungicides to control rust in soybeans, both coverage and canopy penetration are critical. Achieving this usually will require some changes from the traditional sprayer setup, including:

- Different spray nozzle tips
- Different spray carrier volumes
- Different spray pressure
- Different orientation of the spray tips
- Slower travel speed

Most labels recommend using 10-20 gallons of water per acre with the fungicides for ground applications and 5 gallons per acre for air applications. *Always follow label directions.* Higher carrier rates improve coverage and penetration.

Many think that a fine spray particle size provides the best coverage and penetration. At this time, I recommend using a fine spray particle size that is almost in the medium category. While very small spray droplets can increase coverage,

(Continued on page 13)

Ag briefs

Field update

Gary Lesoing, Extension Educator in Nemaha County: In southeast Nebraska in Nemaha County some oats have been planted in the last 10 days and fertilizer has been applied to wheat fields. I have seen some light tillage done on corn stalks. In the last few days some producers have started anhydrous applications and tanks are becoming more visible on field edges. In other areas contractors are doing soil conservation work in fields (i.e. terraces and waterways).

USDA Nebraska Agricultural Statistics Service: Wheat condition rated 0% very poor, 2% poor, 38% fair, 48% good, and 12% excellent. This rating is above a month ago and well above the 36% good to excellent reported last year at this time. With soil temperatures above a year ago, greenup was evident in some southern fields.

Hay and forage supplies were mostly adequate statewide.

Nebraska Department of Agriculture March 8 Press Release: Nebraska Department of Agriculture (NDA) Director Merlyn Carlson announced today that NDA plans to host a statewide series of agriculture emergency information meetings for Nebraska producers. The meetings are intended to educate producers about local and state efforts as they relate to agricultural emergency planning. The meetings will focus on protecting the state's agricultural industry including livestock, dairy, grains and food products.

"In a state that is home to more than 48,000 farms and ranches, advanced planning and information is essential to protecting human and animal lives," said Director Carlson. "This effort is also key to ensuring that the agriculture industry, which contributes more than $10 billion to the state's economy, continues to be secure."

NDA, working with local extension educators, veterinarians and county emergency managers will host more than 70 meetings across the state from April to early fall. Program topics will include: threats to agriculture, simulated disease outbreak, indemnification and Nebraska premises, and animal identification systems.

For more information about these meetings, including dates and locations, visit www.agr.state.ne.us on the web or call 800-897-1163, ext. 24.

Market Journal

This week's ***Market Journal*** focuses on niche production and marketing of hogs as well as other Nebraska ag issues. Market Journal, Cooperative Extension's Television for Ag Business Decisions, is available on-line at *marketjournal.unl.edu* Use the web to watch or listen to the broadcast using RealPlayer.

Also this week, host and Agricultural Economics Specialist Doug Jose will visit with Brad Lubben, Extension Ag Economist, Kansas State University, about the process for developing the 2007 farm bill. Lawmakers are currently seeking input from producers, commodity groups and other stakeholders.

News for Nebraska

To stay informed about the latest news from the University of Nebraska Institute of Agriculture and Natural Resources, visit its news site on the web at: *http://ianrnews.unl.edu/* Many of their ag stories also are available on the *CropWatch* Web site.

This week's stories include: *Farmers Hiring Custom Work This Season May Pay More* and *Producers Need to Keep Current on EPA's Air Quality Compliance Agreement.*

Next issue

How likely are corn flea beetles and Russian wheat aphids to cause problems this growing season? See the March 25 *CropWatch* for what the experts say.

CROP WATCH

cropwatch.unl.edu

Crop Watch is published from March to November by Cooperative Extension and Communications and Information Technology in the University of Nebraska Institute of Agriculture and Natural Resources, PO Box 830918, 108 Agricultural Communications Bldg., UNL, Lincoln, NE 68583-0918. To order a print subcription or to change your address, write to ***Crop Watch*** at the above address or call (402) 472-7981. The newsletter also is available on the Web at **cropwatch.unl.edu**

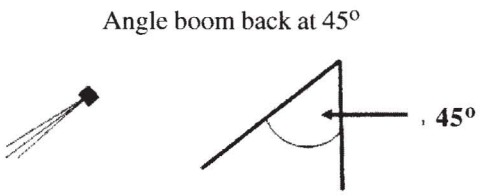
Lisa Jasa, Editor; Email: ljasa1@unl.edu

Sprayers *(Continued from page 11)*

Table 1. The preferred nozzle tip size and pressure for each category is indicated.

	XR TeeJet® (XR) and XRC TeeJet® (XRC)						
	15	**20**	**25**	**30**	**40**	**50**	**60**
XR11002	M	F	F	F	F	F	F
XR11003	M	M	M	F	F	F	F
XR11004	M	M	M	M	M	F	F
XR11005	M	M	M	M	M	M	F

For example: with 02 use 20 psi
with 03 use 30 psi
with 04 use 50 psi



Nozzle Spacing *(in inches)*	Height Above *(in inches)*
20	10
30	17

Figure 1. Boom spray tip angle and boom height

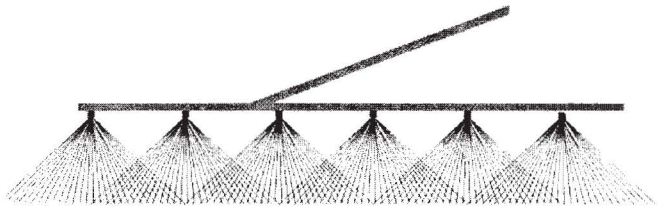


Figure 2: Spray pattern with 100% overlap.

they are susceptible to off target movement and evaporation. For example, with a Spraying Systems XR11003 nozzle you would use 30 psi while if you use a XR11005 you would use 60 psi (see *Table 1*).

If nozzle tips are available in ceramic, they probably are your best investment because of their superior wear life.

To increase penetration and coverage, angle the spray tips back 45° and ensure that the height of the spray boom provides 100° overlap at the target height – the top of soybean plants (see *Figure 1*). Some may suggest using drops, but I would *not recommend* using drops.

If you have to use a higher boom height, reduce the angle to less than 45° so the pattern provides a 100% overlap. One hundred percent overlap is where the pattern from the nozzle tip ends up under the next nozzle (see *Figure 2*).

A NebGuide, *Spray Boom Set-Up for Field Sprayers* (G1548), is helpful for making these boom adjustments and changes. *Figure 3* illustrates how a boom can be set up for this type of spraying.

Bob Klein, Extension Cropping Systems Specialist
West Central REC

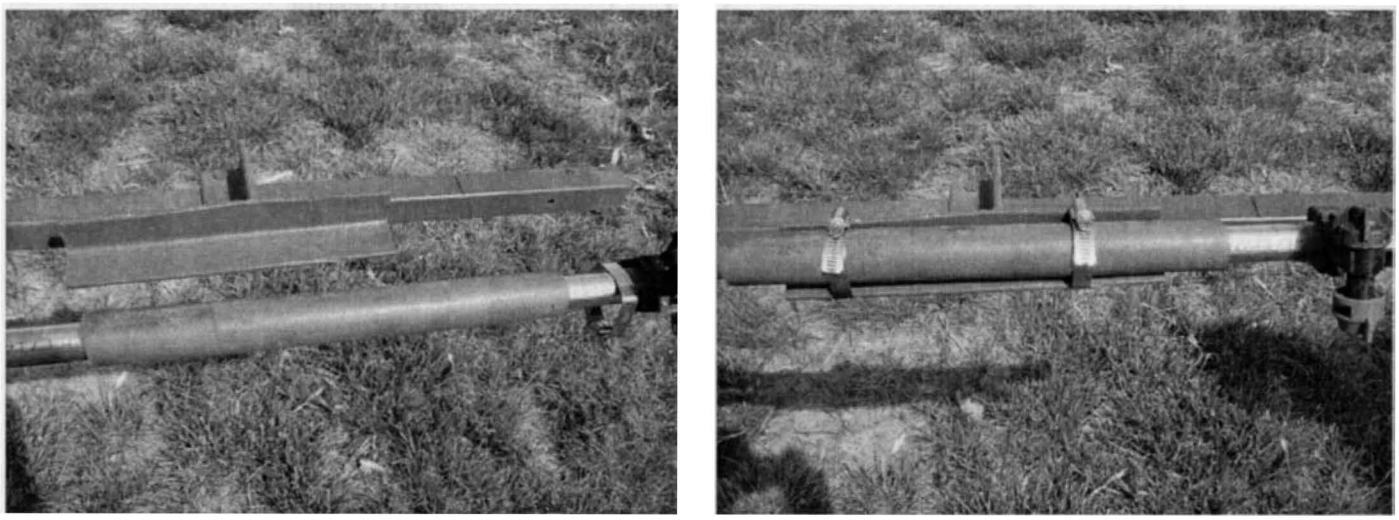


Figure 3: Wet boom with heater hose set-up and stainless steel hose clamps to hold boom in place.

Assess soybean rust *(Continued from page 11)*

and our soybean crop will continue to be strong.

Symptoms

Soybean rust symptoms start in the lower canopy and are most commonly observed on the leaves. Lesions also can develop on petioles, pods and stems. Symptom development occurs rapidly once pod set occurs and can result in significant levels of defoliation under favorable environmental conditions. Lesions first appear as small yellow and irregularly shaped spots. As the disease progresses, lesions enlarge to 1/16- to 1/12-inch in diameter and are tan to dark reddish brown. Within each lesion are a few to several volcano-shaped uredinia (spore-producing structures). These features can only be seen under magnification (20X recommended). As rust severity increases, plants prematurely lose their leaves and commonly mature early. Lesions from soybean rust can appear similar to other foliar diseases of soybean and can be confused with brown spot and bacterial pustule. See "Identifying Soybean Rust" (Cooperative Extension EC05-1892) for more information.

Life cycle

Spores are produced in great numbers in the uredinia within each lesion and are readily dispersed by wind. The cycle repeats multiple times throughout the season, moving with the wind into new areas. The soybean rust fungus will not overwinter in Nebraska and will have to be reintroduced each year, similar to other crop rusts. After contacting a host, spores germinate to produce a germ tube that grows across the leaf surface. Germ tubes penetrate directly through cell walls into the leaf. Pustules with more spores can develop in seven to ten days after initial infection and spore release from a pustule can continue for up to three weeks.

Soybean rust development is favored by temperatures of 59-84°F and a relative humidity above 90% for more than 12 hours. In order for spores to germinate and infect the plant, six hours of continuous leaf wetness is required. Infection increases with longer leaf wetness periods up to 12 hours. In South America, significant rust development is associated with rain.

Characteristics that make soybean rust potentially devastating

Broad host range. Soybean rust has 35 leguminous hosts and is know to infect 95 plant species.

Lack of resistance in soybean. Based on USDA evaluations of commercial soybean varieties, there is no resistance in commercial varieties at this time.

Airborne and repeating. Soybean rust is airborne and spreads via spores. A spore can infect a plant and cause a new lesion which will produce spores in 7-10 days. Under favorable temperature and humidity conditions, spore production in a field can double every two days and over 400 billion spores per acre are produced.

Large acreage of soybeans. There are more than 87 million acres of soybeans in the United States which can serve as a building inoculum source for the disease as it progresses northward each year.

Loren Giesler
Extension Plant Pathologist

Need meeting details?

For a list of spring ag programs visit the ***Events*** page on the ***CropWatch Web*** site at

cropwatch.unl.edu

Rust detection classes set for late March

Soybean Rust First Detector Training will be offered at two meetings in late March. Sponsored by the University of Nebraska Cooperative Extension in cooperation with the National Plant Diagnostic Network (NPDN), the meetings will cover the mission of the NPDN and an introduction to biosecurity issues; monitoring for high risk pests; and quality and secure sample submission.

The program will be offered March 29 from 8:30 a.m. to 1 p.m. at the University's Agricultural Research and Development Center (ARDC) near Mead and March 30 from 9:30 a.m. to 2 p.m. at the Lifelong Learning Center at Norfolk. This training is part of the University of Nebraska Cooperative Extension's Crop Management Winter Programs. The program is designed for, but not limited to: crop consultants, certified crop advisors, growers, cooperative extension personnel, state and federal inspectors, master gardeners, and others involved in plant health management. Those attending will be able to enhance their pest identification skills, learn about exotic pest issues that may threaten Nebraska agriculture, and become a registered First Detector.

This class is limited to 65 participants so early registration is recommended and will help ensure that appropriate class materials are available. This training session, which costs $25, is available at a reduced rate courtesy of the Great Plains Diagnostic Network. Fees include lunch, refreshment breaks, and workshop and reference materials.

Register online at *ardc.unl.edu/registration.htm*, call 402-624-8000, fax 402-624-8010, e-mail cdunbar2@unl.edu, or write to NU ARDC, CMDC Programs, 1071 County Road G, Ithaca, NE 68033.

Timing critical to fungicide treatments for rust

Timing of your first fungicide application will be critical if the weather becomes conducive for soybean rust development. The window of protection will be from flowering (R1) through full berry (R6).

Since this will be the first year for this disease in Nebraska, we don't know exactly how it will respond to our conditions. The following observations may be helpful in assessing your risk and determining whether a fungicide application is needed.

- Irrigated fields will be at a greater risk as this is a moisture driven disease. In Brazil, outbreaks are associated with rain and rust is known to develop in the pivot irrigated fields used for winter seed production.
- Based on my recent discussions with Brazilians, night temperatures appear to affect disease development more than high temperatures during the day.
- The USDA predictive models do not include irrigation (55% of the Nebraska crop is irrigated).
- I would not recommend fungicide application to historically low-yielding fields. Do the math and determine what percentage yield savings you need to pay for the fungicide. This will quickly lead you to the higher yielding fields.
- Application timing is everything (especially when you miss the target): Experience has shown Brazilian producers that to stay ahead of this disease, the best return is a preventative treatment. Consider preventative treatments on high yielding fields (especially irrigated) when rust is an immediate threat based on the disease forecast for spore movement.
- While the Disease Forecasting Model has not been validated for the United States, it is the best chance we have at predicting where soybean rust will most likely appear next.
- If soybean rust is detected in the area, but is not present in the field, a preventative fungicide can be used.
- If soybean rust is detected in the field, a curative fungicide should be used if an application is made.
- In poor yielding, dryland fields, rust will most likely not be a significant problem, as conditions for poor yield generally don't favor rust development.
- A range of planting dates will spread the time when plants are flowering, allowing more time for fungicide application.

The EPA has given Section 18 approvals for several soybean rust products. Those products approved at this time are: myclobutanil (Laredo), propiconazole (Tilt, Propimax, and Bumper), tetraconazole (Domark), and tebuconazole (Folicure). The only product pending EPA Section 18 approval is a mixture of propiconazole and azoxystrobin (Quilt). Another national Section 18 request is being prepared for additional products. Products which have soybean rust on the label and are fully registered in Nebraska include chlorothalonil (Bravo and Echo), azoxystrobin (Quadris), and pyraclostrobin (Headline).

At this time, the fully labeled products should be used as preventative treatments and should not be used once rust is established in the field. The Section 18 products are a result of a national request and can be used in Nebraska when rust has been identified in the United States. Rust does not need to be confirmed in Nebraska for the Section 18 to be in force. The applicator is required to have possession of the Section 18 label at the time of application.

In a future *CropWatch* article we will discuss the differences in these products, their modes of action, and why your selection may change depending on whether it's a preventative application or rust is present in the field.

Loren Giesler
Extension Plant Pathologist

Recommended web sites for soybean rust information

Many sources of soybean rust information are available on the Internet. Following are some of the best soybean rust web sites, as recommended by Extension Educator John Wilson and Extension Plant Pathologist Loren Giesler.

- North American Plant Disease Forecast Center at North Carolina State University. This forecast on potential spread of soybean rust should be useful during the growing season. See *http://www.ces.ncsu.edu/depts/pp/soybeanrust/*
- USDA Economic Research Service. Interesting analysis of potential impact of soybean rust in the United States. See *ers.usda.gov/publications/ocs/apr04/ocs04d02/ocs04d02.pdf*
- North Central Soybean Research Program. Good links and it offers soybean rust (and other) educational materials. See *planthealth.info/rust_basics.htm*
- American Phytopathological Society, professional society of plant pathologists. This site includes good links and several PowerPoint programs that could be used as is or with little modification. See *plantmanagementnetwork.org/infocenter/topic/soybeanrust/*
- StopSoybean Rust, developed by Dealer & Applicator and Successful Farming magazines and Greenbook and sponsored by Bayer CropSceience. Good site for links to current news stories and a Q&A section. See *www.stopsoybeanrust.com*

Low level air jet likely to be inoculum carrier

Based on experiences on other continents, it is believed that soybean rust can survive the mild winter in the southern coastal states and expand its population in the subsequent growing season, spreading northward each year. One mechanism for spreading rust would be the low-level air jet. This jet is a concentrated air flow in the atmosphere between the earth's surface and 1-1.5 miles above the surface, flowing from the Gulf of Mexico to the north central United States. A typical jet in the first 15 days of July is shown in *Figure 1a* and its vertical stretch is shown in *Figure 1b.*

The southerly jet appears in late April or early May but is primarily limited to the area south of Nebraska (40°N) until June. From June to September, the jet intensifies and extends northward into Nebraska. Because the jet has strong wind near the surface level (*Figure 1b*), it can pick up rust spores from an infected area and carry them to northern states, where the spores can fall with the rain. This jet has two peaks, one in June-July and the other in September. The June-July peak occurs during a key growth stage for Nebraska soybeans, thus its potential for spreading soybean rust at that time is alarmingly large.

Although more than the jet flow will influence the potential for soybean rust in Nebraska, knowing the jet variation and prediction of jet intensity and northward extension can help producers determine the probability of rust arrival and develop plans to control rust infection. Growers should pay attention to this jet pattern during the season and combine jet variation with the rust monitoring report at the Nebraska Soybean Surveillance Network to make treatment decisions.

Steve Hu
Extension Climatologist

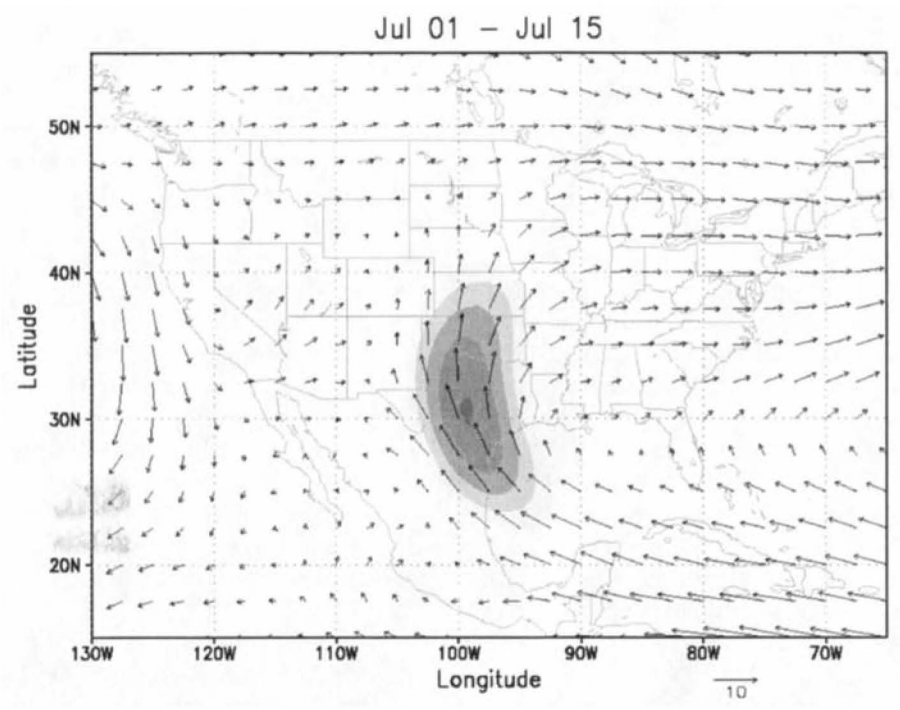


Figure 1a: Average 850mb (~0.7miles above the sea level) flow July 1-15. Arrow length indicates wind speed.

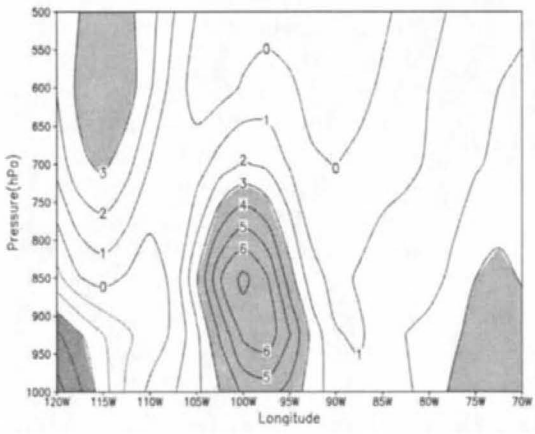


Figure 1b: Average vertical cross section of summer southerly wind in meter per second along 30°N latitude at the different longitudes. The ordinate shows height from 1000 to 500mb, roughly from the sea level to ~3 miles above. The shaded area in the center of the figure shows the southerly jet, which has large southerly wind speed at the near surface levels.

(Note: The color versions of these graphics show more detail and are available on the web at *cropwatch.unl.edu/archives/2005/crop05-2.htm.*)

Federal energy grants aid in energy projects

USDA grants are expected to be available again this spring for energy efficiency improvements, such as switching from gravity to pivot irrigation or improving pumping systems, air systems, refrigeration or lighting.

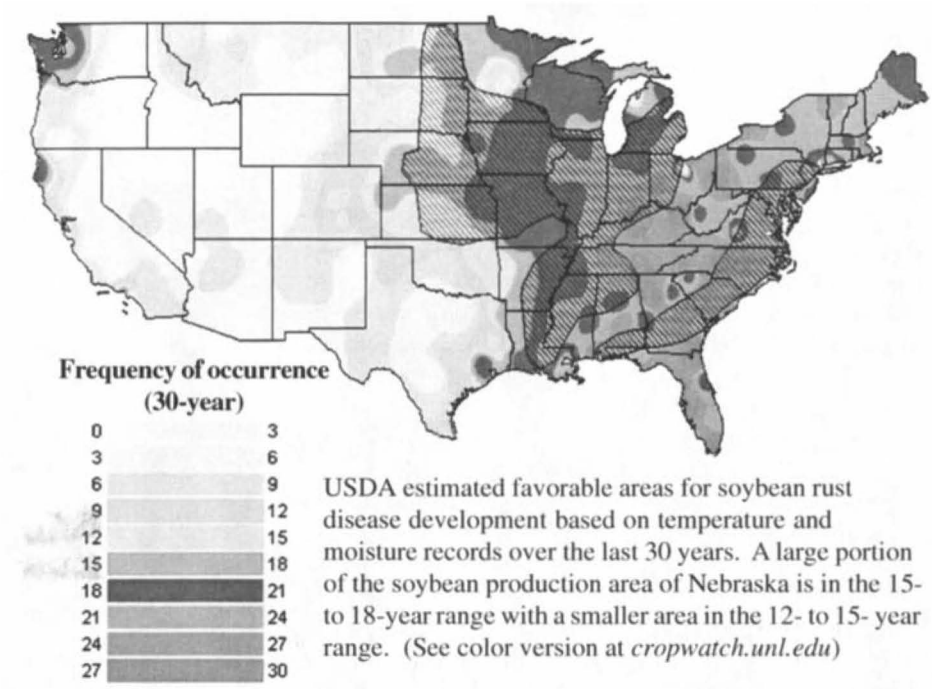
Last year producers could receive grants for up to 25% of project costs. For more information, visit the program web site at *www.rurdev.usda.gov/rbs/farmbill/index.html* or call (402) 223-3125.

Potential impact of soybean rust in Nebraska

The big question running through everyone's mind right now is: How will soybean rust impact Nebraska soybean production? The answer is that we really don't know; however, considering several aspects of Nebraska's agriculture can shed some light on this question. Keep in mind that this is the first of many years when the disease is likely to influence Nebraska agriculture. In the coming years we will all learn a lot about this disease and how it will act in North America.

Nebraska is located on the western "fringe" of soybean production in the north central states. As a state on the edge, we see the extremes of growing conditions. For example, average precipitation ranges from over 30 inches in the southeast corner of the state to less than 16 inches in the Panhandle.

The very things that often complicate crop production in Nebraska, such as inconsistent precipitation and the need for irrigation, may make our crop less susceptible to soybean rust. Also, the extreme temperatures typical in late July and August could reduce our potential for soybean rust. As soybean rust does best at temperatures between 65°F and 85°F and requires moisture for development, the potential for rust to be a significant problem every year in Nebraska is low in our dryland fields. However, irrigated fields would have more favorable conditions for disease development. As a result of our natural, year-to-year environmental variation, we will experience variable degrees of soybean rust each year. Based on the USDA soybean rust risk map, which includes ambient weather conditions, Nebraska has been predicted to have severe soybean rust problems about 50% of the time in most of the state. It is important to note that the risk map does not include irrigation and in 2004, 55% of the Nebraska soybean crop was irrigated.



USDA estimated favorable areas for soybean rust disease development based on temperature and moisture records over the last 30 years. A large portion of the soybean production area of Nebraska is in the 15- to 18-year range with a smaller area in the 12- to 15- year range. (See color version at *cropwatch.unl.edu*)

Extension Plant Pathologist Loren Giesler examines a rust outbreak in a Brazilian soybean field. Giesler's UNL team is coordinating a northern states system of sentinel plots to be distributed throughout U.S. soybean producing areas to provide an early alert to the disease's arrival

My personal prediction is that soybean rust could possibly increase the profitability of Nebraska soybean producers. This is based on the following points:

1) Soybean rust will result in many U.S. acres being treated with fungicides one to two times per year and Nebraska should not have to do this all years.

2) Soybean rust is predicted to overwinter in the southern United States and will not occur at the same time each year in the upper Midwest.

3) All indications are that soybean prices will increase when rust arrives and fungicide applications become common. Prices will increase to reflect the increased production costs; however, Nebraska producers are not likely to have increased costs every year.

During the season, producers can check the local forecast for soybean rust spore movement at the North American Plant Disease Forecast Center operated by North Carolina State University. It is available on-line at *www.ces.ncsu.edu/depts/pp/soybeanrust/forecasts/s050302.htm*. This site will be the best information we have on the introduction of soybean rust spores into our area. It should be noted that all models forecasting disease potential or movement have not been validated and will surely be wrong

(Continued on page 19)

Spring nitrogen fertilizer options in wheat

Prospects for a good wheat crop this year have many producers asking about nitrogen management. Wheat stands across most of the state are good due to favorable conditions last fall. Now is an excellent time to evaluate stands and check soil moisture to help determine if additional nitrogen will be needed for expected higher yield potential. In some areas more wheat will be under irrigation, due to limited water. If only a portion of the required nitrogen was applied last fall, additional nitrogen will need to be applied fairly soon. Nitrogen application rates should be based on soil tests, taken either last fall or this spring.

Many producers now apply most of their nitrogen in the spring. Depending on nitrogen source and timing, spring application offers some advantages, as well as some disadvantages.

Other nutrients?

Generally, spring fertilization means nitrogen fertilization. Phosphorus should have been applied in the soil or seed furrow last fall to benefit this spring's crop. Most winter wheat is grown on fine textured soils where there is little evidence of yield increases from adding sulfur. If you grow irrigated wheat on sandy soils and the irrigation water contains less than 6 ppm SO_4-S, you may need 10-15 lb sulfur, depending on what was applied last fall. Recent Nebraska research has shown that chloride (usual source 0-0-60) may enhance yields in eastern Nebraska where soil chloride levels are low (less than 30-40 lb/a in a 2-foot soil sample). Research in western Nebraska has not shown consistent responses even at low chloride levels.

Table 1. Recommended fertilizer nitrogen rates.

Residual Nitrate	Wheat Price per Bushel			
Average ppm in 3 foot depth	*$3.00*		*$3.50*	
	Nitrogen price per pound			
	$0.30	*$0.35*	*$0.30*	*$0.35*
	Nitrogen rate - lbs per acre			
2	75	65	85	75
4	55	45	65	55
6	35	20	45	35
8	15	0	25	15
10	0	0	0	0

Spring nitrogen management

How much nitrogen should be applied in spring? *Table 1* shows recommended nitrogen rates based on soil tests for residual nitrate to a 3-foot depth and current wheat and nitrogen prices (see *Fertilizing Winter Wheat Part I: Nitrogen, Potassium, and Micronutrients,* NebGuide G02-1460, for equation).

These recommendations are adequate for yields of 70 bu/ac or less. For irrigated wheat, current guidelines suggest adding 20 pounds of nitrogen to the recommended rate. In most areas this may be sufficient, how-

(Continued on page 19)

Crop insurance covers soybean rust losses

Loss of soybean production due to soybean rust disease is an insurable cause of loss, provided the insured can verify the cause was natural, good farming practices were followed and available control measures were properly applied. Under the terms of the Common Crop Insurance Policy, a practice is considered a good farming practice if agricultural experts agree that the production method would allow the crop to make normal progress toward maturity and produce at least the yield used to determine the production guarantee. The current recognized good farming practices for soybeans generally should not be an issue as soybean rust is not a soilborne disease and crop rotation would not be an effective control.

If no effective control measures are available or there are insufficient amounts of chemicals available for effective control, the resulting loss of production is covered. It will not be a covered loss if there are sufficient control measures available but the insured elects not to use them. Failure to purchase and apply recommended control measures will result in assessing uninsurable causes of loss. Producers are responsible to keep informed of soybean rust outbreaks in their area.

Insured producers should follow developments as to the identification and spread of Asian soybean rust and continue to stay informed and updated concerning appropriate treatments that may apply to their situation. Appropriate treatment may vary from timing of application (pre- or post-discovery of the disease), frequency, and choice of chemical or other determining factors. If crops become infected, discovery of the disease and any recommendations received regarding the application of appropriate control measures must be documented.

Doug Jose
Extension Farm Management Specialist

Nitrogen *(Continued from page 8)*

ever, a better recommendation may be to add 1.5-1.7 pounds of nitrogen per bushel above the 70 bu/acre yield level if the grower has consistently produced over 85 bu/ac. Remember, simply adding more nitrogen will not "enhance" yield potential. Many other production factors (seeding rate, variety, planting date, row spacing, irrigation timing, weed, disease and insect management) will affect whether consistently high yields are achieved.

Higher costs were used for dry or liquid nitrogen because ammonia is not commonly used for spring application. The higher nitrogen cost slightly decreases optimum nitrogen rates. Remember to subtract any nitrogen applied last fall from these recommendations.

Nitrogen sources

Nitrogen solutions. Determining stand quality is important for both weed control and nitrogen fertilization decisions. If nitrogen solution-herbicide combinations are used, they should be applied early for control of many broadleaf weeds. Early nitrogen-herbicide combinations allow more time for distribution into the root zone but may be too early to control some weeds. Later applications may be optimum for some weeds, but may cause plant injury due to the herbicide-fertilizer combination.

Research at North Platte has documented wheat crop damage and yield losses from herbicide-liquid fertilizer combinations. Different timings from early green-up (four-tiller) to pre-jointing were used. Yield loss occurred 40% of the time when major visual damage was noted after Zadoc growth stage 29 with more than 10% damage. Yield loss ranged from 2 to 7 bu/ac. *Don't stop using nitrogen fertilizer solutions because of the potential for damage, but be aware that damage can occur.*

Factors that can complicate yield loss include:

- floater track (more damage) vs non-wheel track (less damage);
- no fall nitrogen (more damage) vs fall fertilizer nitrogen (less damage);
- disease status (more damage on diseased wheat);
- drought status (more damage on drought stress than vigorous growing wheat)
- variety effects
- rainfall effects (less damage if more than 0.25 inch of rain fell within three to four days of application vs none)
- night temperature before spraying (freezing temperatures cause more damage than warmer temperatures); and
- growth stage (less damage early than later).

Crop injury was ranked from none to severe for the following treatments:

1) no herbicide (no injury);

2) ally + 2,4-D + nonionic surfactant, which had less injury than

3) 28-0-0 (UAN), which had less injury than

4) ally + 2,4-D + UAN + ATS (12-0-0-26).

These plots were weed-free so yield loss was not due to weed competition. This wheat received 40 lb nitrogen per acre preplant in the fall before seeding so it was not nitrogen stressed. The UAN-nitrogen rate used was 40 lb/ac nitrogen; injury may be more or less depending upon the nitrogen rate.

For irrigated wheat this may be less of a problem because of lower stress and the ability to apply water soon after nitrogen application.

Urea. If applied early, urea (46-0-0) is a good choice for spring topdressing. The cooler temperatures and the greater probability of precipitation in early spring helps assure a lower potential for nitrogen volatilization loss than if it were applied later in spring.

Ammonium nitrate. Ammonium nitrate (34-0-0) is an excellent nitrogen source for topdressing wheat, but is available only in limited supplies.

Gary W. Hergert
Extension Soils Specialist
Panhandle REC

Potential impact

(Continued from page 17)

in some parameters; however, for the first season it will provide some idea as to what is going on.

In conjunction with the Disease Forecasting Center there also will be an effort of coordinated sentinel plots across the United States. My team at the University of Nebraska is the designated northern states coordinator for this effort. At this time the project is being funded through the North Central Soybean Research Program and the United Soybean Board. All soybean states will have sentinel plots will be early planted soybeans that will be frequently scouted. The scouting reports will be posted on a web site and updates will be provided to alert soybean producers and commercial managers as to the current status and risk for each state.

We will have 30-40 sentinel plots throughout Nebraska, many being coordinated with extension educators. The sentinel system will ground truth the models and will provide the data needed to improve the models.

This season there will be a soybean rust hotline which is being funded by the Nebraska Soybean Board. The phone number is being identified at this time, but it will provide current conditions and recommendations as changes occur through the summer. This number will be featured prominently in a future issue of *CropWatch.*

Loren Giesler
Extension Plant Pathologist

In March and April

Pesticide and PCB disposal offered at 20 sites

Nebraskans can safely dispose of waste or unwanted pesticides and electrical transformers from irrigation systems free at any of 20 locations from March 14 through April 8. The joint venture of the Nebraska Department of Agriculture (NDA) and University of Nebraska Cooperative Extension accepts all pesticides except those in pressurized cylinders.

This is the program's ninth collection since 1995. In that time nearly 2 million pounds, or 1,000 tons, of unwanted pesticide products have been collected from across Nebraska, said Larry Schulze, Extension pesticide education specialist. Of that total, more than four tons were electrical transformers.

"The collection program continues to have a very significant impact on environmental stewardship in Nebraska and I believe that's largely because of the tremendous cooperation among the sponsoring agencies and businesses that make it possible," Schulze said.

Pesticides, including herbicides, insecticides and fungicides and those used for agricultural, livestock, home, lawn and garden, structural and commercial purposes, may be turned in at collection sites. Pesticides in aerosol cans are included. Farmers and ranchers also may dispose of old electrical transformers from irrigation systems. Many of these old transformers contain PCBs, which have been linked to certain cancers and other health problems. Items that won't be accepted include oil, antifreeze, paint, varnish, thinners, cleaners and solvents or pesticide products in pressurized cylinders.

Collected pesticides will be safely disposed of by Clean Harbors Environmental Services, a disposal facility near Kimball, Schulze said.

There is no charge for quantities of pesticides up to 1,000 pounds, Schulze said. Anyone expecting to turn in more than a half ton of waste products should notify Rich Reiman at the Nebraska Department of Agriculture by phoning (402) 471-2394. Products brought to a collection site totaling over 1,000 pounds require a nominal fee of $1 per pound for each pound over 1,000, Schulze said.

People turning in pesticides or transformers should:

- Leave pesticide labels on containers.
- Handle containers with chemical resistant gloves and in a way to prevent them from spilling.
- Wash hands with soap and water after handling.
- Take pesticide materials in for identification and disposal if container labels have been removed or are not legible.
- Transport smaller quantities of pesticides in fragile containers in a plastic bucket or other container that will contain the pesticide if it begins leaking.
- Do not transport pesticides in the passenger compartment of a vehicle.

For more information on collections or individual collection sites, contact your local Cooperative Extension office, the Nebraska Department of Agriculture at (402) 471-2394 or the UNL Pesticide Education Office at (402) 472-1632. Information also is available online at the UNL Pesticide Education web site at *pested.unl.edu*

Collection dates and sites

Collection dates and sites (all open 8 a.m. to noon):

March 14, Auburn, Dettmer Farm Service, 724 W. Third St.

March 15, Plymouth, Farmers Co-op Elevator Co., 501 E. Main St.

March 16, Waverly, Waverly Co-op, 10741 N. 142nd St.

March 17, Fremont, Wal-Mart, 3010 E. 23rd Ave.

March 18, Columbus, Husker Co-op, 402 Pawnee Plaza.

March 21, Wayne, Precision Agronomy, 709 Centennial Rd.

March 22, Norfolk, Madison County Weed Control, 3203 S. 12th St.

March 23, Albion, Helena Chemical Co., 2493 State Hwy 14.

March 24, Central City area, Aurora Co-op, Paddock site, 1561 13th Rd., W. Hwy 30, three miles west of Central City.

March 25, York, United Farmers Co-op, 1403 Rd. 14.

March 29, Hastings, Consumers Service Co., 150 N. Blaine Ave. and E. Hwy 6.

March 30, Holdrege, Agri Co-op, 310 Logan St.

March 31, Gothenburg, All Points Cooperative, West Hwy 30 and Second Ave.

April 1, Broken Bow, Custer County Weed Control, Ryno Road.

April 2, O'Neill, Central Valley Ag, 415 E. Hwy 20.

April 4, Springview, Farmers and Ranchers Co-op, N. Hwy 183.

April 5, Valentine, Valentine Recycling Center, 126 S. Ray St.

April 6, Chadron, Swann Transfer Station, 1010 E. Niobrara.

April 7, Alliance, Western Cooperative Co., 724 W. Third St.

April 8, Scottsbluff, Panhandle Research and Extension Center, 4502 Ave. I.

This program is funded by the U.S. Environmental Protection Agency through the Nebraska Department of Environmental Quality, the Nebraska Environmental Trust through the Nebraska Agri-Business Association, and from fees collected by the NDA for pesticide registrations in Nebraska.

Steven Ress
Communications Coordinator
UNL Water Center