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Extended Visions, July/August 2007

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ARDC Director's Comments

Crops, Fiber Optics and THANKS!

by Daniel J Duncan, ARDC Director & IANR Ag Research Division Assistant Dean and Director

What a great start we had to the growing season...plenty of rain this spring! Of course, some of it came a little too fast and frozen, but for the most part it was a pleasant change from past years of dry weather. With a little luck, the panhandle will receive some of this moisture as well. Summer is underway and we hope the crops continue to thrive.

We are close to getting all areas on the ARDC that are served by the new fiber optic network up and running. This project involved installing 13 miles of fiber optic cable to all major buildings on the ARDC. When fully implemented, we will have direct fiber optic connections from these major buildings to the Lincoln campus. Soon we will be employing VoIP (Voice over Internet Protocol) for voice transmissions bringing the ARDC fully into the digital age. I want to thank everyone that assisted with the installation of this project and especially the people that enabled us to secure funding for this project.

First of all, I would like to thank Mr. August (Augie) Christenson for his support. His generosity has helped us reshape the ARDC and will continue to do so for many years. Vice President and Vice Chancellor John Owens pledged funding three years ago that enabled us to begin this project. Augie and John, the faculty and staff working at the ARDC thank you for your generous support! □

Late Season Crop Management Diagnostic Clinic - Aug. 24

Alate season Crop Management Diagnostic Clinic will be held on Aug. 24 at the ARDC. Topics include the impact of crop residue removal -- cellulosic ethanol, crop water management, new soil test software, nutrient management issues for soybean production, pumping plant performance testing, and understanding plant-to-plant variability in corn.

Six Certified Crop Advisor credits are anticipated with 2.5 in soil and water management, 2.5 in nutrient management, and 1 in crop production.

Cost for this clinic is \$135 for those registering one week in advance and \$185 after.

This UNL Extension clinic begins with 7:30 a.m. registration at the ARDC August N. Christenson Research and Education Building and starts at 8 a.m.

Presenters include UNL extension educators and specialists.

For more information or to register, contact the ARDC CMDC Programs, 1071 County Road G, Ithaca, NE 68033, call (800) 529-8030, fax (402) 624-8010, e-mail cdunbar2@unl.edu or visit the Web at <http://ardc.unl.edu/training.htm>. □

Call or visit the website above to learn more about these other SUMMER 2007 LEARNING & CCA OPPORTUNITIES...

* **Soybean Management Field Days**
8/14 Hastings/Doniphan, 8/15 Weeping Water,
8/16 Osmond & 8/17 Genoa.
*Unbiased, Research-Based Information for
Soy Producers and Industry Reps.*

* **Solution Days**
8/28 & 8/29 - York
*Learn to Manage your Corn & Soy Production
Dollars More Wisely!*

* **Irrigation and Energy Conservation
Field Day**
9/6 - North Platte
*For Irrigated Corn Producers - Conserve Water...
Save Dollars!*



Sweet Sorghum, the Sugarcane of the Midwest

by Ismail Dweikat, Associate Professor, UNL
Department of Agronomy & Horticulture

Sweet sorghum is a drought-tolerant feed stock with the potential to produce more ethanol per acre than corn. Sweet sorghum stalks contain up to 75% juice, varying between 12 and 23% in sugar. There's enough juice in an acre of sweet sorghum to make 400 to 800 gallons of ethanol. Sorghum juice-derived ethanol is cheaper to produce than corn ethanol because it doesn't require the cooking and enzymes that corn requires for conversion of starch to sugar to fuel grade alcohol. Current estimates suggest that intensive plant breeding and cultivation research could, over time, increase the sugar content of sorghum juice to a level needed to produce 1,000 gallons of ethanol per acre. We plan to evaluate the potential of sweet sorghum as an ethanol-producing crop for Nebraska.

Sweet sorghum is a perennial crop in areas that don't have a winter freeze. Plant breeding efforts continue to improve the cold tolerance of sorghum for growth in the Midwest. In the Corn Belt, sweet sorghum grows 10 to 15 feet tall during a growing season. The taller the plant and the thicker the stalk, the more juice the plant will produce. To maximize juice and ethanol production in the Corn Belt, growers need to plant the crop early to mid-April. The grower could then make the first cutting for juice in early July, when the crop starts to flower. A second cutting could be made in October, shortly before frost, yielding enough juice for an additional 100 to 200 gallons of ethanol. Or, if feed were short, the grower could hay or graze the second cutting. Sweet sorghum's energy-savings and value emerge in several ways:

- * The crop only needs 12-15 inches of rain during the growing season to make a crop. Therefore, it is suitable for dryland production or limited irrigation. If the crop receives more moisture, it will respond positively.
- * It requires only 40-60 pounds of nitrogen per acre. The crop is long-rooted and can extract residual nitrogen left by previous crops, or from nitrogen-fixing soybeans preceding in rotation.
- * Sweet sorghum juice doesn't require the long fermentation and cooking

FEATURE UNIT - AGRONOMY RESEARCH AREA - Cont. on P. 2



A taller the stand of sweet sorghum will result in thicker stalks and more juice production.

FEATURE UNIT - AGRONOMY RESEARCH AREA - from P. 1

time needed to process corn ethanol.

* Some of the crop residue left after juice extraction (called bagasse) can be dried and burned to fuel ethanol distillation. These residues can also be used for animal feed, paper, or fuel pellets.

* The crop needn't be grown on a farmer's best land, allowing the farmer to make use of poorer ground.

* The simplicity of ethanol production from sweet sorghum could lend itself to on-farm or small-cooperative efforts at fuel-making.

* Ethanol plants in the State could choose, with some additional equipment, to make seasonal runs of sweet sorghum juice.

Ethanol is currently processed from sweet sorghum in Texas, Oklahoma, and Iowa, as well as India and other parts of the world. Our belief in its excellent suitability for Nebraska ethanol production has prompted the present proposal. We seek to enhance sweet sorghum performance on marginal lands, and to identify a strategy for improving its ethanol processing potential, two key components for developing this system for production in Nebraska. □

Agronomy Research at the ARDC

In this issue of *Extended Visions*, we feature agronomy research at the ARDC.

Agronomy emphasizes staple food crops, such as corn, rice, beans, and wheat, which are produced on a large scale and represent the foundation of our human food supply. Forage plants and hay crops are also considered agronomic crops and are the feed base for the ruminant livestock industry on pastures and rangeland.

Agronomy research at the ARDC is conducted by UNL's Department of Agronomy and Horticulture. This includes range and forage management, plant breeding, genetics and molecular physiology, plant physiology and production ecology, soil and water science, and weed science.

Because of the vast range of research projects within the Department of Agronomy and Horticulture - it is impossible to describe all of them in great detail. This article briefly describes what our research encompasses.

Crop physiologists, crop ecologists and crop specialists in the Department of Agronomy and Horticulture focus a large portion of their research activities on understanding the response of major food and feed crops to the environment. Researchers utilize various tools from basic laboratory analysis of cellular and subcellular components to more applied crop production management strategies to study a broad range of environments across ecogeographic zones for both rain dependent and irrigated crops.

The research encompasses water and nutrient use efficiency, stress tolerance, soil management, crop rotations, crop modeling, genotype by environment interactions, and precision agriculture, among others, to enhance crop production and profitability. In extension, the research-based information is utilized to help farmers increase profitability with intensified cropping systems.

The Extension focus is on both rain-dependent and irrigated crop production systems involving corn, soybean, grain sorghum and winter wheat as well as some efforts in crops such as proso millet, sunflower and alfalfa. Grass seed production systems in Nebraska's panhandle have also been targeted. The team uses a diverse set of tools ranging from standard crop diagnostic procedures, and hybrid and/or varietal testing programs, to precision agriculture techniques, global information systems (GIS), global positioning systems (GPS), and crop simulation models to achieve the goal of enhanced profitability and integration of systems. All of these efforts recognize the importance of protecting our natural resources and enhancing the important rural-urban interface.

Range and forage science research is committed to addressing the conservation and utilization of rangeland and forage resources. The research has played a role in the development of the varieties found in the several million acres of improved perennial pasture grasses grown in Nebraska. Researchers are looking for ways to improve profits for the

FEATURE UNIT - AGRONOMY RESEARCH AREA - Cont. on P. 3

Bringing It Into Focus...

by Karna Dam, UNL Extension Educator

The 4-H Photography project is a fantastic way for young, aspiring photographers to learn more about the joy of capturing memories on film. Saunders County Extension hosted a Photography Clinic in June for the beginning and intermediate level photographers. Thirteen participants attended the clinic. Kay Jurgens, of



The ARDC courtyard provided photo opportunities.

Waverly served as the primary clinician and helped youth understand more about their cameras, fundamentals of taking good pictures, setting up shots, lighting and much

more. The clinic was coordinated by Alli Oswald, 4-H Summer Intern in Saunders County. Alli was active in the 4-H Photography project when she was a 4-H member in Cuming County. Her years of knowledge and experience combined with Kay's experience as both a 4-H parent and a 4-H Photography judge made for an awesome day of education.

This clinic was designed to be a hands-on learning opportunity. Kay spent the morning sharing information with the participants and in the afternoon, they were given an opportunity to take pictures and apply the information they had learned in the morning. Photos were later critiqued and everyone went home with new ideas of capturing their memories.

BRINGING IT INTO FOCUS - Cont. on P. 3

About the People

Ismail Dweikat is one of the many faculty members that perform research within UNL's Department of Agronomy and Horticulture. He is an Associate Professor specializing in sorghum and pearl millet genetics. His research focuses on the genetics of sorghum and pearl millet with emphasis on the identification of DNA-based markers and mapping systems useful in practical selection schemes.

Dweikat teaches several courses at UNL including crop engineering, plant genetics and a graduate seminar course. While his Extension appointment allows him interact with sorghum and millet growers by providing them with timely information regarding opportunities and advances in germplasm development.

Dweikat earned his bachelors degree in Plant Science, his masters degree in Vegetable Crop Physiology, and his Ph.D. in Plant Breeding and Genetics - all from the University of Florida.

TJ McAndrew is the Research/Production Coordinator and manages Agronomy research projects at both ARDC and the Havelock farm near Lincoln. He manages the day-to-day operations of the Agronomy research projects at the ARDC, as well as on East Campus and at UNL's research farm located 84th & Havelock. McAndrew coordinates use of land and equipment for the research that is performed at these areas and oversees the production farming operation that is for rotational purposes.

McAndrew has a bachelors degree in ag education and a masters in agribusiness from UNL. He and his wife, Nancy, live near Beaver Crossing and have 2 sons and a daughter. McAndrew has been honored with the UNL Kudos award and IANR's Employee of the Month in recent years.

Rich Goodding has been an

Ag Research Technician at the Agronomy research area since 1995. He

and his wife, Amy, live near Ithaca.

Dan Josoff joined the staff in 1998 and is an Ag Research Technician. He and his wife, Jennifer, have four daughters and live near Yutan.

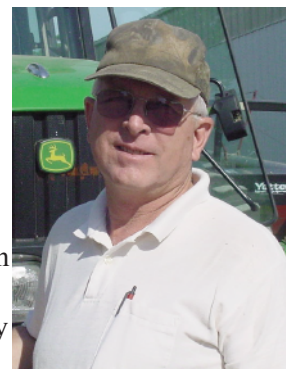
Todd Kudlacek is an Ag Technician at the Agronomy research area. He has been with the University since 1997 and worked at the ARDC since 2004. He has an Associates Degree in Agribusiness from Southeast Community College. He and his wife, Cari live near Bruno. □



Ismail Dweikat, Ph.D.



TJ McAndrew



Rich Goodding



Dan Josoff



Todd Kudlacek

FEATURE UNIT - AGRONOMY RESEARCH AREA - from P. 2

people whose livelihood depends on grazing animals on these grasses. For instance, recent research has established that interseeding legumes helped improve beef gains by 25 to 40 pounds per acre. That translates into about \$10 to \$20 an acre of additional income.

In cooperative research with USDA scientists, switchgrass is being developed into a potential biomass energy crop. For example, the improved digestibility of the Trailblazer switchgrass has added about \$4 million a year to farmers' profits.

Agronomy research at the ARDC is on the leading edge of alfalfa variety development - we've performed over 1,400 variety and germplasm comparisons, more than 30,000 plot harvests and 35 plus years of data collection on alfalfa varieties. Commercial companies use the data to determine which varieties to market.

Nebraskans spend a substantial amount of money on weed control. Weed Science research addresses long- and short-term pest management needs in an integrated pest management context. The scope of activities spans pest ecology to integrated weed management systems to the fate of pesticides in the environment. A core group of UNL faculty are responsible for teaching and statewide coordination of extension programs and research in their respective fields.

Nebraska consists of approximately 50,000,000 acres of land covered with soil, half of which is in cultivated crops. About 8,000,000 acres are irrigated with water diverted from streams or pumped from wells.

The mission of the Soil and Water Science peer group is to improve, through teaching, extension, and research, the understanding and wise use of soil and water resources so that the productivity of the soil and the quality of water supplies may be maintained or improved. The peer group works in close collaboration with other soil and water scientists from the USDA-ARS Soil and Water Conservation Research Unit, the School of Natural Resource Sciences, and the Department of Biological Systems Engineering.

The research component is aimed at achieving the following goals:

- Maximize profits and yet avoid water contamination from fertilizers and inorganic soil amendments.
- Utilize and/or dispose of animal and municipal by-products (biosolids).
- Keep toxic materials (pesticides, chemicals, etc.) from food and water supplies.
- Conserve soil, water, and climatic (global warming) resources.
- Develop fundamental relationships (basic research).

For more information, please visit the UNL Department of Agronomy and Horticulture website at <http://www.agronomy.unl.edu>. Or call 402-472-2811. □

Extension Summer Intern

If you read the *"Bringing It Into Focus"* article, have attended any 4-H activities this summer or stopped by the Extension Office - you may already know that Saunders County Extension has an intern in the office, out and about this summer.

Alli Oswald has been, as she puts it, "Doing a little bit of everything this summer." She has assisted with the babysitting clinic, tagging and identifying animals, the PASE/Life Challenge, a recruitment activity at the regional speech meet, taught quality assurance, and attended two district horse shows. She also coordinated a photography clinic that drew in 13 participants.

Internships are beneficial for both the intern and the organization. Alli says that she hopes to better understand the leadership role of Extension faculty in establishing and maintaining community, county, and state linkages and networks. Alli states, "I want to become more confident with myself not just in front of a group of people, but also with my work. I want to also network with extension staff across the state and other prominent organization leaders." Alli has enjoyed working areas that she is well versed in, such as beef, photography, horse and home environment. But she also appreciates having a chance to be involved with the other areas of 4-H in order to become more familiar with them.

Alli is originally from Wisner and grew up on a feedlot. Her family also raised corn and beans. She is currently a senior Agribusiness major with an Animal Science minor and will be graduating in December 2007. She plans to pursue a Masters Degree and hopes to have a career in Extension. Alli will be with the Extension office until the end of the summer. So if you happen to be in the Christenson Building or see Alli at the fair - please stop and introduce yourself. □



Alli Oswald

Drought Conditions Under a Tent

It's not uncommon to see tents sprouting up in the Crop Management Diagnostic Clinic plots when it is field day time at the ARDC. However, this year there is a tent of a different sort that isn't being used for the purpose of shading clinic participants in the mid-day heat.

If you have taken a quick glance while coming from the east on Hwy. 66, you may have noticed a tent southeast of the Christenson Research and Education Building at the ARDC and wondered why it is there. The tent is being used to teach diagnostic clinic participants about the affects of drought conditions on crops. The stress mitigation tent helps simulate drought conditions.

The conditions created by the tent allow diagnostic clinic participants to learn about corn root and hybrid dynamics during stress conditions and how nutrient and water uptake in corn is impacted by drought stress conditions....during a year when we have had a rainy spring! □



The stress mitigation tent at the ARDC simulates drought conditions for teaching sessions during the Crop Management Diagnostic Clinics.



Calendar of Events

AUGUST

- 1-2 Egyptian Biosafety Project
- 8 Unit Managers Meeting
- 14 Nebraska Turf Grass Association
- 24 Late Season Crop Management Diagnostic Clinic

SEPTEMBER

- 12 Unit Managers Meeting
- 17 Saunders County Extension Board Meeting
- 25 Wahoo High School ACT Prep

OCTOBER

- 2 Promoting Positive Peer Relationships
- 3 4-H Council Meeting
- 4 & 5 Ag Awareness Festival
- 8 & 9 Ag Awareness Festival
- 10 Unit Managers Meeting
- 17 PSAT Wahoo High School
- 27 Harvest Festival

BRINGING IT INTO FOCUS - Cont. from P. 2

Alli also helped everyone learn about matting their photos. Each participant was able to mat their own picture and learned the secrets to exhibiting their photos at the county fair.

This was the third clinic held at the Saunders County Extension office this summer. Providing hands-on learning for 4-H members helps to add substance to project enrollment. "I believe that 4-H has an opportunity to provide quality programming through summer workshops and clinics that can really help our 4-H youth strengthen their interest in project areas." Karna Dam, Extension Educator said. "I am looking forward to adding more workshops to the annual schedule in the future." □



Alli Oswald coordinated the photography workshop and taught participants.

Saunders County Fair Schedule

SATURDAY, JULY 28

- 9:00 a.m. 4-H Dog Show - Open Air Pavilion
- 10:00 a.m. Check in Cats - Gayle Hattan Pavilion
- 11:00 a.m. 4-H Cat Show

MONDAY, JULY 30

- 8:30 a.m. Fashion Revue Judging - 4-H Building
Interview Judging - for clothing being styled - 4-H Building
- 9:00 a.m. Open to All Livestock Entries (Beef, Dairy, Sheep, Swine, Goats, Poultry, Rabbits)
- 6:00 p.m. 4-H Shooting Sports Competition - Gayle Hattan Pavilion
- 7:00 p.m. Public Fashion Revue - Open Air Pavilion

TUESDAY, JULY 31

- 9:00 a.m. 4-H Horse Show - Judging Halter Classes, Showmanship - Rodeo Arena
- TBA that day 4-H Horse Show - Performance, Walk-Trot, Pleasure, Western Riding, Horsemanship - Rodeo Arena
- 4:00-8:00 p.m. Check-in 4-H Rabbit and Poultry - Poultry/Rabbit Barn
- 5:30-8 p.m. Home Ec and add'l 4-H & FFA Exhibits Entry - 4-H Bldg
- 5:45 - 7:15 p.m. Weigh-in 4-H and FFA Sheep & Goats - Swine Barn
- 7:45 - 9:15 p.m. Weigh-in 4-H and FFA Beef - Swine Barn
- 8:00 p.m. All Livestock, Poultry and Rabbit Exhibits in place (including swine)

WEDNESDAY, AUGUST 1

- 8:00 a.m. Weigh-in & Ultra Sound Swine Entries - Swine Barn
- 8:00 a.m. ATV Safety Driving
- 9 a.m.-4 p.m. Judging of 4-H Exhibits & Interview Judging by Appointment - 4-H Bldg
- 12:00 p.m. 4-H Tractor Driving Contest (or immediately following ATV) - Gayle Hattan Pavilion
- 4:00 p.m. 4-H Bicycle Safety Contest - (or immediately following Tractor Driving contest) Meet at Gayle Hattan Pavilion
- 5:00 p.m. 4-H Building Open to Public
- 6:30 p.m. 4-H and FFA Hay Hauling Contest - Gayle Hattan Pavilion

THURSDAY, AUGUST 2

- 8:30 a.m. 4-H Sheep Lead Class - Gayle Hattan Pavilion
- 9 a.m.-9 p.m. 4-H Building Open to Public
- 9:00 a.m. 4-H Sheep Show - Judging Breeding & Market - Gayle Hattan Pavilion (or 15 minutes after conclusion of Lead Class)
- 12:00 p.m. 4-H Poultry Show - Open Air Pavilion
- 1:00 p.m. 4-H Meat, Dairy, Pygmy & Angora Goat Show - Gayle Hattan Pavilion (or immediately following Sheep Show)
- 6:00 p.m. Saunders County Fair Parade - Downtown Wahoo

FRIDAY, AUGUST 3

- 8:30 a.m. 4-H Rabbit Show - Judging - Open Air Pavilion
- 9:00 a.m. 4-H & FFA Beef Show - Judging Breeding & Market - Gayle Hattan Pavilion
- 9 a.m.-9 p.m. 4-H Building Open to the Public
- 9 a.m. Ice Cream Rolling - Open Class Patio
- 12:00 p.m. 4-H Dairy Show - Gayle Hattan Pavilion
Only Milking Dairy Cattle released following the show - all other livestock, rabbits and poultry must stay!
- 4:00 p.m. Family Livestock Judging Contest

SATURDAY, AUGUST 4

- 8:30 a.m. 4-H Swine Show - Judging - Gayle Hattan Pavilion
- 9 a.m.-9 p.m. 4-H Building Open to the Public
- 9:00 a.m. 4-H Small Pet Show - Open Air Pavilion
- 10:30 a.m. Clover Kids Show (or after Small Pet Show) - Open Air Pavilion
- 3:00 p.m. Livestock Round Robin Showmanship - Gayle Hattan Pavilion (or half-hour following Swine Show)

SUNDAY, AUGUST 5

- 8:00 a.m. Release of all 4-H and FFA livestock, rabbits and poultry
- 4:00 p.m. 4-H BBQ - Gayle Hattan Pavilion
- 4:00 p.m. Meritorious Award Recognition - Gayle Hattan Pavilion
- 1-5:30 p.m. 4-H Building Open to the Public
- 5:00 p.m. Livestock Sale - Gayle Hattan Pavilion
- 5:30 p.m. Home Ec Exhibits released
- 6:00 p.m. State Fair & Ak-Sar-Ben entries due



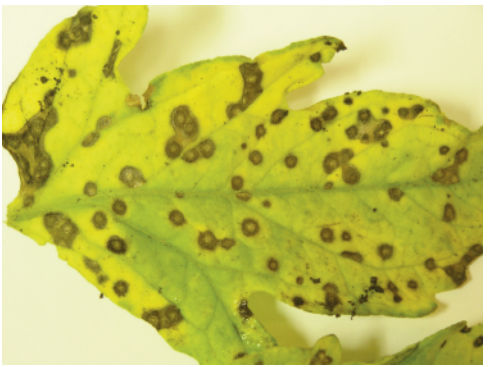
Controlling Tomato Leaf Spot Diseases

by Sarah Browning, UNL Extension Educator

Nothing is better than a home-grown, garden tomato, but growing tomatoes does have its pitfalls, including disease problems. Tomatoes are subject to many diseases. This article looks at common leaf spot problems affecting tomatoes.

Tomatoes are attacked by both fungi and bacterial diseases that affect the leaves, petioles and stems, and cause blemishes on the fruits. Loss of foliage due to disease, causes the tomato plant to be less productive or vigorous. Severe foliage loss can lead to sunscald on developing tomatoes, which are suddenly exposed to more intense sunlight. If foliage diseases are not controlled, they can lead to death of the plant.

Common diseases of tomato include septoria leaf spot, early blight, bacterial speck and bacterial spot. Septoria leaf spot begins as tiny black dots on the leaves, enlarging to small circular spots with a dark margin and gray center. Infected leaves turn yellow and die. Early blight appears as irregular, dark brown areas on the leaves with concentric, black rings developing in a target-like pattern as the spots enlarge. Early blight can spread very rapidly. Bacterial speck appears as tiny, pinhead sized, black specks on tomato leaves and fruits. Bacterial spot is very similar to bacterial speck, but the leaf and fruit spots are slightly larger. On tomato fruits, bacterial spot results in slightly raised, brown, scabby lesions.



This photo shows a tomato leaf infected with early blight. Early blight can spread very rapidly and kill off plants.

One of the most common sources of infection for tomato leaf spot diseases is through rain splashing on bare soil. All of the disease mentioned above overwinter on infected plant debris in the soil. During a rainstorm, water droplets hit the soil surface, splashing water and soil up onto the lowest tomato leaves. Prevent rain splash in your garden by covering the soil with mulch. Mulch plants with clean straw, black plastic, newspapers, wood chips, or any other coarse organic material. Mulch also helps suppresses weed growth, moderates soil temperature extremes and helps retain soil moisture.

Suppression of leaf spot diseases, once plants have been infected, can be accomplished through sanitation and the application of fungicides. As soon as leaf spot diseases as noticed, remove the affected leaves and begin a fungicide spray program. Fungicides labeled for use on garden tomatoes include maneb, mancozeb, copper sulfate and sulfur. Read and follow label directions carefully, including how often to reapply the fungicide product and the number of days that must pass after application before tomatoes can be harvested. Also, keep tomato leaves as dry as possible, by applying water to the base of plants, instead of through an overhead sprinkler, since water on the leaf surface promotes germination of fungal spores and leaf infection.

Sarah Browning is a Horticulture Extension Educator with the UNL Extension in Dodge and Saunders Counties. She can be contacted by phone at 402-727-2775; by mail at 1206 W. 23rd Street, Fremont, NE 68025; or by e-mail at sbrowning2@unl.edu. □