

Press&Dakotan

Some Dry Options

The Advantages Of Drought-Tolerant Grasses

BY RITA BRHEL P&D Corresponden

Agricultural producers are constantly looking for better ways to manage their crops and livestock during drought. So is Joseph Craine, a biologist with Kansas State University in Manhattan, who has been traveling the world comparing how plants react to various climates in an effort to determine how cattle and bison might be affected by climate change.

'Studying nutrient-limited ecosystems is a good segue to understanding drought effects," Craine told Steve Young, a weed ecologist with the Univer-sity of Nebraska in North Platte, Neb., during the North American Invasive Plant Ecology and Management Short Course on May 1.

Craine has conducted research throughout the North American grasslands, most notably the Colorado High Plains, has well as the South African savannah, Australian eucalyptus grasslands and New Zealand alpine grasslands. Of the 11,000 grass species in the world, he has studied 426 of them. "We were seeing these global patterns

of what plants do in low-nutrient grass-lands," Craine said.

Much of his career has centered on comparing plant traits with nitrogen availability.

What Craine found was that plants in nutrient-rich environments tend to have more stems and deeper canopies, whereas plants in soil with low fertility are more likely to grow in rosettes, sending stems — very erect stems and as few as possible — only when flowering. Plants in low-nitrogen growing conditions also had tougher leaves that were able to live more than twice as long as leaves on wellnourished plants, as well as lower respiration rates and slower photosynthesis.

In other words, the same species of plant in a low-nutrient soil, compared to ideal growing conditions, adapts by conserving as much energy as possible. Additional, Craine said, the plant traits that accommodate for low-nitrogen growing conditions mirror what happens during drought, in that plants change to be able to conserve not only energy but also water use. Essentially, water is a nutrient and the plant will react similarly whether its environment is missing adequate nitrogen or water.

Overall, Craine found that grasses consistently outcompete forbs, even extremely drought-tolerant broadleaf species like Stiff Goldenrod.

"Broadleaves typically are not drought-tolerant at all," Craine said. "Basi-cally, if you wanted to be drought tolerant, you had to have narrow leaves."

But it wasn't just the leaf width narrow leaves conserve energy more than wider leaves — that determined drought tolerance. The tubes inside the plant, called the xylem, that distribute water from the roots to the leaves, are thinner in drought-tolerant plants. Grasses tend to have thinner roots than forbs — .15 mm versus .30 mm — and drought-tolerant plants, including forbs, have a smaller-diameter xylem within the stem, Craine said. The smaller tubes increase water tension. The wider the tubes, the lower the water pressure within the plant, reducing the amount of water making it up the stem. In addition, plants with a larger xylem are more likely to develop an embolism, which would block the water flow beyond the bubble of air.



Foxtail is a grass species, which are naturally more drought tolerant because of their narrow leaves and extensive root biomass.

grasses is enormous compared to that of forbs, making it easier for grasses to find water deep in the subsoil.

"The way these plants compete for nutrients is basically there's an overcapi-talization of roots," Craine said. "If there wasn't competition, grasses would only need 1 percent of the roots they do have.'

He feels this information can help farmers and ranchers by aiding them in identifying which plants, whether in cropping or grazing systems, are more likely to be successful in drought conditions. Researchers can use this information on how plant traits adapt to low-nitrogen and dry environments to further develop crop varieties and pasture management methods. On the farm or ranch, producers may be able to compare Craine's information with their own observations on how fields and pastures change with nitrogen and water availability

looking at things, you start to notice pat-

PHOTO: RITA BRHEL

terns," he said. Producers can learn a lot by looking to nature to see how to better manage drought.

Craine's research has also found that whole ecosystems can shift temporarily during a prolonged drought, where even some fairly hardy grass species find it difficult to thrive. He talked about situations during long droughts where short grasses, like sideoats grama, would take over the area originally occupied by tall grasses, like little bluestem. And once the drought was over, the short grasses them receded, allowing the tall grasses to move



Field Day Slated Near Hartington

HARTINGTON, Neb. - No-till on the Plains, Inc. will host a field day for producers to gain a better understanding of the importance of soil health by utilizing continuous no-till cropping systems. Members of the media and the general public are also invited. Funded through a grant from the Nebraska Environmental Trust and PrairieLand RC&D, No-till on the Plain, the Natural Resources Conservation Service and University of Nebraska Extension Service are pleased to offer this high-quality educational event to all interested producers.

The Whirlwind No-till Expo will take place on Thursday, June 5, beginning promptly at 8:30 a.m. at the Matt Kathol farm located at 88192 564 Ave., Hartington, Nebraska. The day will begin with a Rainfall Simulator demonstration followed by excellent discussion down in a soil pit on the Kathol farm. Lunch will be provided at VFW Hall followed by a full afternoon of knowledgeable speakers. A registration fee is required by May 27 for attendance.

Featured speakers are Dr. Ray Ward, president of Ward Laboratories and knowledgeable no-till expert from Kearney, Nebraska; University of Nebraska-Lincoln Extension Engineer Paul Jasa, who is a great source of information in the Midwest on no-till planting equipment and system management. Con-tinuous no-till producer speakers include Osage City, Kansas father and son partners Keith and Ben Thompson and Rick Beiber from Trail City. These long-term no-till producers will present information about their operations, cropping rotations, including cover crops and livestock integration into their no-till systems. Also on the program is soil health specialist Dr. Jerry Hatfield from the Agriculture Research Service in Ames, Iowa.

No-till farming systems offer several advantages to producers willing to implement the system. Fewer trips across fields without tillage passes will reduce fuel costs. Increasing crops in rotations will break weed and insect pest cycles. Increased crop residue and root systems will increase soil organic mat-ter and microbiological activity, thereby increasing the pro-ductiveness and fertility of the soil. Implemented in a site-specific systems approach, no-till will, over time, outper-form conventional tillage. Each year, No-till on the Plains hosts field days, bus tours

and the annual Winter Conference for producers to gain valuable no-till information. "We're striving to meet our mission to be a primary resource for no-till information and a support network for producers," says Ryan Speer, No-till on the Plains President.

For more information on the Whirlwind No-till Expo or to pre-register by May 27, contact No-till on the Plains, Inc. at 888-330-5142 or register online at www.notill.org.

Scuse To Speak At Gov's Ag Summit

PIERRE — The South Dakota Department of Agriculture (SDDA) announces U.S. Department of Agriculture Under Secretary Michael Scuse will speak at this year's South Dakota Governor's Agricultural Summit June 26-27 at the Lodge in Deadwood.

Pre-registration is required for the Summit and will be accepted through Monday, June 9, at www.sdagsummit.com/. Special room rates are only available until May 26 at the Lodge in Deadwood

We are glad to have Under Secretary Scuse delivering an update on the Farm Bill's implementation progress at this year's Summit," said S.D. Secretary of Agriculture Lucas Lentsch. "We look forward to a review of key choices the farm bill provides and provisions that will assist South Dakota farmers and ranchers. A Black Hills Ag Tour will kick off this year's event on Thursday afternoon with demonstrations from the SDDA's Wildland Fire and Resource Conservation and Forestry divisions and a tour of Belle Joli Winery in Sturgis Friday morning will begin with a "State of Ag Address" from S.D. Secretary of Agriculture Lucas Lentsch. Under Secretary Scuse will give an update on the 2014 Farm Bill and Gov. Dennis Daugaard will present the 2014 Ag Ambassador Award. Three afternoon sessions will be held titled "Keys to Agricul-tural Development: Roads, Rails and Rivers," "Environmental and Regulatory Issues Forum" and "What's Ahead for South Dakota Agriculture?" For more information about the Summit, visit http://sdda.sd.gov/office-of-the-secretary/ag-summit/ or contact Kea Warne at kea.warne@state.sd.us/. This event is free and open to the public.

Additionally, the root biomass in

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Dack in

"We're going to have dry times. We're going to have wet times," Craine said. "In a diverse prairie, we're going to have plant species that can adapt. Native, diverse grasslands really can be resilient to drought, because they have diversity. If you lose that diversity, you lose that insurance.

Safety Training Program To Be Offered

BROOKINGS — Youth 14 to 15-years-old seeking employment in production agriculture must comply with the training requirements of the U.S. Department of Labor's Hazardous Occupations Order in Agriculture (AgHOs) law. To help youth meet these requirements, National Safe Tractor and Machinery Operation Program sessions will be delivered across the state throughout the spring by SDSU Extension staff.

The National Safe Tractor and Machinery Operation Program (NSTMOP) is a project of Hazardous Occupations Safety Training in Agriculture (HOSTA) for youth ages 14 and 15. As part of meeting the training requirements, youth must

complete an approved training program. The (NSTMOP) is a comprehensive program that consists of a minimum of 24 hours of independent study using the NSTMOP task sheets, followed by skills and driving instruction. After completing the task sheet independent study, each student must complete a 50-question knowledge test and obtain a minimum passing score of 70 percent. If the student successfully passes the knowledge test, he or she is then permitted to take the program's skills and driving tests. Upon successful completion of all parts of the NSTMOP, the student receives a formal certificate of completion from the NST-MOP head office.

By successfully complet-

ing the program, 14- to 15 year-olds may legally operate farm tractors and powered machinery for hire, which they otherwise would not be allowed to operate under the US Department of Labor's Hazardous Occupations Order in Agriculture.

The NSTMOP program is designed to consistently cover core content areas including safety basics, agricultural hazards, tractors, connecting and using implements with tractors and materials handling.

Dates and locations of the NSTMOP training sessions in South Dakota will be as follows:

• May 29 at 9 a.m. — Near Beresford at the SDSU Southeast Research Center (29974 University Road, Beresford)

To register, visit iGrow.org. Cost of the training can be paid on the SDSU iGrow website during registration.





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