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## **ARS studies, develops forages that fit into crop, livestock systems**

By SUE ROESLER, Farm & Ranch Guide



**John Hendrickson researches improved forages at the Mandan ARS lab.**

MANDAN, N.D. - Improved forages are showing promise as crops that will have many uses - both for now and for the future.

One research study at Mandan's ARS Northern Great Plains Research Laboratory is looking at how forages can be used as part of a crop rotation to help break up the weed and disease cycle.

"As we move into biofuels, we need to find out how to manage forages in our cropping systems," said John Hendrickson, research rangeland management specialist at the lab.

The ARS-Mandan lab is growing two perennial grasses - intermediate wheatgrass and switchgrass - and rotating them with an annual crop to see how the two work together. They are using continuous wheat for the annual crop.

"It's all part of integrated agricultural system research - how can we use our diverse crops and put them all together to decrease our inputs for an economical advantage and increase our usage," he said. "These crops can also be good for the soil and can be environmentally friendly."

Other forage research at Mandan's laboratory is uncovering how planting improved forages can help livestock producers extend the grazing season.

With corn and grain prices high, forages can be a less costly and more adaptable-to-the-climate alternative, and livestock can get out and graze earlier in the spring and longer into the fall.

"The idea is if you can reduce the amount of feeding for livestock, it will always be cheaper," Hendrickson said.

Native grasses should not be grazed until the three to four leaf stage, he said. However, the research demonstrated that some improved forages could be grazed in late April and early May.

It was also found improved forages could be grazed again in late fall after native pastures begin to turn brown when temperatures get hotter and precipitation drops.

There are many improved forages that can be grown for the hay mix or for grazing at times when native pastures are re-establishing.

Hendrickson said there were some 20 different cool season grasses that NDSU-Hettinger and the USDA-Plant Materials Center have researched, including such diverse forages as Russian wildrye, a bluebunch wheatgrass, and quackgrass hybrid.

"Lots of times we get stuck into only thinking about planting certain forages. There are a lot of varieties out there, depending on what each producer needs," Hendrickson said.

The Mandan lab decided to focus its research on intermediate wheatgrass and alfalfa. Intermediate wheatgrass was chosen because of its fit into what can grow well and be prolific in the Northern Plains. Alfalfa was chosen because it is known as the "queen of forages," he said.

While most producers tend to grow the purple flowered variety of alfalfa for hay, the scientists decided to evaluate the yellow-flowered varieties.

Yellow-flowered alfalfa is a good choice for producers in the upper Plains because it goes dormant during drought, he said.

It is also more grazing-tolerant than other varieties.

Hendrickson said 16 different cultivars and strains of yellow-flowered alfalfa - along with a few purple-flowered - were planted and grazed

over five years.

A mode of grazing called "mob grazing" was used where as many animals as possible grazed the plots heavily.

"There was heavy livestock pressure over a short period of time," he said.

Plants were grazed when they were from two to three inches tall, then allowed to regrow to 10 to 12 inches, and regrazed.

There were five different mob grazing periods done during the season which put heavy stress on the plants, Hendrickson said.

Three alfalfa releases did well in the study - Yellowhead, a new Canadian variety; Anik, an older Canadian variety known to be extremely winter hardy; and Travois, which has been adapted for the upper central Plains regions.

"All three of these alfalfas are winter varieties that can handle the climate up here well," Hendrickson said.

Vernal, an older public variety, was used as the control.

"Being able to handle the climate is as important as the ability to handle grazing," he said. "A lot of alfalfa varieties can handle the grazing pressure but can't handle the climate."

Anik, Yellowhead and Vernal were then put through the clipping study to see how they would respond to grazing.

Alfalfa varieties were planted into rangeland, clipped at different growth stages, and then clipped or left with vegetation around the plant.

"The reason for leaving vegetation around the plant is that many times, livestock do selective grazing," Hendrickson said.

Research found that Yellowhead was the most consistently productive variety grown.

When alfalfa varieties were a part of the hay mix, the yields were greater.

Anik did well when there was early defoliation, and selective defoliation did not appear to affect the alfalfa varieties' performance, according to Hendrickson.

The ARS lab has also looked at improving intermediate wheatgrasses, which are high-yielding, high-quality forages that establish easily.

The disadvantage is that they did not keep their stands or longevity (persistence) when grazed.

The lab researched whether time of grazing would impact the stand longevity of the wheatgrasses.

What was found was that grazing intermediate wheatgrasses increased longevity when compared to non-grazing.

It was announced earlier this year that the newer wheatgrass variety developed at ARS laboratories, Manifest, is coming out in 2010.

Manifest has been found to have a stronger ability to handle grazing in the upper Plains, which will be a big help to livestock producers looking for a good, useful improved forage.

Manifest was developed by John Berdahl, a retired Mandan scientist, and has been tested at ARS plots along with other varieties, Hendrickson said. Those varieties include Manska, a variety developed by the ARS lab in Nebraska, and Reliant, a new ARS variety developed at Mandan that is a strong hay forage.

Compared to other varieties, Manifest had improved grazing stands and yielded the highest when averaged with all ARS locations. Those locations in the study included Mandan; Green Canyon and Blue Creek in Utah; Sidney and Mead, in Nebraska; and Miles City, Mont.

"We couldn't have developed these varieties without the help of the Plant Materials Center in Bismarck," Hendrickson said.

Hendrickson said the study concluded that forages do not replace native grasses but complement them; forage varieties are improving and there are more to choose from; and management is important and can increase the longevity and productivity of quality forages.