

# Dry beans part of beef diet

**A**n economical, practical use for split or cracked great northern, kidney and pinto beans rejected for human foods is to feed them to livestock.

But, as with human digestion, proteins called phytohemagglutinins or lectins pose digestion and nutrition challenges for animals. Humans soak and cook dry edible beans which destroys these properties and improves digestion.

IANR research at NU's Panhandle Research and Extension Center, Scottsbluff, found that growing steer rations can contain limited amounts of cull beans.

"Producers can feed 10 percent beans without any adverse effects to the cattle," said Ivan Rush, IANR animal scientist. He said rumen microorganisms apparently help break down protein inhibitors.

Rush fed 96 head of 625-pound steers three different rations in a 112-day feeding

trial. Crude protein in rations of corn silage, alfalfa hay, corn and beans varied from 12.8 to 13.6 percent. Net energy was similar in each.

The treatments were no beans, 5 percent and 10 percent beans. Cattle on the 10 percent bean ration had the best weight gains and feed efficiency.

"In contrast, steers fed 5 percent cull beans consumed more total ration than the two other groups," Rush said.

The 10 percent ration steers gained 3.3 pounds per day and consumed 6.04 pounds feed for each pound gained. The 5 percent group gained 3.03 pounds per day and had feed efficiency of 7.18 pounds feed/gain.

Cattle on the no-bean control diet gained 2.98 pounds per day and had 6.73 pounds feed/gain.

— *Mary Bargman Crawford*

# New hard red winter wheat to be available for fall planting

**A** new hard red winter wheat developed by IANR and USDA wheat breeders should please western Nebraska dryland wheat producers.

Named Windstar, it's a joint release of NU, the USDA-Agricultural Research Service and the South Dakota Agricultural Experiment Station. Windstar's main advantage compared to other available varieties is its consistent, high yields in dryland production, said Stephen Baenziger, IANR wheat breeder.

"It's not a racehorse wheat. Windstar might not always be in first place, but it will always show and finish the race," Baenziger said.

Windstar is best adapted to Panhandle growing conditions, but also will perform

well in southwest and west central Nebraska, Baenziger said. It is a taller semi-dwarf wheat with a short coleoptile and medium to late maturity.

Windstar is moderately resistant to stem rust disease, moderately susceptible to leaf rust and shows a low level of tolerance to wheat streak mosaic virus disease. It has performed well in five years of milling and baking tests.

Seed will be available for fall planting from NU's Foundation Seed Division.

Nebraska's wheat breeding program is funded in part by the Nebraska Wheat Development, Utilization and Marketing Board.

— *Monica Manton Norby*

# Work g

**W**alking the stony hillsides of small farms in southern Brazil, Jose Molin began to imagine designs for a new kind of corn planter.

Ten years later and thousands of miles from those fields, the machine he designed plants corn in IANR research plots.

His innovative punch planter design brought him recognition as Brazil's Young Scientist of 1995-96, an award he traveled to Brazil to receive from President Fernando H. Cardoso.

"It's only once in your life that something like that happens. I really enjoyed it," Molin said.

Probably one of the oldest planting methods, in punch planting farmers use something to punch a hole in the soil, then drop in the seed and cover it.

Children planting seeds after poking holes in the dirt with their fingers illustrate the concept.

Originally, Molin's research aimed to help Brazil's small farmers by designing a mechanized version of their manual punch planters. When he came to NU in 1993 to work on his doctoral degree in biological systems engineering with Leonard Bashford, he proposed building a punch planter for U.S. no-till planting systems.

These systems reduce soil erosion by leaving crop residue on the soil surface. The less soil is disturbed during planting, the better.

"I proposed a rotating machine that would punch the seed into the soil, as opposed to cutting a slot in the soil like the usual no-till planters," Molin said.

Molin designed a 16-inch diameter wheel with 15 punches bolted onto it. He experimented with different punch shapes to find one that could be manufactured easily and still pack a punch. Then he angled the wheel so that as it rotates, it presses the soil to one side against the



# ives planter added punch

wall of the 5-inch-long punch.

This leaves the punch's other side soil-free, so the seed can drop into the hole. A commercially-available vacuum seed meter separates seeds and drops them singly into the punch.

"I think the biggest improvement I made on previous punch planters is that this machine is strong enough to cut through residue on the soil," Molin said.

Other punch planters, used mostly in Europe, are very slow, use many movable parts to open a slot in the soil and work only on well-prepared, groomed soil, he said.

Molin's punch planter is designed for planting corn at a standard 2.5-foot row width, dropping 39,050 seeds per acre. He tested the planter in the laboratory and on no-till fields with different amounts of corn and soybean residue, at speeds up to 5.6 mph. Planting speeds for corn planting range from 4.5 to 6.5 mph.

Molin measured distance and regularity between plants and soil disturbance and movement in fields. The planter performed well in all different conditions. Up to 83 percent of seeds emerged singly at the correct spacing.

Molin wants to adapt the punch planter to be more easily used for precision planting, where uniform plant spacing increases yields. Changing the wheel diameter changes the space between seeds, but that requires solving certain engineering problems.

"I'm planning to work on a mechanical way to automatically change the diameter of the punch wheel," Molin said.

Molin graduated in December and returned to Brazil and his position as an assistant professor at Sao Paulo State University. He hopes his planter eventually can increase the use of no-till, conservation planting there.

"We don't know if the design we're proposing now is the best. I think that industry can test and develop this further," Molin said.

Bashford, Molin's faculty adviser, believes the new punch planter will be developed and is a significant contribution to production agriculture.

"Obviously, with Jose winning the award in Brazil, there is also international significance to his work," Bashford said. "I know we in the department think he is

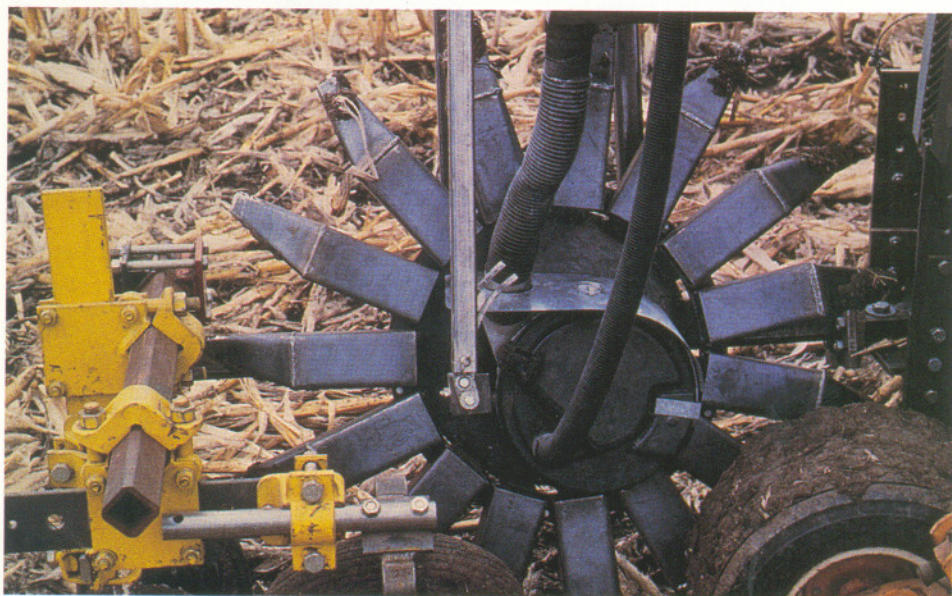
certainly one of the top two or three students we've had in the past 15 years. He's really an outstanding scientist."

— Monica Manton Norby



Mark Hansen

Jose Molin examines the punch planter he developed while working on his doctoral degree in biological systems engineering. A native of Brazil, his innovative design brought him recognition as Brazil's Young Scientist of 1995-96.



Jose Molin

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