

Interdisciplinary Research To Improve Quality Corn Silage

UNIVERSITY PARK (Centre Co.) — "When I started at Penn State in 1989," said Greg Roth, associate professor of agronomy, "corn wasn't managed specifically for silage. People often used corn that didn't fare too well for silage."

But since then, producers have begun to realize that the yield and quality of silage can be an important factor in the profitability of their farming enterprise. There's a nationwide trend toward increasing silage in feed, especially at larger dairies, so the silage quality is becoming more important."

Now, after more than a decade of research and extension education on silage quality, "We have started producers thinking about the kinds of things that influence silage quality," said Roth. "On a 100 cow dairy, improved silage quality can increase milk production by about \$10,000 per year. Farmers now recognize that silage is a high value crop. Making producers aware of these issues allows them to remain competitive in the marketplace."

Roth's work in this area began when farmers started to ask whether certain hy-

brids were better than others for producing silage and about harvesting recommendations. He and his research team, including research support technologist Mark Antle, studied the timing of harvest for optimal silage quality and found that yield and quality decrease if the corn is allowed to mature for too long. They recommend harvesting when the kernel moisture content is between 63 and 70 percent, a measurement producers can make themselves.

In 1994, Roth worked with several county agents to examine the effect of using narrower rows and higher per acre plant populations for silage corn than was traditional for grain corn. They found that narrower rows measuring 15 to 20-inches wide boosted the yield by about five percent over conventional row spacing (30-inches wide), producing an additional ton of silage per acre.

They also found that optimum yield was obtained by planting 30,000 to 32,000 plants per acre. This allowed an additional five percent increase in yield over traditionally recommended plant populations in corn for grain.

By combining the nar-

rower row spacing with the increased plant populations, producers could increase their yields by about 10 percent.

Roth's team found that row spacing had no effect on the quality of the silage. They did find, however, that silage quality decreased as the plant population increased, but some of this loss of quality was offset by the increased yield.

In the mid-1990s, seed companies introduced silage-only corn hybrids, and Roth began evaluating those for producers. He found that many hybrids do well in narrow row, high population management programs.

Roth worked with Dick Fox, professor of soil science, and Bill Piekielek, research support associate, to determine optimum nitrogen rates for silage hybrids. They found that the economic optimum nitrogen rate was 20-pounds nitrogen per acre higher for silage corn than that recommended for grain corn, because the protein

content of the silage and its value increase as the nitrogen rate increases.

Roth has been working for several years with Jud Heinrichs, professor of dairy and animal science, and Dennis Buckmaster, associate professor of agricultural engineering, to further refine knowledge about silage quality. "In the past 10 years," said Roth, "we've seen a great increase in the sophistication of analysis methods that people are considering to characterize silage crops."

With Heinrichs, Roth is evaluating the effects of corn silage particle size on cow health. To maintain the health of a dairy cow's rumen, the diet must contain food particles of a variety of sizes.

If too much of the food is finely chopped, the rumen will produce too much acid and the cow will have to be culled from the herd.

About four years ago, Heinrichs and Buckmaster developed a sieving device to determine the particle size of

mixed rations, including silage, so that producers can feed a size-balanced ration. "Now virtually all the forage analysis labs and feed companies and many farmers have one of these sieves and use it to measure the forage particle size," said Heinrichs. "It allows them to do a better job of ration balancing," which is very closely tied to herd health and profitability.

Heinrichs, Roth, and Buckmaster are developing a physical effective fiber index that would be applied to silage and other forages to describe both the chemical and physical components — including particle size — of the fiber present. The index would allow a farmer to know how the forage will affect a cow's digestion without conducting expensive, time-consuming feeding trials. Heinrichs and Roth hope over the next few years to test the index on many varieties and cuts of forage in the field.

Roth and Buckmaster are

(Turn to Page 27)



In Stock at Umberger's



Your
Livestock
Implement
Line

The #1 Name in Feedmaking

GEHL Mix-Air® portable grinder-mixers have been leading the industry for over 35 years. Whether you're feeding today's "leaner" hogs and beef, poultry, or top-producing dairy cows, look at GEHL grinder mixers for these advanced features:

- **Total hydraulic control.** The self-contained hydraulic system allows infinite speeds to power the discharge conveyor, unloading auger and infeed attachments
- **Remote controls** operate the unloading conveyor from the tractor seat or from the rear of the machine
- **Electronic scales** for precise ration weighing
- **Customize your machine** with a wide variety of options and attachments



Umberger's Of Fontana, Inc.

1067 Horseshoe Pike, Lebanon, PA 17042
8 Miles E. of Hershey on Rt. 322

Hours:
Mon. thru Thurs.
7:30-6
Fri. 7:30-8
Sat. 7:30-4



717-867-5161
1-800-261-2106

STINE®

YIELD = PROFIT

It's as simple as that!

STINE...HAS YIELD

CONTACT

Name	Phone	City
Ken Deltch.....	717-486-7311	Boiling Springs, PA
John Marks.....	570-799-0769	Catawissa, PA
Eldon Ocker.....	717-263-2592	Chambersburg, PA
Stanely Crone.....	570-275-1738	Danville, PA
Richard Crone.....	570-275-1343	Danville, PA
Michael Judd.....	814-334-5281	Harrison Valley, PA
Robert Lentz.....	717-933-8211	Lebanon, PA
Charles Groff.....	717-242-3712	Lewisburg, PA
Kore Yoder.....	570-966-3947	Lewisburg, PA
Locust Brook Inc., Dale Greiner/Tim Weaver.....	800-248-4418	Manheim, PA
Harlan Martin.....	717-589-7676	Millerstown, PA
Webb's Super Gro.....	800-258-6689	Mill Hall, PA
Carl Schmidt.....	570-546-3117	Muncy, PA
Joe Anchor.....	570-538-1170	New Columbia, PA
East Gate Feed & Grain, LLC.....	888-567-6556	Reedsville, PA
Ron A. Wasson.....	814-237-2339	State College, PA
Forman Grain.....	570-649-5579	Turbotville, PA
Stacy Bodder/Piper Farms.....	215-766-9325	Pipersville, PA



Keystone Group

New Columbia, PA

570-538-1170 • 570-546-3117