Crops Day Highlights Forage, Small Grains Research

BY JACK HUBLEY

STATE COLLEGE — The tour wagons were filled to capacity at Penn State's annual Crops Day held at the Rock Springs Agricultural Research Center on June 26. The topics were small grains and forages, as agronomists escorted the crowd to university test plots where the latest findings in varieties, management and disease and insect control were discussed. Some of the day's highlights are discussed below.

Small Grains as Forage

Agronomist Sidney Bosworth thinks that a fairly recently introduced small grain crop called triticale may have some potential as a forage. A wheat-rye hybrid, triticale's name comes from a combination of its parent crops' Latin names, Triticum (wheat) and Secale (rye).

In studies conducted in 1984 and '85, triticale matured five days later than wheat and about two weeks later than rye. This year the rye was harvested on May 15, and the wheat and triticale were both harvested at the boot stage on May 23.

Yields for all three species were similar last year, with triticale registering the highest yield of the three in 1984. This year, triticale yields were less than rye but higher than wheat.

From a quality standpoint, Bosworth found that crude protein levels were similar in the three species at comparable stages of maturity. Triticale's total digestible nutrient level averaged slightly lower than wheat and rye.

Regardless of the species grown--wheat, barley, rye or triticale--the winter cereal grains offer a hedge against corn silage losses in drought years, in addition to reducing soil erosion during the winter months, says Bosworth. They adapt well to steep hillsides where farmers may want to break an alfalfa cycle without going to highly erodible row crops.

Potential Problems with Brassicas

A balanced diet is no less important for livestock than it is for humans, according to USDA agronomist David Gustine. Most forage crops can cause animal health problems when fed as the total diet, and brassicas are no exception, he points out.

Two major antiquality components present in brassicas are the glucosinolates and S-methyl cysteine sulfoxide, or SMCO. When fed to ruminant animals, glucosinolate is converted to toxic compounds that interfere with thyroid function and result in appetite problems and weight loss.

Elevated SMCO levels interfere with the normal action of red blood cells and can result in anemia in livestock.

Gustine emphasizes that such problems crop up only after brassicas are fed exclusively for four to six weeks or longer. "So it's really a question of dosage," he says. One way to avoid problems is to ensile brassica crops. Studies show that glucosinolate levels decrease by 90 percent and SMCO levels drop 20 percent when brassicas are ensiled.

The best way to avoid overdosing livestock on these two antiquality compounds, however, is to limit exclusive feeding of brassicas to no more than two to four weeks. Better yet, feed these crops in a forage mixture, Gustine says.

Warm-Season Grasses

Pennsylvania summers may be enough to cause ryegrass and orchardgrass to lose their cool, but the warm-season grasses, such as switchgrass and bluestems are well adapted to the midsummer simmer.

"These grasses are native to this country," says agronomist Jerry Jung. While the cool-season grasses essentially shut down when temperatures exceed 90 degrees, warm-season varieties do nearly 70 percent of their growing after June 1.

Warm-season grasses also require less fertilizer, Jung points out. In addition to requiring less phosphorus, warm-season varieties are more than twice as efficient as cool-season varieties in utilizing nitrogen.

The switchgrasses and bluestems are very efficient users of water, as well, says the agronomist. High temperatures and low moisture levels that will wilt tall fescue fail to have detrimental effects on warm-season varieties.

Although warm-season grasses have a reputation for being difficult to establish, Jung points out that stand establishment techniques have improved in recent years. Two factors critical to producing a healthy stand are early seeding, preferably in late April to early May, and controlling competition from weeds.

The quality of warm-season grasses is generally considered to be as good or better than cool-season varieties. Studies begun last year at Penn State are attempting to provide more information on quality with respect to grazing.

Red Clover's Advantages

An important hay crop in Pennsylvania, red clover has been used longer than any other forage, points out agronomist Steve Fales. The crop is well adapted for ground that is either too acidic or too wet for alfalfa.

"One of its benefits is its high seedling vigor," says Fales, noting that red clover does well when no-tilled or frost seeded in late winter.

Fales recommends harvesting red clover no later than the early bloom stage, since later cuttings will take off the second growth as well, which retards the next cutting. The agronomist notes that farmers should not count on much production after the first major harvest year.

Handling Round Bales

Researchers had a number of recommendations for reducing losses when using round bales. Ag engineers Paul Anderson and Bill Kjelgaard demonstrated a bale lifter-transporter that makes bagging the big bales easier. The bags were five to six-mil low density polyethelene that hold 500 pounds of dry matter.

Demonstration bales were made from first-cut alfalfa bagged at 40 to 45 percent moisture the same day that the bales were made. Anderson recommends dropping the tractor speed one gear below normal baling speed to improve bale density. Researchers did not recommend evacuating the bags, since the material is slightly permeable to air and water. Cost per bag is $5 to $6, which is comparable to other storage systems, according to agronomists. Bags that are torn can be used a second year by enclosing them in a new bag.

The engineers also demonstrated another way of making good hay by injecting round bales with anhydrous ammonia. For both round and square bales, moisture levels should be 20 to 30 percent for this process. The ammonia is injected via a probe into the center of the bale. Bales are then partially covered with a sheet of plastic.

Alfalfa Fertility

Extension agronomist Douglas Beegle stressed the need to plan ahead when fertilizing for alfalfa. "We need to look at fertility about the time we plow up the old stand," he says. "Once the sod is established it takes a long time to make changes with fertilizer."

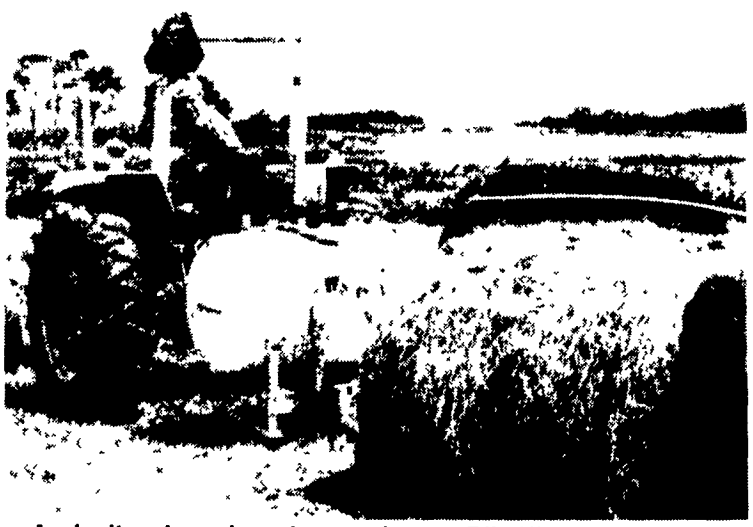
In addition to requiring plenty of phosphorus and potassium, alfalfa is one of the most sensitive crops to pH, Beegle cautions. It's important to get soil pH as close to seven as possible so that the crop can fix all the nitrogen that it needs, since nitrogen deficiencies can definitely hurt alfalfa yields. The agronomist urges farmers to lime their fields at least one year before the proper pH will be needed.

Should starter fertilizer be used when an alfalfa stand is being established? Beegle said that research in this area has produced inconsistent results, but the key factor seems to be stress. If conditions are very wet, cold or dry, or soil fertility is low, then the stand will be likely to respond to starter fertilizer. Placement of starter fertilizer is critical, however. "It's got to be directly under the seed," cautioned the agronomist.

Should manure be applied to established stands? Although the crop will likely respond to the additional potassium and phosphorus, the extra nitrogen doesn't seem to help, since the alfalfa will already be fixing nitrogen from the air. The added nitrogen will spur the growth of grasses in an alfalfa/grass mix, which will then tend to outcompete the alfalfa. "If you've got to put it on alfalfa, put it on the old fields first," Beegle recommends. "You've essentially signed the death notice on those fields," he concludes.

Agronomist Jerry Jung inspects a stand of Niagara big bluestem. Such warm-season varieties do well during the state's hot, dry summers, and adapt well to both livestock production and conservation programs.

Agronomy professor Elwood Hatley discusses barley varieties with an attentive Crops Day audience. The day-long tour highlighted Penn State forage and small grain research.



Agricultural engineering professor Bill Kjelgaard applies anhydrous ammonia to round hay bale. Probe injects 2½ pounds of ammonia when bale is at 20 to 30 percent moisture level.

Living Mulches Control Soil Erosion

BY MARY MAXWELL
Centre Co. Correspondent

ROCK SPRINGS — The use of crownvetch as a living mulch may be the answer to soil erosion problems for farmers. For years this perennial legume has been used for soil stabilization and erosion control on roadsides. Now Dr. Nathan Hartwig, associate professor of Weed Science at Penn State, is looking at the use of crownvetch as a way to control erosion plus increase fertility in field crop production.

On a tour last week at Penn State's Agronomy Farm at Rock Springs, Dr. Hartwig discussed his research. He referred to a research plot where there was a 99 percent reduction in soil erosion on a 14 percent slope. "The corn was even planted up and down the slope," Hartwig commented, "But I wouldn't advise doing that except on a research plot." Hartwig found that with reduced water run-off, pesticide run-off was also reduced 95 percent or more.

He found that for best results the crownvetch should be seeded after small grains have been harvested for silage. This allows the crownvetch to become established before winter. The following spring, legume or legume/grass can be seeded into the crownvetch. Then corn could be planted the following year. Corn could also follow the crownvetch seeding with hay, corn or small grain the following year. Small grains when planted into crownvetch compete least and so allow the crownvetch to get established. The following years the field can be planted to hay, corn or small grain again. For each crop Hartwig makes specific herbicide recommendations.

Hartwig and his associates originally studied crownvetch in no-till settings, but now they have planted research plots using a variety of tillage methods: chisel plow, deep disking, minimum till, and no-till. They also are studying various methods for seeding the crownvetch.

As a part of a regional project with Rutgers, Cornell and the University of Maryland, the Rock Springs farm has test plots of other living mulches. These are flat pea, red, crimson and subterranean clover, Austrian winter pea, hairy vetch and winter rye.

Living mulches also provide some competitive weed control. "Crownvetch may reduce corn yields 5 to 10 percent," says Hartwig, "but the loss has to be compared with the value of additional weed control, soil erosion control and the feeding value of fall pasture or stalklage after corn grain harvest."

A pamphlet, "Crownvetch and No-Tillage Crop Production for Soil Erosion Control," is available from Dr. Nathan L. Hartwig, Department of Agronomy, 119 Tyson Bldg., University Park, PA 16802. A single copy is free and additional copies are 50 cents.