

Kura clover a tool in erosion battle?

■ Using kura clover as a living mulch could expand potential corn silage acreage.

by *Dave Natzke*

While kura clover is gaining popularity in grazing operations for its feed quality and yields, the plant's physical properties hold some challenges for conventional forage harvesting operations. However, don't overlook this relatively new legume as a tool to increase corn silage acreage in your crop rotation while controlling soil erosion.

Increase corn silage acreage *and* erosion control? Sounds like mixing oil and water. University of Wisconsin-Madison researchers are find-

Kura clover strengths

1) *Capable of producing high-yielding, high-quality legume forage.* Because of the high proportion of leaves to stems, it is very high quality with protein concentrations ranging between 18% and 25%, and neutral detergent fiber concentrations between 25% and 40% in Wisconsin conditions.

2) *Very persistent once established.* A spreading perennial clover, kura clover has an extensive root and underground (rhizome) stem system, and is extremely winterhardy. Some kura clover stands in Wisconsin are more than 14 years old.

3) *Thrives under diverse conditions.* It tolerates low fertility and soil acidity, wet soils, and some flooding. Kura clover tolerates lower pH and fertility than alfalfa. Although it is not high yielding under drought, it survives because of its deep root system.

4) *Mixes well with forage grasses,* including Kentucky bluegrass, smooth brome grass, orchard grass, reed canarygrass and tall fescue.

5) *Seed size of kura is about the same as alfalfa,* but because the plant spreads by rhizomes, a lower sowing rate can be used. Researchers have consistently obtained excellent stands of kura clover with 8 pounds of seed per acre, and have been successful with as low as 2 pounds per acre.

6) *No significant disease problems* are known for kura clover. However, some insects that damage other legumes (such as potato leafhopper) also affect kura clover.

ing kura clover may be valuable as a living mulch when interseeded with corn silage, adding an erosion-reduction tool to the forage producer's toolbox. And, if managed properly, it can yield an additional forage source.

Native to Eastern Europe and western Asia, kura clover was introduced in the United States about 1911. It didn't receive much research attention here until the early 1990s.

Once established, kura clover is extremely persistent. The plant has three leaflets, although four to five aren't uncommon, with very long petioles, and sends out rhizomes and stems from a taproot.

Test plots in Wisconsin have shown kura clover yields are similar to alfalfa or red clover, and actually increase as the stand ages. Forage quality is greater than alfalfa and red clover, with lower neutral detergent fiber. Lower NDF translates into higher dry matter intake.

"We've never had a legume like it," said Ken Albrecht, agronomist at the University of Wisconsin-Madison. "We have an opportunity like we've never had before. It's a clover that will live forever."

So why isn't this wonder crop planted from fence row to fence row across the Midwest? There are challenges (see kura clover concerns).

Playing on its strengths, Albrecht began looking at kura clover as a living mulch in 1994.

"Many of us would like to grow more corn silage than what our soils can handle due to erosion," he said. "Could we develop a system that would allow us to grow corn silage in a living mulch?"

Albrecht conducted mulch studies at Arlington and Lancaster UW research facilities. His latest research has been assisted by agronomy graduate student Augustina Sabalzaray. They've tried kura clover mulch interseeded with both regular, Liberty Link and Roundup Ready corn, using several methods, including:

- killing the clover crop, similar to a normal alfalfa/corn rotation, with and without supplemental nitrogen.
- band-killing kura clover 12 inches wide and



Wisconsin dairy producer Bob Staudinger (left) and Extension crops specialist Scott Hendrickson inspect an interseeded corn in kura clover test plot.

FYI

■ For more on kura clover research by UW-Madison agronomist Ken Albrecht, obtain "Experiences with kura clover in agricultural systems in Wisconsin." Call 608-262-2314; e-mail kaalbre@facstaff.wisc.edu or log on to www.uwex.edu/ces/forage/pubs/Kura_stands.htm.

■ For information on the kura clover interseeding test plot at Blue Royal Farms, contact Scott Hendrickson, Manitowoc County UW-Extension office, at 920-683-4167 or e-mail scott.hendrickson@ces.uwex.edu. Log on to www.uwex.edu/ces/cty/manitowoc/KuraClover/index.htm.

■ Read more about Blue Royal farms in the October 2001 issue of *Midwest DairyBusiness*.



University of Wisconsin-Madison agronomist Ken Albrecht and graduate student Augustina Sabalzaray have researched kura clover as a forage source and as a living mulch.

interseeding corn.

- suppressing kura clover with a low rate of Round-Up, then planting corn with and without supplemental N.
- Using zone tillage, planting corn in the tilled strip.

What they found

Beyond the benefits of holding soil in place, corn silage and grain yields suffered little in the kura clover mulch when managed properly. The key word is management.

Spring soil temperatures did have a big impact on early season corn development. Kura clover is cool-season legume, so early in the spring it can be

Kura clover concerns

- 1) *Slow to establish.* With few or no upright stems during the first year and its short stature, it is extremely susceptible to shading from weeds or existing companion grass in the field.
- 2) *Seeding with a noncompetitive legume or grasses is needed* for erosion and weed control and to enhance yields.
- 3) *Low forage production during the year of establishment.*
- 4) *Semi prostrate growth habit and high moisture content make mechanical cutting, drying and harvesting difficult.* Grass companion crops aid in keeping it upright and speeds wilting or drying.
- 5) *Less forgiving than other legumes* if establishment management steps are not carefully followed.
- 6) *Kura clover has very high protein and very low fiber contents* so bloat is a concern when grown in pure stands in a grazing operation.

too competitive with corn seedlings. Using tillage or herbicides, kura clover must be suppressed early. Once the corn seedling is tall enough, it creates a canopy that limits kura clover growth and water uptake.

Scott Hendrickson, Manitowoc County (Wis.) crops and soils agent, applied Albrecht's findings to a larger plot at Blue Royal Farms near Reedsville, Wis. The kura clover was established in spring of 2001, and corn was interseeded this year.

Research results will be reviewed this fall, but already look promising. As the research continues, the plan is to put corn in the same row next year, gaining advantages of warmer soil temperature and reduced corn seedling competition.

But that's not the only option. After a corn silage crop is removed, winter wheat or grasses could be interseeded into kura clover to provide a silage crop next year.

Further research needed

The other challenge facing many dairy producers is land availability for manure applications. Broadcasting manure on top of kura clover mulch would cause a surface buildup of phosphorus. Incorporation with a drag or similar tool would catch the clover's rhizomes, ripping them up, so coulters are needed to cut strips for manure. There have been no studies with strip knifing manure in the mulch system, but the technology is available.

Due to intensive management requirements and need for manure acreage, Hendrickson sees application limited to land with potential erosion problems.

"The cropping system is fairly management intensive, especially at establishment," Hendrickson said. "Herbicide application timing is critical. You're not going to plant the whole farm to it, but if you have some slope, using this protocol could expand corn silage opportunities. Everyone has a conservation plan. Everyone should map fields to determine the soil loss. If you have a field that is exceeding the uniform soil loss equation, that's a starting point."

Kura clover as a living mulch has not yet been categorized as a best management practice because it hasn't been out there long enough, so don't look for cost-sharing assistance.

Nutrient advantage

Another advantage of kura clover is the fact that, as a legume, it is capable of fixing nitrogen from the air. That could result in less supplemental nitrogen needed for an interseeded corn crop. For corn, which requires about 150 pounds of supplemental N, Sabalzaray suggests N applications to interseeded corn could be as low as 50 pounds by the year.

Although questions remain and management recommendations need to be fine-tuned, kura clover appears to have potential beyond intensive grazing systems.

"We're closer to adding kura clover to our tool box," said Hendrickson.

Kura clover establishment management steps

- 1) *Test soils.* Nutrient needs are similar to alfalfa or red clover.
- 2) *Perennial weeds should be controlled the year before sowing.* In the spring, prepare a seedbed similar to alfalfa or red clover.
- 3) *Spring and late summer are the best times for conventional sowing.* Early spring (April 15 to June 1) takes advantage of usually abundant moisture, but annual weed pressure can be severe. Late summer (July 15 to August 15) sowing is riskier, but competition from annual grass and broadleaf weeds is reduced.
- 4) *Sow shallow,* with ideal depth 1/4 to 1/2 inch. Cultipacker seeders or drills with presswheels can be adjusted for proper sowing depth and packing to ensure good seed-soil contact.
- 5) *The strains of rhizobia that work with kura clover are not naturally found in Midwest soils.* They must be applied to the seed before sowing. Recommendations call for applying rhizobia to the seed on the day of seeding, because evidence exists that strains of rhizobia specific for kura clover are not as robust as other rhizobia and do not survive long after application to the seed.
- 6) *Herbicide labels must be read and interpreted carefully* to ensure that a given herbicide can legally be used on kura clover. In most cases, control of annual weeds after emergence can be accomplished by strategic grazing or clipping several times during the summer.