UW-Madison College of Agricultural and Life Sciences
Center for Integrated Agricultural Systems

# Research Brief #59

# Holstein steers show good gains on kura clover

Is kura clover a good legume choice in rotationally grazed pastures? A study conducted at the UW Lancaster Agricultural Research Station says yes, with excellent beef production on kura clover/grass pastures. Kura's persistence and leafy growth led to higher Holstein steer growth rates on kura/grass pastures than red clover/grass pastures.

"Both kura clover/grass and red clover/grass pastures provided excellent feed for the steers," notes Francisco Mourino, UW-Madison graduate student in Agronomy, "but the kura clover/grass pastures consistently led to greater beef production." Mourino worked with Ken Albrecht, also with the Agronomy Department, Dan Schaefer from Animal Sciences, and Arin Crooks, Assistant Station Superintendent, to evaluate the productivity of kura clover and red clover pastures when grazed by Holstein steers.

## The study

From 1998 to 2000, the researchers turned 192 Holstein steers on two kura clover/grass and two red clover/grass pastures. Each year beginning in late April, each of the four pastures was stocked with 16 steers, weighing 450 pounds each. Grass in the pasture was a mix of smooth bromegrass, orchardgrass, reed canarygrass, Kentucky bluegrass, tall fescue, and others. Each six-acre pasture was subdivided into six one-acre paddocks. Researchers moved the steers every three to four days, making a complete cycle in 21 to 24 days. Over the growing season, researchers removed some steers from both systems to match stocking rate to pasture availability, therefore maintaining a uniform grazing pressure for each type of pasture.

The researchers managed for maximum beef production per acre. They recorded steer liveweight every 28 days and sampled quality and quantity of forage throughout the season. The researchers clipped the pastures to remove grass stems after the initial spring flush, usually after the second grazing.

## Results

"In terms of animal performance, pasture productivity, and pasture quality, the kura clover/grass pastures outperformed the red clover/grass pastures in all three years," says Mourino. Seasonal beef production (pounds/acre) and average daily gain (pounds/day) averaged 911 and 2.66 for kura clover/grass versus 714 and 2.27 for red clover/grass pastures. (See the graph on page 2.) Stocking rate expressed as number of 600-pound steers per acre per day over the season was 2.3 for kura clover/grass pastures and 2.0 for red clover/grass pastures. This represents a 15 percent greater carrying capacity for the kura clover/grass pastures.

"The kura clover/grass pastures in this study provided dairy quality feed," says Albrecht. Season average crude protein ranged from 22 to 25 percent in these pastures, average digestibility was 85 percent, and neutral detergent fiber (NDF) ranged from 34 to 37 percent. Since NDF measures bulk, or fiber, lower percentages are more desirable. Forages with a high NDF cause animals to feel full and stop grazing sooner, leading to lower production.

Superior animal performance on mixed legume/grass pastures containing kura clover was associated with greater total forage yield and forage quality compared to red clover/grass pastures. "These results can largely be attributed to the fact that we were able to maintain 50 percent legume in our kura clover/grass pastures, leading to improved pasture and animal performance," states Albrecht. The red clover/grass pastures contained 30 percent legume at most, and had to be re-seeded at a rate of three to six pounds per acre every spring. The kura clover/grass pastures did not require any re-seeding.

## Kura persistence

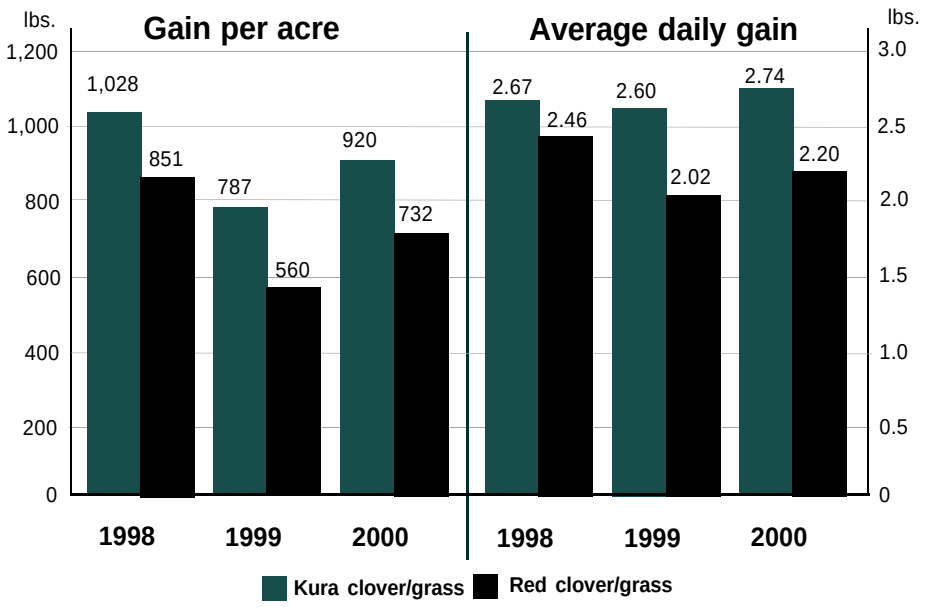
What makes kura clover so persistent, especially compared to red clover? Kura clover has a massive rhizome (underground stem) system. When the

*Professor Ken Albrecht holds a kura clover plant, showing the massive rhizomes that make this plant so persistent. Photo courtesy Wolfgang Hoffman, UW-Madison Life Sciences Communication.*

plant is damaged by livestock, machinery, or freezing, numerous underground buds sprout new growth. An example of its persistence: plots of kura clover at the UW Arlington Agricultural Research Station have survived for 12 years (and counting), including the harsh winter of 1991-1992 that caused extensive damage to alfalfa.

Kura clover's soil fertility and pH requirements are similar to those of red clover, so it is useful for areas not suited to alfalfa.

Growth of Holstein steers on kura clover/grass and red clover/grass pastures, 1998-2000




Because kura clover is a leafy plant, it provides high quality feed with protein concentrations between 22 and 25 percent and NDF concentrations between 25 and 35 percent. Combinations of kura clover and grasses, which are generally lower forage quality, typically contain fiber and protein concentrations similar to first flower alfalfa.

## Managing kura clover pastures

Graziers using kura rather than red clover in their pastures need to be aware of the different management it requires.

• **Establishment:** "While someone with experience managing kura clover may have success with frost-seeding, that technique will be much more risky than it is with red clover," says Albrecht. He suggests grazing, clipping, or using herbicides compatible with legumes to control competition from grasses and weeds when establishing kura clover. The low growing kura can quickly become overwhelmed by taller plants that rob it of the light it needs to make a good start. In addition, he suggests making sure that the kura clover seed is inoculated with the correct rhizobia.

The researchers report one success and one failure in establishing kura clover into existing grass pastures that were suppressed with Paraquat. The failure occurred in 1995 when an extended dry period followed no-till sowing of kura clover into a suppressed smooth bromegrass pasture. The grass recovered and kura clover seedlings were deprived of moisture. The success was in the same pasture in 1996 when normal rainfall occurred after no-till sowing the kura clover.

• **Bloat:** Increasing legume content usually means increasing the risk of bloat. Three of the 192 total steers (1.5 percent) died from bloat on the kura clover/grass pastures, one during each year of the study. A bloat-preventing feed additive, Bloat Guard, subsequently added to the mineral supplement was effective in preventing additional cases of bloat. Kura clover pastures require careful animal management to avoid bloat, just like any pasture with a high percentage of any legume.

• **Managing for grass:** Typically, graziers manage their pastures to maximize legume persistence. With kura clover, graziers may find themselves needing to manage for grass persistence. The bromegrass present at the beginning of the steer study was not aggressive enough to maintain itself in combination with kura clover. Reed canarygrass, orchardgrass, and tall fescue moved in to take the place of the bromegrass in the kura pastures.

The researchers wish to thank the UW-Madison Center for Integrated Agricultural Systems and Regional Research Project NC-157 for supporting this project.

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