

# Colby study looks at wheat cropping systems

Farmers in semiarid western Kansas have known since the Dust Bowl days of the 1930s that incorporating a fallow period into wheat cropping systems is beneficial for wheat productivity. But a Kansas State University study also indicates that continuous cropping increases the percentage of precipitation that can be used by the crop.

In the first stage of an ongoing study, Kansas State research crop scientist Rob Aiken found evidence that fallow helps "drought-proof" the farms in western Kansas. He also found that increasing crop intensity by going to continuous cropping, the amount of precipitation available for crop production was increased, but less grain was produced. "The wheat-fallow system accumulates water over a two-year period, producing a single wheat crop," said Aiken, who is based at Kansas State's

Northwest Research-Extension Center in Colby. "Farmers really picked up on this in the 'Dirty 30s.' It's a long-standing cropping practice for good reason."

Tillage provides weed control but often leaves soil exposed, which can promote evaporation and erosion. Frequently, 80 percent or more precipitation is lost to evaporation during a fallow period, he said.

"Will fallow, we're not very effective in storing water," he added. More intensive crop sequences use feed grains and oilseeds to reduce the fallow periods and increase crop access to precipitation.

"Our objective with the study was to compare water use, grain yield and biomass productivity for 10 cropping sequences, which all included winter wheat," Aiken said. Corn or grain sorghum feed grains were included in nine of the

crop sequences; six sequences were cropped continuously by including an oilseed crop - spring canola, soybean or sunflower.

"Our results in the first stage (2002-2007) showed that by increasing crop intensity, going from wheat-fallow to continuous cropping, we nearly doubled the amount of precipitation available for crop production," he said.

The difficulty, he said, is that despite increased precipitation crop water productivity dropped from 221 pounds per acre inch to 145 pounds per acre inch. So the message is to proceed with care with continuous cropping. Farmers use many different sequences besides wheat-fallow, which produces a crop every two years so is considered 50 percent crop intensity. Another is 67 percent crop intensity, which results in two crops every

three years, for example what-a-feed grain or oilseed-fallow.

"One of the objectives with this study is to look at 100 percent intensity," Aiken said, such as planting spring canola, which comes out in mid-July, so does use as much water as soybean or sunflower, which is the most intense in terms of water use.

Cropping sequences included three-year cycles of wheat, feed grain (corn or grain sorghum), and oilseed (sunflower, soybean, canola) or fallow, as well as wheat-fallow (two-year cycle) and wheat-corn-sorghum-fallow (four-year cycle). Each phase of a sequence was present in each year in triplicate sets of plots.

Initial study results for the period 2002-2007, which included a three-year drought, indicated several trends:

- Land productivity varied with rainfall among years;
- Wheat productivity benefited from summer fallow;
- Grain sorghum productivity exceeded corn when limited by water;
- Continuous cropping increased the percentage of precipitation which could be used by a crop, but reduced overall land productivity; and
- Stand establishment, timing and amount of water limited oilseed productivity.

"Annualized productivity, averaged over all growing seasons, indicated that land productivity was greatest for the wheat-grain sorghum-fallow sequence and similar for the wheat-fallow sequence," Aiken said. "Land productivity for the wheat-corn-fallow sequence exceeded that of continuous crop-

ping with grain sorghum and either spring canola or soybean."

Kansas State agricultural economist, Dan O'Brien collaborated with Aiken on the study. They found that greatest net returns to land and management occurred with the wheat-grain sorghum-fallow and wheat-fallow sequences. Wheat-corn-fallow also gave positive net returns but economic returns were negative for other crop sequences.

"Considering the drought conditions in three of the initial seven years of the study, the threshold for economic harvest was always met for wheat after fallow, but was met only in 70 percent of the cases for wheat after oilseed (continuous cropping)," Aiken said.

More information about the first study and Aiken's other research is available online at [www.karc.org/p.aspx?tabid=80](http://www.karc.org/p.aspx?tabid=80).

## matters of record

### Municipal Court

These are cases decided by the Goodland Municipal Court:

**March 20:** Philip Ray Ramires, driving on suspended, cancelled or revoked license, fined \$341

**March 22:** Rory E. Strum, improper parking, fined \$105

**March 27:** Terry D. Carpenter, dog at large and no animal license, fined \$120

**March 28:** Francisco Jasper Me-

drano, battery - simple, fined \$260

Joseph J. Eli, dog at large, fined \$90

Joseph Patrick Fitzgibbons, battery - simple and disorderly conduct, diversion, \$460

Johnnie J. Howard, expired license or no drivers license, fined \$160

Stacie L. Smith, no animal license x2, dog at large and vicious animal x2, fined \$640

**March 30:** Brandy Lynn Gilbert, report, hit, unattended vehicle and inattentive driving, diversion, \$335

**April 4:** Jared Dowell, improper parking, fined \$105

Reynaldo Solorzano, improper backing, fined \$105

Jeffery A. Yates, speeding 11 mph over speed limit, fined \$111

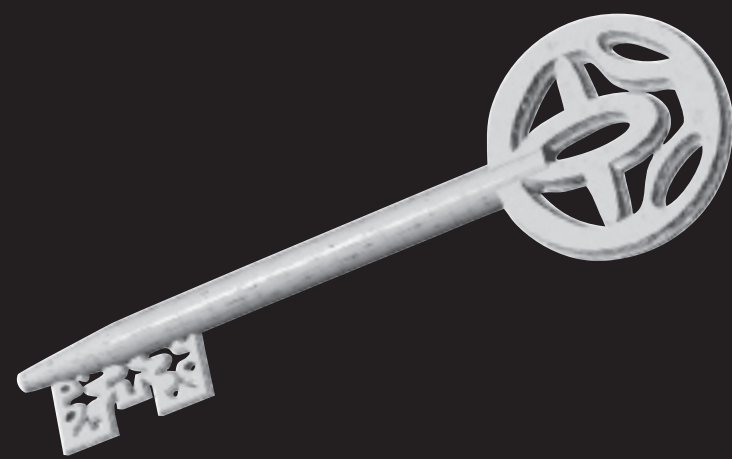
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