Forage Research Updates
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MINNESOTA - Adding Alfalfa Benefits Corn-Soybean Rotations
Jeff Coulter, University of Minnesota

There are many advantages to including forage legumes in the crop rotation. A primary advantage is the nitrogen (N) credits provided to subsequent grain crops. For example, when an alfalfa stand with ≥4 plants/ft² is terminated, N fertilizer rates can be reduced by 150 lb N/ac for first-year corn and by 75 lb N/ac for second-year corn.

Perennial forage legumes also disrupt the life-cycles of pests such as corn rootworm and weeds, thereby protecting against crop yield losses while reducing crop-protection input expenses. Forage legumes also enhance soil structure and tilth while reducing soil erosion and organic matter loss. Under dry conditions, however, deep-rooted forage legumes such as alfalfa can reduce the amount of subsoil moisture available for the following grain crop.

From 1992-2007 at the University of Minnesota South- west Research and Outreach Center near Lamberton, a 4-year oat/alfalfa-alfalfa-corn-soybean rotation was compared with a 2-year corn-soybean rotation within ‘zero-input’, organic, ‘low-input’, and ‘high-input’ crop-management systems. This trial was established at every stage in both rotations, so each crop was present every year.

Averaged across years, soybean yield was 7% higher with the 4-year rotation than the 2-year rotation, regardless of crop-management system. For corn, however, the yield advantage due to the 4-year rotation varied with management system and declined as the amount of agronomic inputs increased (Table). Corn yield within the 4-year rotation was greatest and similar under high-input, low-input, and organic-management systems; but greatest corn yield in the 2-year rotation occurred only with the high-input system.

Results demonstrate the potential to increase soybean and corn yields with a longer crop rotation that includes alfalfa, and that such rotations provide more options for reducing agronomic inputs without sacrificing corn yield.

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SOUTH DAKOTA - Forage Yield Potential of Annual Cool- and Warm-Season Crops
Thandiwe Nleya, John Rickertsen, and Bruce Swan, South Dakota State University-West River Agricultural Center

Perennial forages provide most of the livestock feed in western South Dakota. However, frequent droughts in recent years have resulted in feed shortages, driving a high demand for alternative forage sources. Annual crops can be of great value in year-round forage systems. They provide early grazing before perennials are available, extend the grazing season, and increase hay and silage production. This study assessed the forage yield potential and adaption of warm- and cool-season annual crops for western South Dakota.

Ten entries each of cool- and warm-season crops were evaluated in replicated trials near Ralph, SD (northwestern). Species and varieties are listed in Tables 1 and 2. Entries were planted in 6-row plots, 5’x30’, at recommended seeding rates. The cool-season trial was planted early April; the warm-season trial in early June. Cool-season crops were harvested once at each of four dates shown in Table 1. Warm-season crops were harvested once at each of five dates starting August 4 and weekly thereafter.