Soybean and Small Grains

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Intercropping Corn and Soybean to Increase Forage Protein Concentration

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Each year we receive questions regarding the potential to increase corn silage protein concentration by intercropping corn and soybean.

The accompanying table summarizes results of a corn/soybean intercropping study conducted in Massachusetts, which has a growing environment fairly similar to Wisconsin.

Monoculture corn was planted in 36-inch rows, to achieve final stands of about 28-30,000 plants/acre. Two narrow (12-inch) soybean rows replaced every third corn row in corn-corn-soybean and every other corn row in corn-soybean planting patterns. Soybeans were seeded to give a final stand of 160,000 plants/acre (about 6 plants per ft. of each double row).

Weeds were controlled chemically with alachlor (Lasso) and linuron (Lorox), applied reemergence, and dinoseb (no longer registered) , applied post-emergence. Nitrogen fertilizer was broadcast at 110 to 140 lbs/acre. Soybean cultivar maturity was matched to corn hybrid maturity, so that optimum maturity occurred for both when forage was harvested.

Intercropping increased forage protein concentration by 1-2 units, but reduced total forage yields by 5-10X, compared to monoculture corn for forage (See table) . Research with monocrop soybean conducted in Wisconsin found similar maximum soybean forage yields of 3.3 tons/acre with a crude protein of 19.2.

Total forage dry matter yields and yield contribution of corn and soybean in carious cropping patterns (Two-year average, Massachusetts).

	Forage DM Yield			
Planting patterns	Corn	Soybean	Total	Crude protein
	----------Tons/A ----------			%
Monoculture soybean	---	3.3	3.3	20.1
Monoculture corn	8.0	---	8.0	8.0
Corn-corn-soybean	6.9	0.8	7.7	9.2
Corn-soybean	5.8	1.4	7.2	10.1

There are several management concerns that growers should consider beforemixing corn and soybean grown for forage:

- Optimum planting date for corn is slightly earlier than that for soybean.
- Matching corn hybrids and soybean varieties, planted on the same date, so that both reach optimum maturity for forage harvest at the same time may be difficult. (Soybeans should be

at full bean pod, R7, and corn or near 1/2 to 3/4 kernel milkline stage to maximize forage yield and quality).

- Weed control may be difficult, unless weed species present can be controlled mechanically or with herbicides which are compatible with both crops.

Usually, the relatively small increase in protein concentration with corn/soybean intercropping will likely not offset the forage yield decrease compared to monocrop corn, especially given the management difficulties that may be encountered. An alternative way to increase forage protein content is to plant one-half the field to each crop and chop one row of each per round to mix while chopping. This would likely result in greater increases in forage protein content that intercropping corn and soybean, but forage yields per acre for the field would be about 30% lower than for corn grown alone.

In most situations, protein levels in rations including corn silage could be increased more effectively by adding protein supplement using soybean meal or whole soybean at feeding time.

Reference

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