One Year of Alfalfa & Red Clover Can Supply N for a Corn Crop

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Crop rotations containing alfalfa and red clover are widely used to achieve healthy soils and to reduce reliance on nitrogen (N) fertilizer. Legumes are typically grown in 3- to 4-year rotations. However, farmers do occasionally grow legumes for a single year to fit within their crop rotations. A two-year legume-corn rotation experiment was established at Rosemount and Lamberton, MN, to investigate the effects of single-year legume stands on subsequent corn yields. Alfalfa and red clover were planted alone (solo-seeded with no weed control) or with a spring wheat companion crop in year 1, followed by corn in year 2. The spring wheat was harvested for grain (average yield 59 bu/ac) and the legumes were allowed to regrow following harvest. When solo-seeded, the legumes were harvested once for forage (average yield 1.5 tons/ac) and allowed to regrow. Regrowth in all treatments was plowed down in November.

At fall plowdown, N contained in alfalfa herbage and roots averaged 68 lbs N/ac, while N in herbage and roots of red clover averaged 82 lbs N/ac. For both alfalfa and red clover, harvesting fall regrowth for forage would have decreased the N contribution from the legumes (Table 1). Corn yield following alfalfa was similar whether solo-seeded or seeded with a wheat companion crop. Corn yield following solo-seeded red clover was greater than red clover with a wheat companion crop. Corn yields of legume treatments were similar to those of corn grown following wheat and fertilized with 150 lbs N/ac (163 bu/ac).

Table 1. Fall forage dry matter yield and N incorporated in herbage and roots of alfalfa and red clover, and corn grain yield the following year. All crops were produced in accordance with organic production techniques.

Legume	Companion Crop	Fall Forage Yield		Fall N Yield		Corn Yield[1]
		Herbage	Root	Herbage	Root	
		DM (lbs/ac)		lbs N/ac		bu/ac
Alfalfa	Wheat	1070	1420	32	37	164
Alfalfa	Solo-seeded	1030	1380	31	35	160
Red Clover	Wheat	920	1440	28	37	152
Red Clover	Solo-seeded	1320	1950	40	50	163

[1]For comparison, corn grain yield following wheat and fertilized with 150 lbs N/ac was 163 bu/ac.

Red clover and alfalfa grown for a single year can supply adequate N to a subsequent corn crop. Farmers have considerable flexibility in producing either a small grain crop underseeded with alfalfa, or a single-year forage legume crop, all of which supply adequate N to the subsequent corn crop.