North Dakota - Ley Farming, Integrated Crops and Livestock in the Northern Great Plains

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Small plot experiments were conducted in Montana, North Dakota, South Dakota, and Wyoming, and a beef grazing study was conducted in North Dakota during two years of severe drought. Fall-seeded hairy vetch produced equal or greater forage yield than three other fall-seeded legumes (Austrian winter pea, woolypod vetch, and rigid medic) and three spring-seeded legumes (annual sweetclover, birdsfoot trefoil, and alfalfa), however, hairy vetch is a poor reseeder. Birdsfoot trefoil and rigid medic were expected to reseed naturally, but neither did so consistently. Drilling legume seed directly into small-grain stubble failed to enhance stand establishment and yield compared with broadcasting and lightly incorporating legume seed into a tilled seedbed.

In North Dakota, cattle preferred rigid medic to alfalfa, birdsfoot trefoil, and sweetclover; but neither rigid medic nor sweetclover persisted beyond the establishment year. Conversely, alfalfa and birdsfoot trefoil stands provided a second year of grazing. The two persisting legumes were rotated with spring wheat in a three year pasture-pasture-wheat sequence compared to a two year wheat-pea grain rotation (Table 1). Grain yield was greater in one of the three years when wheat followed pea versus pasture legume species. Preliminary analyses suggest economic advantages rotating wheat with legume pasture (ley farming) compared with a crop rotation where only grain is harvested (e.g., wheat-pea).

Table 1. *Wheat yields (lbs/ac) following pea, alfalfa pasture, or birdsfoot trefoil pasture at Dickinson, North Dakota*

Previous Crop	2004	2005	2006
Pea	2,150	2,550	2,180
Alfalfa Pasture	1,240	2,330	1,920
Birdsfoot Trefoil Pasture	1,640	2,210	1,420