Oat-Hairy Vetch Intercropping Demonstration (2018-2019) and Seeding Rate Evaluation (2019)

Project duration: May 2018 – September 2019
Objectives: To demonstrate the use of intercropping for grain, forage and soil nutrient management
Collaborators: Parkland Crop Diversification Foundation

Results

Demonstration (2018-2019)

The data presented here are for two years of demonstration: oat grain yield and oat-hairy vetch straw feed values (Year 1) and hairy vetch seed production (Year 2).

In 2018, establishment for the oat-hairy vetch intercrop was successful. Despite high oat yields, there was virtually no lodging in the oats, as the hairy vetch appeared to provide structural support. The intercrop was straight-combined. The hairy vetch plants had not produced over-abundant amounts of plant material, and as a result, the oat-hairy vetch straw passed through the combine without wrapping. The harvested grain was cleaned to remove green leaf material from the hairy vetch.

In 2019, regrowth of the hairy vetch plants began in mid-April, and flowered in late July. Harvest of the hairy vetch seed occurred on October 1. Table 1 shows yield for 2018-2019.

Table 1: Yields for 2018-2019 Oat-Hairy Vetch Intercrop Demonstration

Type (Year)	Yield
Oat grain (2018)	100.7 bu/ac
Oat-hairy vetch straw (2018)	Yield not recorded
Hairy vetch seed (2019)	692 lb/ac

Seeding Rate Evaluation (2019)

In 2019, PCDF established test plots to evaluate different seeding rates for intercropping of oat and hairy vetch. Table 2 shows the seeding rates for that test.

Table 2: Seeding Rates for 2019 Oat-Hairy Vetch Intercrop Evaluation

Treatment	Rate (lb/ac)
Oat only	45
Oat only	90
Oat-hairy vetch	90-30
Oat-hairy vetch	90-15
Oat-hairy vetch	90-5
Oat-hairy vetch	45-30
Oat-hairy vetch	45-15
Oat-hairy vetch	45-5
Hairy vetch only	30
Hairy vetch only	15
Hairy vetch only	5

Background

Seeding oats with hairy vetch has the potential to improve straw feed values, while not impairing oat grain yield. However, seeding and harvest date and seeding rate are important. If the hairy vetch seeding rate is too high, or if the hairy vetch is allowed to grow too much, harvest for oat grain can be difficult. Earlier seeding (mid- to late-May) provides the oats with a competitive advantage over the hairy vetch and allows the oats to mature sooner in fall. However, earlier seeding combined with a delayed harvest in fall may allow the hairy vetch plants to grow too much, causing serious issues with wrapping, catching on the combine header, and plugging. Using a header with vertical side knives may help to reduce harvest problems.

In 2019, earlier seeding and later harvest dates (as compared to 2018) gave the hairy vetch crop an additional 30 days of growth. Consequently, the hairy vetch for some of the higher seeding rates was extremely thick (see Figure 1). For this reason, harvest was discontinued for the plots and no grain yield was obtained.

Figure 1: Thick growth of hairy vetch in oats due to high seeding rate (30 lb/ac hairy vetch) and delayed harvest.

Among the rates tested in 2019 (Table 2), hairy vetch rates of 30 lb/ac created harvest problems. However, that rate did not create a problem in 2018, when the crop had less time to grow. Because hairy vetch seed can be costly (around $2/lb), lower rates that are seeded earlier and harvested later may reduce costs, while still contributing a meaningful amount of the hairy vetch in the straw. More work is needed to determine optimum planting and harvest dates, as well as seeding rates.

When present in adequate amounts, hairy vetch improves the feed value of oat straw. Table 2 shows the feed value for the oat-hairy vetch straw harvested in 2018, with comparisons for other forage types.

Table 2: Feed Value of Oat-Hairy Vetch Straw

Feed type	Crude Protein %	TDN %
Hairy vetch plus oat straw	13.33	59.94
Hairy vetch only (comparison)	27.33	69.74
Oat straw only (comparison)	5.44	48.21
First-cut alfalfa-grass (comparison)	13.12	57.57
Recommended requirements for 1400 lb cow, mid-3rd pregnancy	7.00	55.00

Assuming that the hairy vetch is able to over-winter (as in 2018), the crop can be used in several ways: 1) as an early-season forage crop; 2) as a green manure plow-down; and 3) for seed production. In 2019, PCDF harvested the hairy vetch from the demonstration plots for seed, producing 692 lb/ac. Growing hairy vetch for seed can reduce the costs of the system dramatically. The amount of seed harvested from one acre at PCDF is enough to plant 46 acres at 15 lb/ac.

A disadvantage to using hairy vetch is the high level of hard seed, which results in sporadic germination in subsequent years. Some reports show problems for ruminants fed hairy vetch seed (although some show that the risk is minimal). The crop is also resistant against glyphosate, which can cause problems for some rotations, especially for crops of similar seed size and shape (such as soybean).

Agronomic info

Soil Type: Erickson Loam Clay
Landscape: Rolling with trees to the west
Seedbed preparation: Cultivated and harrowed before oat-hairy vetch (2018); no prep in 2019.

Materials and Methods

Demonstration (2018-2019)
Seeding: Jun 12, 2018
Harvest 1: Sept 27, 2018 (oat grain)
Harvest 2: Oct 1, 2019 (hairy vetch seed)
Evaluation (2019)
Seeding: May 14, 2019
Harvest: Oct 10, 2019

Fertility

The oat-hairy vetch for both the demonstration and evaluation was planted with 10 lb/ac actual P and 2.11 lb/ac actual N. The hairy vetch was inoculated, and no N was added to the demonstration in 2019.

Table 3: Spring Soil Test

	Available	
	Demonstration (2018)	Evaluation (2019)
N	150 lb/ac	156 lb/ac
P	23 ppm	9 ppm
K	181 ppm	170 ppm