Intercropping: Wheat-Phacelia

Project duration: May 2020 – September 2020
Objectives: To evaluate intercropping potential for wheat and phacelia
Collaborators: PCDF

Background

Phacelia is a flowering broadleaf plant that may be included in cover crops mixtures as an outstanding pollinator species with moderate soil texture-building characteristics. Honey producers prize the crop for its long flowering period and light honey quality. Conversely, cereals crops such as wheat rely on wind for pollination, and do not provide good habitat for pollinators. Intercropping wheat and phacelia increases in-crop diversity, provides pollinator habitat in cereals crops (which are usually less attractive to pollinators), and can attract beneficial predators, such as wasps that predate wheat midge. This trial evaluates the potential for intercropping wheat and phacelia, and the effect of different rates of phacelia on wheat yield in particular. For a detailed summary of phacelia cultivation, see this USDA Plant Guide.

Figure 1: (top) wheat-phacelia intercrop; (bottom) phacelia blossoms with a pollinator.

Results

The wheat yield (bu/ac) for treatments is shown in Figure 2. The phacelia yield (lb/ac) for treatments is shown in Figure 3.

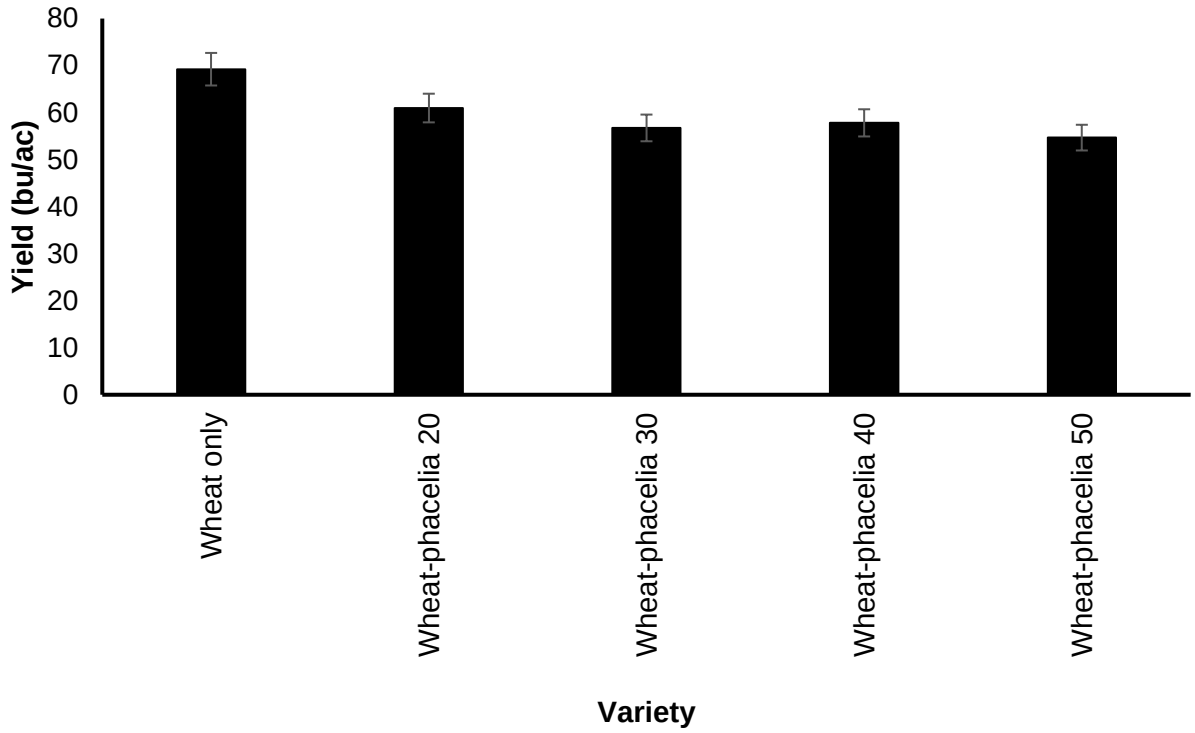

Figure 1: Wheat yield (bu/ac) by treatment.

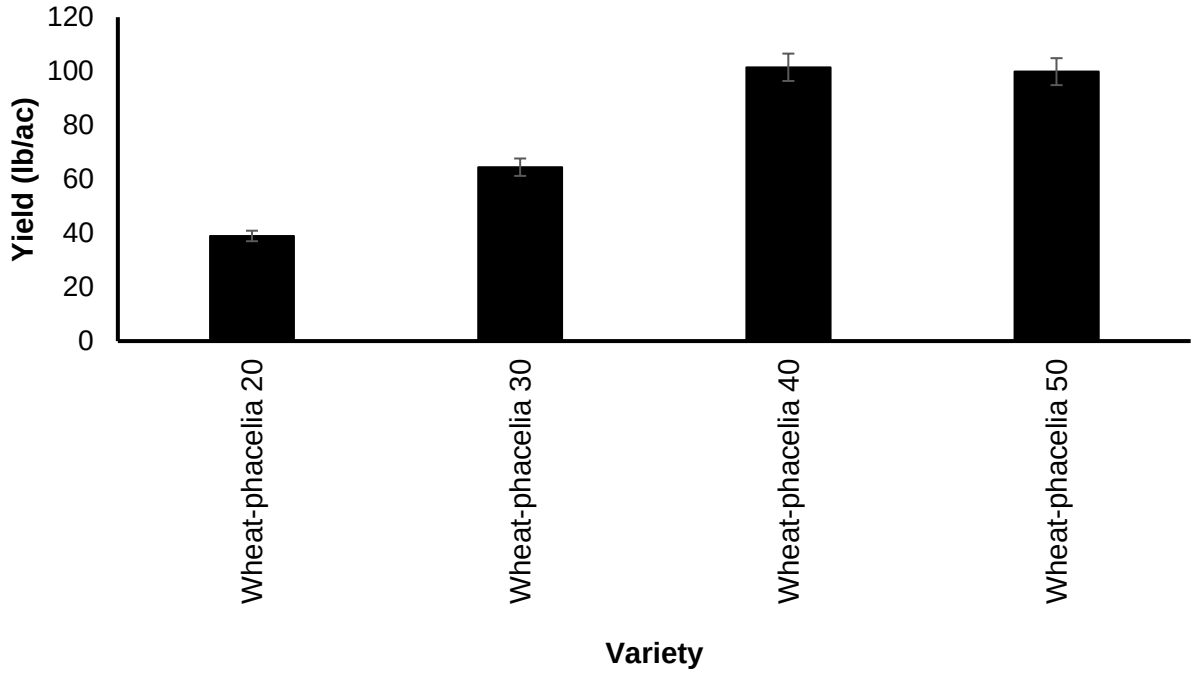

Figure 3: Phacelia yield (lb/ac) by treatment.

The results for wheat yield differ statistically by treatment (Table 1). Including phacelia treatment decreased the yield for wheat by up to 14.5 bu/ac (Treatment 5), likely due to increased water usage by the phacelia crop. Phacelia yield increased with seeding rate, but the reliability of those results is low due to a high percent CV for the phacelia yield.

Table 1: Summary of statistical information for wheat and lupin yield

Entry	Wheat yield (bu/ac)	Phacelia yield (lb/ac)	Statistical significance: Wheat*		Statistical significance: Phacelia*		
Wheat only	69.2	-	A				
Wheat-Lupin 20	61.0	38.9	A	B	A		
Wheat-Lupin 30	56.7	64.4		B		B	
Wheat-Lupin 40	57.8	101.4	A	B			C
Wheat-Lupin 50	54.7	99.8		B			C
CV (%)	12.6	36.4					
LSD (0.05)	37.0	11.3					

* Treatments not marked with the same letter are statistically different from other treatments.

There are no herbicides registered for phacelia, making intercropping with wheat a challenge. Good weed control prior to seeding is crucial. The trial was hand-weeded.

Materials and methods

Experimental Design: Random Complete Block Design
Wheat variety: AC Goodeve VB
Entries: 5
Seeding: May 22
Harvest: Sep 11
Treatments: 5

Table 2: Treatments

	Wheat	Phacelia
Treatment 1	90 lb/ac	-
Treatment 2	90 lb/ac	2 lb/ac
Treatment 3	90 lb/ac	3 lb/ac
Treatment 4	90 lb/ac	4 lb/ac
Treatment 5	90 lb/ac	5 lb/ac

Data collected Date Collected
Emergence: Wheat: May 23-26, Phacelia: May 26-30
Wheat Heading: Jul 5-7
Phacelia Flowering: Jul 11-18
Stand rating: Jul
Vigor Rating: Jul
Yield: Oct 30
Moisture: Oct 30

Agronomic info

Previous year's crop:	Barley Silage
Soil Type:	Erickson Loam Clay
Landscape:	Rolling with trees to the east
Seedbed preparation:	Heavy harrowed

Table 3: Fertility Information

	Available	Added	Type
N	61 lb/ac	128 lb/ac	46-0-0
P	47 ppm	10 lb/ac	11-52-0-0
K	393ppm		

No herbicide applied (hand weeded)