

Providing Ecosystem Services Utilizing Companion Crops with Sorghum

Four, fifteen acre plots of sorghum was planted with a companion cover crop mix as a demonstration/ education plot in July 2018. The companion crop mix was designed primarily to attract beneficial insects, but also to suppress weeds and access available soil nutrients in symbiosis with the sorghum. No-till on the Plains worked with four participating producers and a cover crop seed provider to determine the best species to meet the needs of the project objectives. The companion species/mixes were consistent at all of the sites



Project objectives

- Demonstrate appropriate companion crops can be viable alternatives to crop protection products
- Demonstrate which families of companion crops can benefit sorghum production
- Provide demonstration plots available for others to observe
- Document results of yield variance and economic differences between companion plots and non-companion fields along with soil health benefits ie: total carbon, infiltration, bulk density, penetration resistance, soil respiration and macro-invertebrate population counts



Emerging companion crop in Mitchel County. Below the same field in September.



- Sorghum planted at 45,000-60,000 seeds per acre
- Pre-residual herbicides were used prior to planting but nothing after planting on plots
- All plots had a cover crop planted ahead of the sorghum
- 3 of the 4 plots had companions planted in the same furrow as the sorghum, one had them between the rows
- All but 1 of the plots had nitrogen applied before planting starter fertilizer applied with the sorghum, no post fertilizer was applied
- No additional herbicides or insecticides were applied to the plots
- 3 of 4 farms required no additional crop protection application outside of plots. Mitchell Co. farm had one application of insecticide outside of plot at \$8 per acre.

The Companion Species

Buckwheat	4 lb
Mung bean	3 lb
Flax	3 lb
Phacellia	1 lb
Crimson Clover	2 lb
Guar	3.67 lb

Planted 15-16 lbs per acre
Cost \$17.50/acre

Emerging companion crops in Saline Co.



Results

Site	Yield Inside Plot (bu/ac)	Yield Outside Plot (bu/ac)
Ford County*	76	82
Mitchell County	121.9	121.2
Osage County**	23.4	24.3
Saline County	107	119

* Field and plot had hail damage on July 29, sorghum without hail damage yielded 110 bu/acre
 ** No moisture from plant date, June 1, until August



Emergence in June
 Ford Co., Osage Co., Mitchell Co.

Aggregate Stability		Reported as % Aggregates	
Site	Management	5-18-18	12-18-18
Ford County*	Companion Crop	2	2
	No Cover Crops	0	0
Mitchell County	Companion Crop	4.67	0
	No Cover Crops	4.67	0
Osage County**	Companion Crop	68.33	50.33
	No Cover Crops	68	56.33
Saline County	Companion Crop	26.33	9.33
	No Cover Crops	25.33	17.67



Growth in July
 Ford Co., Osage Co., Saline Co.

Soil Sample Results - Active Carbon			
Site	Management	5-18-18	12-18-18
Ford County*	Companion Crop	373	366
	No Cover Crops	340	302
Mitchell County	Companion Crop	558	520
	No Cover Crops	637	340
Osage County**	Companion Crop	519	603
	No Cover Crops	425	511
Saline County	Companion Crop	595	622
	No Cover Crops	588	332

Soil Sample Results - Total Carbon			
Site	Management	5-18-18	12-18-18
Ford County*	Companion Crop	1.25	1.71
	No Cover Crops	1.4	1.35
Mitchell County	Companion Crop	1.85	1.35
	No Cover Crops	1.85	1.85
Osage County**	Companion Crop	2.5	2.6
	No Cover Crops	2.35	1.75
Saline County	Companion Crop	2.3	1.6
	No Cover Crops	2	2.6



Growth in September.
 Ford, Osage, Mitchell, and Saline Co.

General Observations

- Pre-residual herbicides did have an impact on the survivability of the companion crops
- Phacellia and clover struggled to establish in most plots
- The mix was designed to attract beneficial insects, it did attract a good population of aphid predators
- The mix did have positive benefits on weed populations in some of the demonstration plots
- Companion mix did have benefit to soils