Intercropping Organic Peas and Oats for Forage

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Intercropping is the practice of growing two or more crops together at the same time in the same field. The idea is to find combinations of plants that complement each other or perform better than when planted alone. Intercropping can lead to increased yield and quality compared to mono-cropping. Two types of intercropping are to grow them for grain /seed harvest or to grow them for biomass/forage harvest. Grain harvest can be more challenging, particularly if seed separation is desired, compared to harvesting them together for forage. Other important considerations for intercropping include proper seeding rate/plant density for each component of the mix and variety selection to match maturity dates.

The CREC has trialed numerous pea/oat forage combinations over the years on conventional plot ground. This practice has proven to increase yield and quality of the harvested forage. These two plants grow well together and can complement each other in the production system. Agronomic benefits from this mix include the oats providing support for the pea with the pea providing nitrogen.

A field trial to examine organic intercropping of pea/oat forage was conducted this past growing season at the CREC. The trial objective was to examine pea types along with various seeding rate combinations of pea/oat intercrops in an organic environment. The trial evaluated two pea types, Banjo, a semi-leafless pea, and Protecta, a leafy type field pea. Both of these pea varieties were developed for bio-farming or organic agriculture. Jury was used for the oat variety in this trial. The trial also evaluated various seeding rates or plant densities of the intercrops. The sole rates and the 100% intercrop rates were set at 1,250,000 PLS/ac for the oats and 350,000 PLS for the peas. Table 1 lists the rates used for all of the treatments in PLS per acre along with the plants per square foot for each treatment.

Table 1. Seeding rates for sole and intercropped treatments.

Sole oats and oat 100% intercrop	= 1,250,000 PLS/ac or 28.7 PLS sqft
Sole peas and pea 100% intercrop	= 350,000 PLS/ac or 8.0 PLS sqft
Oat 75% intercrop	= 937,500 PLS/ac or 21.5 PLS sqft
Pea 75% intercrop	= 262,500 PLS/ac or 6.0 PLS sqft
Oat 50% intercrop	= 625,000 PLS/ac or 14.3 PLS sqft
Pea 50% intercrop	= 175,000 PLS/ac or 4.0 PLS sqft

The field trial was planted on May 3 on ground that was previously cropped to einkorn. Peas and oats were sown at the same time with a row spacing of 7”. Peas were inoculated with an OMRI-listed peat-based rhizobia inoculant prior to planting. Stand counts were taken on May 24 to determine plant densities of the seeding rates used. The trial was harvested on June 27 with the oats in the early milk stage and peas in the flat pod stage.

Results gathered show significant differences in forage yield amongst the treatments. Intercropping peas and oats increased forage yield compared to sole treatments of either peas or oats. Intercropped treatments at the highest seeding rates, 100 and 75%, significantly increased forage yield compared to the sole treatments of peas and oats. Protecta pea yielded significantly more than Banjo pea in the sole treatment and in the 50% intercrop treatment. Although the yield differences were not significant with other intercrop treatments, Protecta increased forage yield across all treatments compared to Banjo pea, demonstrating that differences exist between pea varieties. Yield data gathered also show that plant density is important for the performance of this intercrop combination. As plant density was increased, forage yield also increased, indicating that higher densities of the intercrop are needed to maximize forage production.

Oat-Pea Intercropping Forage **Carrington**

Forage Treatment	Oat Stand	Pea Stand	Days to Oat Head	Days to Pea Bloom	Oat Height	Pea Height	Harvest Moisture	Forage DM Yield
	sq ft	sq ft			inch	inch	%	ton/ac
Jury	26.4	.	53.8	.	32.4	.	74.3	1.43
Banjo	.	7.4	.	46.5	.	25.1	80.7	1.26
Protecta	.	8.5	.	45.5	.	30.8	82.0	1.55
Banjo/Jury 100%	25.0	6.8	53.5	47.8	32.8	19.7	77.4	1.74
Protecta/Jury 100%	23.4	8.3	53.5	46.0	33.4	23.0	77.6	1.85
Banjo/Jury 75%	18.6	5.7	53.8	47.5	33.5	19.7	76.4	1.73
Protecta/Jury 75%	18.9	6.0	53.0	45.5	34.9	20.9	77.9	1.72
Banjo/Jury 50%	11.2	3.3	54.8	47.5	31.3	20.7	77.2	1.33
Protecta/Jury 50%	13.0	4.6	54.8	45.5	32.1	21.6	78.3	1.56
Mean	19.5	6.3	53.9	46.5	32.9	22.7	78.0	1.57
C.V. (%)	11.4	14.7	0.9	1.8	6.4	11.2	1.2	9.2
LSD 0.05	3.3	1.4	0.7	1.2	3.1	3.7	1.3	0.21