Field Pea Variety Trial
2015 Results

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Interest in field peas in Maine stems from the need for viable rotation crops for organic grain production and from increasing demand for organic and non-GMO feed grains for dairy, chicken, and other livestock. Field peas can break small grain disease cycles, are grown with the same production equipment as small grains, and as legumes, fix all of the nitrogen required for the crop.

We conducted trials from 2013 to 2015 to assess the feasibility of organic field pea production in Maine. Because field peas are normally grown in more arid climates, there is concern that our humid conditions could exacerbate disease and lodging issues. In addition, field peas are thought to be less competitive with weeds, which under organic production practices could negatively impact yields and cause an increase in the weed seed bank. Results from 2013 and 2014 indicated that dry peas can be a viable crop in Maine. Overall yields were good to excellent, ranging from 2706 to 4426 lb/acre, and peas proved to be very competitive with weeds. For a complete summary of the 2013 and 2014 field pea trials, see http://umaine.edu/localwheat/research/.

In 2015, the University of Maine field pea trials was conducted in conjunction with a SARE Farmer/Rancher project conducted by Benedicta Grain Company in which they grew four of the same varieties each on 1.8 acres. Results from this SARE project, titled *Viability of Integrating Field Peas into Organic Cereal Grain Rotations in Maine* (project # FNE15-826), can be found on the SARE project report website, http://mysare.sare.org/search-projects/.

Table 1. Varieties, suppliers, and seed characteristics for the 2015 pea variety trial in Old Town and Presque Isle, ME.

Variety	Supplier (source)	Germination (%)	Number of seeds/pound
AC Agassiz	Meridian seeds	88	1953
DS Admiral	Pulse USA	98	1754
Jetset	Meridian seeds	92	1830
Nette	Pulse USA	97	1930
SW Midas	Pulse USA	94	2188

METHODS

Two variety trials were conducted at the University of Maine's Rogers Farm and Aroostook Farm located in Old Town and Presque Isle, respectively. Five varieties of determinate grain-type field peas (Table 1) were grown alone and in mixture with oats (var. Radisson, SeCan). All varieties grown were semi-leafless, yellow types. Grain-type field peas are usually grown as a monocrop, however there is interest among organic growers in growing field peas in mixture with cereals to help compete with weeds and reduce lodging.

Seeding rates for the monocrop and pea/oat mixtures were the same for each location (Table 2). Peas were seeded at 9 seeds per square foot in monocrop, and in mixture at 3 pea seeds and 14 oat seeds per square foot. In the pea/oat mixes, the pea seed made up 18% of the mix by seed count. Due to differences in seed weights (Table 1) the pounds per acre of seed used to achieve these densities were different among varieties (Table 2). The peas were inoculated with a pea/lentil inoculant prior to planting and no fertility was applied at either location. At both locations, plots were planted with an Almaco small plot cone seeder with a 6.5" row spacing and harvested with a Wintersteiger Classic small plot combine. Plot sizes were 6' by 15'.

University of Maine Rogers Farm – Old Town, ME – The previous crop was spring wheat and the soil type was Melrose fine sandy loam. The pH was 6.1 and background phosphorus and potassium levels were moderate and optimum respectively. The plots were chisel plowed on May 7, seedbed conditioned and planted on May 27, and harvested on August 28.

University of Maine Aroostook Farm – Presque Isle, ME – Conventional potatoes were grown the previous year and the soil type was Caribou gravely loam. The pH was 5.6 and the potassium and phosphorus levels were both optimum. The plots were chisel plowed on May 18, seedbed conditioned and planted on May 21, and harvested on September 2.

Table 2. Seeding rates of field pea grown alone and in mixture in 2015 in Old Town and Presque Isle, ME.

Pea Variety	Monocrop seeding rate (lbs/acre)	Mixture seeding rate (lbs/acre)		
	Pea	Pea	Oat	Mixture total
AC Agassiz	228	76	62	138
DS Admiral	228	76	62	138
Jetset	233	78	62	140
Nette	209	70	62	132
SW Midas	191	63	62	126

RESULTS AND DISCUSSION

Growing conditions were good at both sites throughout the season, however the pea plants in Presque Isle were less vigorous and appeared stunted as compared with plants in Old Town. The 5.6 pH of the soil at the Presque Isle site is on the low end of what is recommended for field peas and likely contributed to the relatively poorer growth at this site.

At both sites, the pea density in the mixture appeared to be too low. Pea seed in the mix made up 18% of the total seeds planted, however the actual pea seeding rate in the mix was only 3 seeds/square foot.

Research results from Maritime Canada suggest that peas should not exceed 20% of the total pea/cereal mix to minimize lodging, however the peas were planted at 5 seeds/square foot in their trials (OACC interim report E2006-11).

Disease

In Old Town, disease levels were lower in 2015 compared with 2014. Small patches of *Rhizoctonia* root rot were observed at podfill, but the incidence did not increase as the plants matured as occurred in 2014. White mold (*Sclerotinia*) was found at harvest but also was at much lower levels than in 2014. Diseases were not monitored at the Presque Isle site.

Weeds

Weed biomass was ranked visually at harvest for both locations (Table 3). In Old Town, weed control was good in both the monocrop pea and pea/oat mixtures despite high background levels of lambsquarters, wild mustard, and pigweed observed in plot edges and alleyways. In Presque Isle, weed populations were much higher in the crop. All plots had high levels of corn spurry, and in some plots wild radish, lambsquarter, and hemp-nettle were abundant.

Lodging

Lodging was ranked visually at harvest (Table 3). At the Old Town site, lodging in the monocrop peas was quite high and significantly higher than the pea/oat mixes. There was less lodging at the Presque Isle site, which may have been due in part to the stunted growth of the peas and higher weed biomass.

Table 3. Weed pressure and lodging rankings, test weight, and grain yield for field peas grown alone and in mixtures in Old Town and Presque Isle in 2015. Values that are underlined are the largest for that measure, and values that bolded are not statistically different from the underlined value.

	Weed Pressure†		Lodging ‡		Test Wt (lbs/bu)	
Variety	**Old Town**	**Presque Isle**	**Old Town**	**Presque Isle**	**Old Town**	**Presque Isle**
Monocrop						
Agassiz	1.0	4.0	**7.3**	3.7	62	63
DS Admiral	1.3	3.0	**8.8**	4.7	62	62
Jetset	3.0	5.7	**6.8**	2.7	63	63
SW Midas	3.5	4.3	**7.5**	5.3	62	63
Nette	3.5	6.3	**6.8**	7.3	63	64
Oats	2.0	6.0	1.0	1.0	-	-
Mixture						
Agassiz/oat	2.8	5.7	1.0	2.3	**63**	63
DS Admiral/oat	2.8	4.3	1.8	1.0	63	63
Jetset/oat	2.8	7.3	2.0	1.0	**64**	62
SW Midas/oat	3.5	6.0	1.0	2.7	**63**	60
Nette/oat	2.3	5.0	1.0	3.0	**63**	61
Site average	2.6	5.2	4.5	3.2	63	62
LSD (0.05)	NS	NS	2.8	NS	1.2	NS

† 1 = no low weed pressure, 9 = severe weed pressure

‡ 1 = no lodging, 9 = severe lodging

Yield

Yields averaged 4145 lb/acre in Old Town as compared with 3116 lb/acre in Presque Isle (Table 4). There were no significant differences among varieties and mixes in Old Town, in contrast to Presque Isle, where DS Admiral/oat yielded the most and monocropped Nette yielded the lowest.

Among the mixes, the yield of the pea component of the mix was highly variable but significant differences among varieties were hard to detect (Table 4). However, between the sites there was a marked difference in pea yield and percentage in the harvested mix. Peas comprised on average 33% of the harvest mixed grain in Old Town but only 11% in Presque Isle. Poor early pea growth at this site led to increased competition from the interseeded oats.

Table 4. Yield of pea component of the pea/oat mixes harvested in Old Town and Presque Isle in 2015.

	Old Town			Presque Isle		
Variety	Total Yield† (lbs/acre)	Pea yield in mixtures (lbs/acre)	Percentage of pea in mixture (%)	Total Yield (lbs/acre)	Pea yield in mixtures (lbs/acre)	Percentage of pea in mixture (%)
Monocrop						
Agassiz	4386	-	-	2235	-	-
DS Admiral	4096	-	-	2871	-	-
Jetset	4680	-	-	**3568**	-	-
SW Midas	4028	-	-	2063	-	-
Nette	4548	-	-	1689	-	-
Oats	3705	-	-	**3658**	-	-
Mixture						
Agassiz/oat	3765	1091	29	2770	263	9
DS Admiral/oat	4159	1642	39	**4011**	563	14
Jetset/oat	3688	1489	40	**3468**	531	15
SW Midas/oat	4024	1005	25	**3958**	413	10
Nette/oat	4514	1324	29	**3983**	276	7
Site average	4145	1310	33	3116	409	11
LSD (0.05)	NS	NS	-	1064	NS	-

† Yield at 13.5% moisture

DISCUSSION

Results from this third year of trials at the University of Maine further confirm that field pea is a viable rotation crop in organic cereal/pulse rotations if managed properly. Pea yields at the Old Town site were excellent and comparable to 2014. However, under low pH conditions and high weed pressure, peas yielded 25% less. Pea yields were lower when grown in mixture with oats, although overall grain yields were comparable to monocrop peas in Old Town and higher in Presque Isle. Oats are not as sensitive to pH and were able to compensate for the lower pea performance in Presque Isle. The percentage of peas by weight in the harvested mixes were fairly low, 33% in Old Town and 11% in Presque Isle, indicating that seeding rates of peas in the mix could be higher.

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