Evaluation of the different cultivars and seeding rates on pea crop yield.

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Methodology:

A trial evaluating plant populations across pea cultivars was established on the Ridgetown Campus Research Farm on a sandy loam soil (65.7% sand, 5.6% silt, 28.7% clay). The trial was established as a randomized complete block design with 4 replications. The plot size was 8 m x 3 m, and contained 12 rows spaced 18 cm apart. The plots were established on May 8th, 2023, using a Wintersteiger double cone plot seeder. There were two factors, cultivar and seeding rates, these factors were applied in combination to the experimental units. The four cultivars were Sherwood, Nitro, Tyne, and Rihanna.

Table 1. Seeding rate treatments for each cultivar.

	Seeding rate per acre			
Cultivars	1	2	3	4
Sherwood	550000	650000	750000	850000
Tyne	475000	550000	625000	700000
Nitro	620000	720000	820000	920000
Rihanna	620000	720000	820000	920000

Weeds were controlled by an application of Dual II Magnum (pre-plant), followed by post-emergent application of Assure and Basagram herbicides. The maturity of plots was assessed by comparing the tendrometer reading of the subsample to the target tenderometer value of 110. At harvest, 2.0 m x 8 rows (2.88 m^2) were harvested per plot and shelled through a stationary pea sheller. In addition to this, plant biomass and height from the harvested area were recorded. The final reported yield of the pea was adjusted to 110 tendrometer reading based on conversion factors reported by "Midwest Maturity Studies". Using 500 g threshed peas sample from each plot, the percentage distribution of pea seed was recorded by hand-sieving through the set of steel pea sieves. Analysis of variance for a randomized complete block design was conducted by using SAS software. Tukey-Kramer test was used to separate the treatments with significant differences.

Results: As pea populations increased, the pods per plant tended to decrease in the cultivars Tyne, Nitro and Rihanna (Table 3). Peas per pod tended to decrease in response to increasing plant populations in Sherwood and Nitro. Yields (adjusted) peaked at 850 000 seeds per acre for Sherwood, 625 000 seed per acre for Tyne, 920 000 seeds per acre for Nitro and 720 000 seeds per acre for Rihanna; however there were no significant yield differences within any cultivar at different planting populations (Table 3).

Table 2: Green pea sieve sizes.

Sieve size	**Diameter of circular opening in mm (inches)**	
	Will not pass through	Will pass through
1	-	7.1 (18/64)
2	7.1 (18/64)	7.9 (20/64)
3	7.9 (20/64)	8.7 (22/64)
4	8.7 (22/64)	9.5 (24/64)
5	9.5 (24/64)	10.3 (26/64)
6	10.3 (26/64)	11.1 (28/64)

Table 3. Effect of cultivar and seeding rates on plant biomass, height, number of pods per plant, peas per pods, and adjusted yield at Ridgetown, Ontario.

Treatments (Cultivars and seeding rates)	Plant biomass (kg)	Plant height (cm)	Pods per plant (#)	Peas per pods (#)	Yield (lb/ac)	Tendrometer readings	Yield adjustment factor	Adjusted yield (lb/ac)
Sherwood @ 550000 seeds/ac	6.05 d	25.5 c	5.0 bc	5.5 bc	4010.2 ef	95	1.24	4932.0 b
Sherwood @ 650000 seeds/ac	6.13 d	23.4 c	4.3 c	5.8 bc	4054.7 ef	93	1.31	5361.3 ab
Sherwood @ 750000 seeds/ac	7.13 bcd	24.3 c	5.0 bc	5.3 c	4696.1 bcdef	94	1.29	6016.0 ab
Sherwood @ 850000 seeds/ac	6.76 cd	25.9 c	5.5 abc	5.3 bc	4396.9 cdef	89	1.38	6106.3 ab
Tyne @ 475000 seeds/ac	8.94 abc	53.7 a	6.7 abc	6.6 abc	6157.9 ab	117	0.96	5891.9 ab
Tyne @ 550000 seeds/ac	9.65 ab	61.5 a	7.0 abc	6.5 abc	5789.9 abcd	114	0.99	5703.5 ab
Tyne @ 625000 seeds/ac	10.23 a	54.1 a	6.3 abc	7.5 a	6536.0 a	122	0.93	6043.4 ab
Tyne @ 7000000 seeds/ac	10.85 a	59.5 a	6.3 abc	7.0 ab	6257.1 ab	115	0.97	5996.2 ab
Nitro @ 620000 seeds/ac	8.78 abc	28.9 bc	7.8 abc	6.8 abc	5641.4 abcde	92	1.32	7430.7 a
Nitro @720000 seeds/ac	8.90 abc	30.5 bc	6.3 abc	6.5 abc	5676.6 abcde	101	1.14	6432.3 ab
Nitro @ 820000 seeds/ac	9.53 abc	29.3 bc	6.5 abc	6.3 abc	5134.4 abcdef	92	1.32	6672.8 ab
Nitro @ 920000 seeds/ac	9.43 abc	27.6 c	6.5 abc	5.5 bc	6061.0 abc	93	1.29	7764.1 a
Rihanna @ 620000 seeds/ac	7.40 bcd	56.8 a	9.8 a	6.3 abc	3702.4 f	86	1.49	5379.3 ab
Rihanna @720000 seeds/ac	8.85 abc	54.9 a	9.5 ab	6.5 abc	5004.7 abcdef	88	1.43	7073.7 ab
Rihanna @ 820000 seeds/ac	8.48 abcd	52.3 a	8.3 abc	6.5 abc	4875.8 abcdef	95	1.27	6140.5 ab
Rihanna @ 920000 seeds/ac	9.23 abc	45.4 ab	8.0 abc	6.3 abc	4314.1 def	89	1.40	5901.7 ab
Effects								
Cultivar x seeding	<0.0001	<0.0001	0.0021	0.0009	<0.0001			0.0104
[z]SE	0.6318	3.4483	0.8690	0.3489	378.81			495.88

[z]SE indicates standard error of means.

[a-f]In each column and for each effect, means followed by a different letter indicate statistically significant effect at $P<0.05$ per Tukey-Kramer adjustment.

The presented plant biomass in the table is from the randomly harvested area of 2.88m^2.

The days to harvest for Sherwood, Nitro, Tyne, and Rihanna were 52, 60, 67, and 65 respectively.

Table 4. Percent size distribution of peas from cultivar and seeding rate experiment at Ridgetown, Ontario.

Treatments	Sieve Size (size in mm which the pea will not pass through)						
(Cultivars and seeding rates)	>6	6 (10.31)	5 (9.52)	4 (8.72)	3 (7.93)	2 (7.14)	1 -
Sherwood @ 550000 seeds/ac	0.1	3.7	26.1	39.2	19.5	6.8	2.8
Sherwood @ 650000 seeds/ac	0.3	5.3	28.4	38.3	18.8	5.7	2.0
Sherwood @ 750000 seeds/ac	0.3	4.3	25.3	42.0	19.6	5.2	2.0
Sherwood @ 850000 seeds/ac	0.5	4.8	26.2	41.7	18.8	5.2	1.6
Tyne @ 475000 seeds/ac	1.8	10.2	37.2	32.0	11.5	3.6	2.3
Tyne @ 550000 seeds/ac	2.5	11.8	35.4	31.9	11.5	3.9	2.1
Tyne @ 625000 seeds/ac	1.6	10.5	35.9	33.3	11.1	3.6	2.7
Tyne @ 7000000 seeds/ac	1.5	9.5	38.1	32.4	11.2	3.9	2.2
Nitro @ 620000 seeds/ac	0.0	0.0	0.3	4.0	33.6	42.2	18.9
Nitro @720000 seeds/ac	0.0	0.0	0.0	3.2	32.1	42.4	20.9
Nitro @ 820000 seeds/ac	0.0	0.0	0.1	3.5	26.9	47.1	21.3
Nitro @ 920000 seeds/ac	0.0	0.0	0.2	2.7	30.9	44.1	20.9
Rihanna @ 620000 seeds/ac	0.0	0.0	0.0	0.2	6.9	39.5	52.3
Rihanna @720000 seeds/ac	0.0	0.0	0.0	0.3	6.7	40.6	51.3
Rihanna @ 820000 seeds/ac	0.0	0.2	0.2	0.2	5.6	41.2	51.4
Rihanna @ 920000 seeds/ac	0.0	0.0	0.0	0.2	5.5	39.1	53.8