

UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION

Department of Agronomy

Rate of Seeding for Peas

by

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Field pea variety test University Farm

Summary

Peas are an important crop in the farming system of northern Idaho.

Varying rates of seeding dependent upon size of seed are necessary for maximum yields of the various varieties.

Four to five plants per square foot produce the highest yield regardless of variety.

Six to seven seeds, weevil free and carefully graded, must be delivered per square foot to produce optimum stands.

Size of seed of individual varieties varies slightly in the different seasons.

A determination of the number of seeds per pound gives the most accurate index to rate of seeding.

Rate of Seeding for Peas

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Seed peas have been an important field crop in northern Idaho for many years. The usual rate of seeding recommended for the crop, regardless of variety, is eight pecks or approximately 120 pounds per acre. Farmers have seeded from 100 to 180 pounds per acre depending upon the prevailing practice in their community. The same rate is used for all varieties regardless of the size of seed of the variety grown.

Previous to 1923 a uniform drill set of eight pecks per acre was used in seeding the various pea varieties grown at University Farm, Moscow. At that time it was noticed that most garden varieties and none of the larger-seeded smooth varieties had ever been high in acre yield. Moreover, it seemed logical that some of these varieties should have inherited high-yielding ability as well as the smaller seeded ones.

Comparison of Delivery Rates

The variation in delivery rate of peas of different sizes for a Superior drill is given in Table I. These data show for each drill-set the number of seeds delivered per square foot and the number of pounds of seed required per acre. Seeding each of the three varieties shown in Table I at the recommended eight peck rate would deliver 12.6, 6.4, and 2.8 seeds to the square foot for the small-, medium-, and large-seeded variety respectively. There is little tillering in peas and the large-seeded variety planted with only 2.8 seeds per square foot has little chance of producing its maximum yield. Moreover, the small-seeded variety, planted at the rate of 12.6 seeds per square foot failed to produce high yields because of excessive plant competition.

¹ Agronomist and Field Superintendent, respectively.

IDAHO AGRICULTURAL EXPERIMENT STATION

TABLE I
Actual Delivery of Large-, Medium-, and Small-Seeded Varieties of Peas
VARIETY

Drill set at rate of	Bangalia (3,720 seeds per pound)		Bluebell (2,480 seeds per pound)		Canadian Beauty (1,336 seeds per pound)	
	Number seeds per sq. ft.	Number lbs. per acre	Number seeds per sq. ft.	Number lbs. per acre	Number seeds per sq. ft.	Number lbs. per acre
4 pecks	6.3	74.2	3.2	58.7	1.4	46.4
5 pecks	7.6	91.9	4.1	74.7	1.7	57.2
6 pecks	9.4	110.1	4.8	88.5	2.1	69.8
7 pecks	10.9	128.8	5.5	101.1	2.4	78.6
8 pecks	12.6	147.8	6.4	117.3	2.8	91.8
9 pecks	14.0	164.2	7.2	130.6	3.2	103.8
10 pecks	15.4	181.1	8.0	145.4	3.5	113.8
11 pecks	16.9	198.4	8.9	161.4	3.9	127.5
12 pecks	18.6	217.9	9.7	175.6	4.2	138.1

The ratio of the relationship among the sizes of seed of the varieties previously mentioned is shown in Table II, with Canadian Beauty used as the basis of comparison. The ratio between the number of seeds delivered per square foot is quite constant for the three sizes of seed at all drill sets. For example, at any given rate, 4½ seeds of Bangalia would be delivered to 1 of Canadian Beauty. Apparently some rate of seeding adjustment must be made so that the maximum yielding ability of the two varieties can be secured under field conditions.

TABLE II
The Ratio of Delivery of Large Seeds (Canadian Beauty) to Medium and Small Seeds
VARIETY

Drill set at rate of	Canadian Beauty (1,336 seeds per pound)		Bluebell (2,480 seeds per pound)		Bangalia (3,720 seeds per pound)	
	Number seeds per unit area	Number pounds per unit area	Number seeds per unit area	Number pounds per unit area	Number seeds per unit area	Number pounds per unit area
4 pecks	1	1	2.28	1.25	4.50	1.58
5 pecks	1	1	2.41	1.30	4.58	1.60
6 pecks	1	1	2.28	1.26	4.47	1.57
7 pecks	1	1	2.29	1.48	4.54	1.63
8 pecks	1	1	2.28	1.27	4.50	1.61
9 pecks	1	1	2.25	1.25	4.37	1.58
10 pecks	1	1	2.28	1.27	4.40	1.59
11 pecks	1	1	2.30	1.27	4.42	1.57

RATE OF SEEDING FOR PEAS

Drill Calibration

Actual drill calibration studies were begun in 1922. From these trials, rates of seeding were definitely established and in 1923 all of the pea varieties were seeded at a uniform number of seeds per unit area. In order to secure uniform stand, it was necessary to vary the rate of seeding from 4 to 16 pecks, depending upon the size of the seed of the various varieties. The rate of seeding in pounds per acre varied from 65 pounds for Bangalia to 202 pounds for Ne Plus Ultra, a garden variety. Six of the varieties in the pea variety test of 1917 were still under trial in 1930. Table III shows the effect of drill calibration upon the yield and rank of these varieties.

These data show that the average acre yields of White Canada and Kaiser changed but little during the two six-year periods. This can be accounted for by the fact that drill calibration scarcely changed their rate of seeding. Such varieties have medium- or average-sized seed and the drill set at the recommended rate seeded them at about the proper rate. However, the rank of Kaiser was changed materially. This was due to the fact that when seeded correctly some of the other varieties were better able to demonstrate their yielding ability and out-yielded it.

Bangalia increased its yield but lowered its rank. This is a small-seeded variety and undoubtedly was seeded too heavily. In fact, to secure the proper stand, its former rate of seeding was reduced nearly one-half.

Blue Prussian and Early Britain previously had been seeded at too low a rate. When properly seeded Early Britain increased its average yield over 500 pounds and ranked first. Blue Prussian increased its yield nearly 450 pounds and went from sixth to fourth in rank.

TABLE III
The Effect of Proper Rate of Seeding Upon the Yield and Rank of Field Pea Varieties, 1917 to 1928 inclusive

Variety	Average yield 1917 to 1922 inclusive at 8-peck seeding	Rank	Average yield 1923 to 1930 inclusive seeded with equal stands	Rank
Early Britain	1438	3	1799	1
White Canada	1515	1	1653	2
Bangalia	1370	4	1626	3
Blue Prussian	1256	6	1621	4
Potter	1299	5	1534	5
Kaiser	1493	2	1507	6

Proper Stands for Maximum Yields

If rates of seeding established by drill calibration are to be used successfully by the grower, the stand necessary for maximum yields of the various commercial varieties must be determined. Average yield data on more than thirty varieties indicated that the optimum stand was between four and five plants per square foot. Other data secured by seeding four selected varieties at various definite rates of seeding gave definite proof that the above mentioned stand produced maximum yields. The four year average results shown in Table IV for the Bluebell variety are typical of the information secured. The "net yields" represent the "total or gross yield" less the actual weight of seed planted per acre.

TABLE IV
Effect of Rate of Seeding Upon the Yield of Bluebell Peas

Drill set pecks	Number pounds seeded per acre	Seeds delivered per square foot	Plants per square foot	Per cent germina- tion	Four year average yield pounds per acre	
					Gross	Net
6	85	3.8	2.6	68.4	1578	1493
8	112	5.0	3.5	70.0	1710	1598
10	139	6.3	4.4	69.8	1800	1661
12	154	7.5	4.8	54.0	1728	1564
14	190	8.6	5.5	63.9	1710	1520
16	220	10.0	6.3	63.0	1686	1466

The four year average yields of the four selected varieties together with their drill sets are shown in Table V. These yields were secured in a manner similar to those for Bluebell shown in Table IV. In every case the rate of seeding producing between four and five plants per square foot gave the highest yields.

TABLE V
Drill Set and Its Relation to Yield of Peas

Drill set pecks	Varietal net yield in pounds per acre			
	Bluebell	Green Admiral	White Canada	Bangalia
4	—	1285	1465	1724
6	1493	1350*	1525*	1830*
8	1598	1282	1486	1831
10	1661*	1228	1374	1813
12	1564	1125	1357	—
14	1520	1040	1263	—
16	1466	—	—	—

* Drill set for maximum yield.

Rates of seeding for the more commonly grown commercial varieties of peas are shown in Table VI. The delivery rates shown will produce maximum yields of the dif-

RATE OF SEEDING FOR PEAS

ferent varieties, provided carefully cleaned and graded, weevil-free seed is used. In weedy land a slightly high rate should be used to assist the crop plants in combatting the pests.

TABLE VI
Number of Seeds per Pound Drill Set and Rate of Seeding for Maximum Yields of Pea Varieties Using a Superior Drill

Variety	Seeds per pound	Drill set	Pounds seeded
Bangalia	3404	6	105
White Canada	2972	6	100
Green Admiral	2988	6	95
Alaska	2400	8	120
Horsford	2384	8	120
Kaiser	2285	8	130
Bluebell	1972	10	140
America Wonder	1968	12	155
Solo	1750	13	170
White Marrowfat	1384	16	175
Perfection	2380	8	120

The number of seeds per pound, as shown for the varieties listed in Table VI, is an average of several seasons. Size of seed is a slightly variable factor within an individual variety depending upon the climatic conditions of the season when grown. Table VII was designed to definitely ascertain the rate of seeding necessary to secure maximum yields with any variety regardless of its variability of seed size.

TABLE VII
Pounds of Peas Necessary to Plant an Acre with Varying Numbers of Seed per pound

Number seeds per pound	Rate of seeding pounds per acre
1400	200
1500	185
1600	175
1700	165
1800	155
1900	150
2000	140
2100	135
2200	130
2300	125
2400	120
2500	115
2600	110
2700	105
2800	100
2900	95
3000	95
3100	90
3200	90
3300	85
3400	80
3500	80

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In order to determine the optimum rate of seeding for a given variety it is necessary only to determine the number of seeds per pound. A comparison of this number with those indicated in the above table shows the rate of seeding in pounds per acre. Moreover, the total pounds of seed necessary to plant any given acreage can be determined easily by multiplying the total acreage by the rate of seeding.