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Comparative Studies on Seed Production Capabilities of Some Pea Cultivars under Islamabad Conditions

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Abstract: Eight pea cultivars namely, lincoln, napolitano, piccolo, P. alberto, caravella, rondo, S. gennaro and climax were evaluated for their performance with regard to seed yield. Cultivar rondo produced the maximum number of pods (18.8), while caravella produced the minimum number of pods (8.8) per plant. The maximum 1000-seed weight was recorded in S. gennaro (319.0 g) followed by caravella (286.3 g), piccolo (274.3 g) and napolitano (271.7 g). The seed yield in various cultivars ranged from 1.43 to 1.91.

Key words: Flowering, pod setting, seed maturity, seed yield

Introduction

The field or garden pea (*Pisum sativum*) is a cool season, vegetable crop belonging to the leguminosae family. In Pakistan it is one of the leading and popular vegetables grown. It is cultivated in all the four provinces but Punjab is the leading province, which contributes 70.9 percent of total production (Anonymous, 1999). Seed of improved varieties can be used to boost production in any crop. Although varieties of a crop may exist elsewhere differences in climate, soil, flowering and other agronomic factors may affect their yield potential locally. Varieties may have to be tested for specific local growing conditions.

Ranalli *et al.* (1998) evaluated fifteen pea cultivars/lines for dry seed yield and reported average seed yield of 5.15, 4.68, 4.29 and 2.8 t ha⁻¹ at four different sites. They further reported that pea lines P27, P26 and P11 and the new cultivar perla showed environmental adaptability and yield stability. Ranalli *et al.* (1997) carried out studies to compare 15 new pea lines and five commercial cultivars sown in the autumn and spring for seed yield. They found lines P27, P26 and P33 and cultivar Renata to be promising giving seed yield of 7.2, 6.0 and 5.8 t ha⁻¹ respectively in autumn season while lines P16, P29 and P25 gave a better response with spring sowing (5.7, 5.2 and 4.1 t ha⁻¹, respectively).

Zubov *et al.* (1990) recorded seed yield of 3.9 t ha⁻¹ and 1000-seed weight ranging from 240 to 290 grams in pea cultivar Novokuiby shevskii. Ali (1989) reported that pea cultivar, maitland took 207 days for seed maturation and had 100-seed weight of 25 grams. Fomin and Pivovarova (1990) reported that 1000-seed weight in pea variety orfei ranged from 165 to 288 grams. Tsyganok (1990) revealed that in pea cultivar pervenets, 1000-seed weight ranged from 190-230 grams and period to attain seed maturity ranged from 48 to 57 days.

Limited research work has been conducted with regard to seed production capabilities of both the exotic as well local cultivars of peas in Pakistan. Therefore, the study was initiated. Such information might reveal areas in which selection could bring about further improvements in seed yield.

Materials and Methods

Eight pea cultivars namely, lincoln, napolitano, piccolo, P. alberto, caravella, rondo, S. gennaro and climax were evaluated for their performance with regard to seed yield at the National Agricultural Research Centre, Islamabad. The varieties were sown on 15th October, 1993 in randomized complete block design. The seeds of each variety were sown with plant to plant and row to row distance of 5 and 50 cm respectively.

Data for the following agronomical characteristics were recorded:

Number of days to flowering: The observations were recorded at the time when 50 percent of plants flowered in a plot.

Number of days to pod setting: The Observations were recorded when 50 percent pod setting completed.

Number of days for seed maturity: The observations were made when pods turned brown.

Number of pods per plant: Ten plants per bed were taken at random to count their pods.

Number of seeds per pod: It was recorded by counting the seeds of pods from randomly selected plants and average number of seeds per pod was calculated.

Seed yield per plant: Ten plants from each bed were selected at random and average yield per plant was recorded.

1000-seeds weight: It was recorded by weighing 1000 seeds from each variety.

Seed yield: The seed yield per plot was recorded and calculated on per hectare basis.

The data were analyzed by the analysis of variance and the test of significance was applied following Duncan's multiple range test (Steel and Torrie, 1980).

Results and Discussion

Data (Table 1) indicated that the cultivar napolitano took the maximum time of 80.7 days to flowering whereas cultivars P. alberto, S. gennaro and piccolo were early to flower taking 42.0, 42.3 and 47.3 days, respectively. The pod setting was earlier in those cultivars in which flowering occurred early. The cultivar napolitano took maximum time for pod setting (92.3 days), whereas minimum was recorded in S. gennaro (51.7 days). The difference in flowering and pod setting period may be attributed to genetic and climatic factors.

The early flowering cultivars were also quick maturing. The maximum time taken to seed maturity was by climax (151.3 days) whereas the cultivar P. alberto took 94.0 days only (Table 1). Difference between the earliest and the latest seed maturing cultivars was 57.3 days. Ali (1989) reported 207 days for seed maturation in cultivar maitland whereas Tsyganok (1990) reported seed maturity period ranging from 48-57 days in cultivar pervenets. This variation may also be due to the genetic and climatic factors. Number of pods per plant is very important factor and has an impact on yield. Cultivar rondo produced the maximum number of pods (18.8) while caravella produced the minimum number of pods (8.8) per plant (Table 1). The other cultivars

Hussain *et al.*: Seed production capabilities of pea cultivars

Table 1: Seed yield production capabilities of different cultivars of pea (*Pisum sativum*)

Cultivars	Days to flowering	Days to pod setting	Days to seed maturity	Pods per plant	Seed per plant	Seed yield per plant (g)	1000 seed weight (g)	Seed yield (t ha ⁻¹)
Lincoln	77.3ab	89.7a	150.7a	13.9	6.3a	14.3	191.0g	1.43
Napolitano	80.7a	92.3a	143.7ab	16.5	5.3ab	19.2	271.7c	1.91
Piccolo	47.3c	55.3b	94.3c	14.1	5.9a	15.1	274.3c	1.50
P. alberto	42.0c	52.7b	94.0c	13.6	5.9a	15.2	227.7e	1.51
Caravella	71.3b	87.0a	140.0ab	8.8	4.3b	16.7	286.3b	1.67
Rondo	78.0ab	86.7a	135.0b	18.8	4.9ab	17.4	247.7d	1.74
S. gennaro	42.3c	51.7b	95.0c	9.9	5.2ab	15.1	319.0a	1.51
Climax	75.0ab	89.3a	151.3a	14.0	5.3ab	15.5	217.3f	1.55

Means followed by different letters differ significantly at P < 0.01

produced from 9.9 to 16.5 pods per plant. As reported by Kamur *et al.* (1989), cultivar aparna produced 75 pods per plant. The variation in pod number in different cultivars may also be attributed to genetic and climatic factors.

Lincoln produced the maximum number of seeds per pod 6.3 followed by P. alberto (5.9) and piccolo (5.9), which were statistically at par with one another (Table 1). The minimum number of seeds per pod was recorded in the cultivar caravella (4.3). Kamur *et al.* (1989) recorded 5 seeds per pod in cultivar Aparana. The difference in seed number may be attributed to genetic make up of the cultivars. The data revealed that seed weight per plant ranged from 14.3 to 19.2 grams in different cultivars. However, the difference in values was statistically non-significant. Seed yield potential in peas varies from cultivar to cultivar as reported by Kamur *et al.* (1989) and Zubov *et al.* (1990).

The maximum 1000-seeds weight was recorded in S. gennaro (319.0 g) followed by caravella (286.3 g), piccolo (274.3 g) and napolitano (271.7 g). Present results are in agreement with the findings of Tsyganok (1990), Pivovarova (1990) and Zubov *et al.* (1990) who reported that 1000-seed weight varies from cultivar to cultivar. The seed yield in various cultivars ranged from 1.43 to 1.91, which was statistically non-significant. Seed yield potential in peas varies from cultivar to cultivar as reported by Kamur *et al.* (1989) and Zubov *et al.* (1990).

In conclusion, the cultivars napolitano and rondo seems to be promising in respect of pod yield per plant and seed yield (t ha⁻¹) and are recommended both for green pod and seed yield.

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