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Short communication

Impact of seed size on seed yield of *kabuli* chickpea (*Cicer arietinum* L.)

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ABSTRACT

A study was conducted during *Rabi* 2008-09 to evaluate the impact of seed size on seed yield of *kabuli* chickpea genotypes. Three groups of seed size *viz.*, group 1 (20-30 g), group 2 (30.1-40 g) and group 3 (>40 g) per 100-seed comprising of 18, 99 and 25 genotypes, respectively were used for this study. The estimates of different parameters of three different group of seed size showed that seed yield decreased with the increase in seed size. The correlation and regression coefficient was positive for the group 1 while negative for other two groups of large seed size which further confirmed this observation. It was also observed from the results that seed size up to 30 g/100-seed was useful to realize maximum seed yield.

Key words: Chickpea, Seed size, Seed yield

Chickpea (*Cicer arietinum* L.) is an important food legume crop grown in a wide range of environment comprising about 44 countries in the world (Muehlbauer and Tullu 1997). Chickpeas are classified based on seed size, shape and color such as *desi* with small, angular and coloured seeds, whereas *kabuli* with large, ram shaped and beige coloured seeds (Singh and Saxena 1999). Seed size is an important trait for trade and component of yield and adaptation in chickpea (Upadhaya *et al*. 2006). In *kabuli* chickpea, seed size is a premium trait and is preferred by consumers as it fetches higher price than small seeded *kabuli* types. There is paucity of information regarding the yield response of chickpea genotypes to varying seed sizes. It would be pertinent to know upto what extent seed size can be enhanced without compromising the seed yield. Consequently, present study was aimed at evaluating the impact of different seed size groups on seed yield in *kabuli* chickpea.

One hundred forty two genotypes of *kabuli* chickpea including recommended cultivars of the region were evaluated for their yield potential during the *Rabi* 2008-09 at PAU Research Farm, Ludhiana. The genotypes were sown in unreplicated trial of single row plot of 4 meter length with 40 cm row to row spacing. Recommended package of practices were followed to raise the crop. The seed yield and 100-seed weight of each genotypes were recorded. Three groups of seed size *viz.,* 20 to 30 g (group 1), 30.1 to 40 g (group 2) and more than 40.0 g (group 3) as per 100-seed weight were taken for the study. The group 1 was comprised of 18 genotypes, active 99 genotypes fell in group 2 and 25 genotypes group 3. Analyses of variance, Karl Pearson's correlation and multiple regression coefficients were estimated based on yield (kg/ha) of these three groups.

The analysis of variance of seed yield of the three different seed size groups showed significant differences (Table 1). It indicated existence of genetic variation for seed yield among the different seed size group. The estimates of different parameters of three different group of seed size are presented in Table 2. The seed yield ranged from 2048 to 3194 kg/ha in group 1, 664 to 3750 kg/ha in group 2 and 507 to 2656 kg/ha in group 3. The mean seed yield was highest (2438 kg/ha) for small seed size (group 1) and lowest (1122 kg/ha) for large seed size (group 3). It showed that seed yield decreased with the increase in seed size.

Table 1. Analysis of variance for different seed size groups of *kabuli* chickpea

Source	d. f.	M.S.	F-ratio	S/NS	C.D. (5%)	C.V. (%)
Treatment (Seed groups)	2	10057310	35.84	S		
Error	139	280610			118.57	28.58

Table 2. Estimates of different parameters for different seed size groups of *kabuli* chickpea

Parameter	Seed size groups *		
	Group 1	Group 2	Group 3
Number of genotypes	18	99	25
Yield range (kg/ha)	2048 –3194	664 - 3750	507 - 2656
Mean yield (kg/ha)	2438	1932	1122
Correlation	0.17	-0.23*	-0.41*
Regression coefficient	17.28	-61.4	-22.42
Standard deviation	283.3	569.1	495.5

*Significant at 1% level of significance
Group 1 = 20 - 30 g/100 seed weight
Group 2 = 30.1- 40 g/100 seed weight
Group 3 = > 40.0 g/100 seed weight

The correlation and regression coefficients further confirmed the above observations. The correlation coefficient was positive (r = 0.17) for the group 1 while significant and negative (r = -0.23* and -0.41*) for other two groups of large seed size, respectively. Waldia *et al.* (1988) also reported that

with the increase in seed size the seed yield was affected negatively.

However, Esser *et al.* (1991) found that highest values of yield and yield components were obtained from large size seed and reported the positive influence of seed size on yield and its components. Gan *et al.* (2003) postulated that seed size had no significant impact on plant growth, development and seed yield of large seeded crops such as chickpeas. However, Bicer (2009) reported that in chickpea, effect of seed size on yield and 100-seed weight was significant but seed size did not affect other yield components. Correlation between seed size, seed yield and 100-seed weight were positive but in case of lentil, they found non-significant effect of seed size on yield and yield components. Patel and Acharya (2011) found significant and positive correlation between 100-seed weight and seed yield in pigeonpea. These variations in the results of such experiments may be due to low heritability of yield and yield contributing traits as they are sensitive to environmental conditions.

Thus, in the present study, it is evident from the results that seed size up to 30 g/100-seed weight can be increased to maximum seed yield. Further, increase in seed size would lead to some compromises to be made with seed yield. However, within group 2 and group 3, some genotypes showed high seed yield as it is apparent from seed yield range of these groups. These high yielding genotypes can be crossed with the high yielding genotypes of group 1 and between them to obtain the transgressive segregants. It would help to break the negative linkage between seed size and seed yield.

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