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Soybean Genotypic Response in Abbottabad

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Abstract: Seven genotypes of soybean (*Glycine max* L.) were tested for days to 50% flowering, days to maturity, plant height, 50 grains weight and yield ha^{-1} at Abbottabad during kharif season 2000. All the genotypes showed significant differences for all the observed traits. Genotype Clark gave the maximum yield (3489.0 kg ha^{-1}) and 50 grains weight (20.0 grams). It had medium plant height (93.50 cm), 50% flowering (44.25 days) and maturity (95.50 days).

Key words: Soybean, varieties, genotypes

Introduction

Soybean (*Glycine max* L.) is an important oilseed crop that can grow successfully throughout the country. The domestic production of edible oil in the country is hardly meeting 30-40% of the total requirements. The present total requirement of edible oil is more than 2.0 million tones. The soybean seed contains 40-42% good quality proteins and 18-22% oil comprising 85% unsaturated fatty acid and is cholesterol free so, it is highly desirable in the human diet. (Aslam *et al*., 1995). Soybean yields 5 times more protein and 19 times more calories than beef (Khan, 1985). In NWFP, soybean was sown on an area of 926.20 hectares giving a total yield of 1140 tones during 1998-99 (Anonymous, 1998-99).

Soybean is under research for more than last twenty five years in Pakistan. But the major constraint to abridge the gap between consumption and production has been the genotypic identification for various agroecological zones. Zhan *et al*. (2000) identified three varieties as early maturing. Ablett *et al*. (2000) found that soybean variety RCAT Legacy has good yield potential, equaling or exceeding the yield levels of six recommended cultivars. Vieira and Mondani (1999) observed that different soybean cultivars differed significantly for plant height, crop yield and time taken for maturity. Chandrappa *et al*. (1999) found that variety KB-85 was the highest yielder. Zhong and Zhong (2000) reported that out of 10 soybean cultivars compared at Tibet, the most promising were Liaodou No.9, Ludou No.4 and Dongnong No.836. Taran *et al*. (1997) found that NARC-I, NARC-II and FS-85 yielded more than William-82. Ehsanullah and Hatam (1989) tested the performance of soybean cultivars in Peshawar and found significant differences in plant height. Thurlow and Johnson (1990) evaluated soybean varieties in Alabana for seed yield, plant height and maturity and found significant results.

This study was designed to identify the high yielding soybean genotype, best adapted in the agroclimatic conditions of Abbottabad.

Materials and Methods

The experiment was conducted during Kharif 2000 at Potato Research Centre, Abbottabad, Pakistan. Land preparation was done when soil was in water condition. Mixed fertilizer NPK @ 40-60-30 kg ha^{-1} was applied at the seed bed preparation stage. The pure seed of soybean genotypes namely Wahab 93, Kharif 93, Clark, Flare, Pharoah, Tritan and Monarch were obtained from Pakistan Oilseed Development Board, Agricultural Research Institute, Tarnab, Peshawar. Experiment was planted on 4th July in Randomized Complete Block Design with four replications. Each plot consisted of 5 rows; 5 meter long and 45 cm apart and having 5-7 cm intra plant spacing. All the agronomic practices were kept uniform. No insecticide or herbicide was used.

The data on the days to 50% flowering, days to maturity, plant height, 50 grains weight and seed yield was recorded. Crop was considered mature when 95% pods turned yellow. Seed yield was computed on kg ha^{-1} basis, harvesting central two rows. Days to 50% flowering and maturity were adjudged on expert basis, while plant height and 50 grains weight were obtained from 15 plants at random form each replication. The results were statistically analyzed using MSTAT-C computer software.

Results and Discussion

Days to 50% flowering: Days counted from date of sowing to 50% flowering of these genotypes showed significant differences. Overall, cultivar Monarch took maximum number of days (53.00) to bear flowers. It was also significantly different from all other varieties (Table 1). Cultivar Wahab-93 took maximum number of days (41.00) for 50% flowering and was significantly different from other varieties. The differences in flowering could be attributed to differences among various genotypes. The results are in accordance with Thurlow and Johnson (1990).

Days to maturity: Genotypic response to maturity duration was significantly different for various varieties. Variety Tritan took maximum number of days (115.8) for maturation, while variety Flare took minimum number of days (95.25) to maturity (Table 1). Similar results with other varieties have been reported by Thurlow and Johnson (1990).

Table 1: Average data of different soybean genotypes on days to 50% flowering, days to maturity, plant height (cm), 50-grains weight (gm) and yield ha^{-1} (kg)

Varieties	Days to 50% flowering	Days to maturity	Plant height (cm)	50 grains weight (gm)	Yield ha^{-1} (kg)
Wahab-93	41.00e	96.25d	91.05b	17.50b	1756.0c
Kharif-93	47.75c	101.30c	89.00b	16.45b	1222.0d
Clark	44.25d	95.50d	93.50ab	20.00a	3489.0a
Flare	43.25d	95.25d	87.50b	15.70bc	2600.0b
Pharoah	44.00d	99.50c	79.50b	14.45c	2478.0b
Tritan	50.50b	115.80a	92.50ab	15.80bc	1711.0cd
Monarch	53.00a	106.30b	107.00a	16.65b	1489.0cd
LSD 5%	1.815	1.943	14.60	1.644	531.8

Means followed by different letters in a column are significantly different from each other at $P < 0.05$.

Plant height (cm): The data for plant height (Table 1) revealed that variety Monarch was the tallest one (107.0 cm) and was significantly taller than all other varieties except Tritan. Variety Pharoah was most short statured (79.5 cm) and showed non significant differences with all other genotypes except Monarch. This shows that genetic potential Monarch for gaining height is higher than other genotypes. These results are in conformity with those obtained by Ehsanullah and Hatam (1989).

50 grains weight (gm): Data (Table 1) for 50 grains weight exhibited significant differences. It showed that genotype Clark had maximum 50 grains weight (20.0 gm), which was significantly higher than all other genotypes. Minimum 50 grains weight was recorded in variety Pharoah (14.45 gm), which was significantly lower than all other varieties except Flare and Tritan. Similar results have been reported by Zhang *et al*. (2000).

Yield per hectare (kg): The data (Table 1) analysis for yield ha^{-1} in respect of various genotypes tested revealed significant differences. Variety Clark scored the highest yield (3489.0 kg ha^{-1}), which was significantly higher that all other varieties. Minimum yield (1222.0 kg ha^{-1}) was observed in genotype Kharif-93 which showed significant difference with all other varieties except Tritan and Monarch (Table 1). These results are in accordance with those obtained by Thurlow and Johnson (1990), Tritan *et al*. (1997) and Ablett *et al*. (2000).

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