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Original Research Article

Effect of Seed Priming on Yield of Soybean [*Glycine max* (L.) Merrill.]

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A B S T R A C T

An investigation was carried out at experimental farm of Department of Agricultural Botany, College of Agriculture, Parbhani during *kharif* season of 2016 and entitled "Effect of seed priming on yield of soybean [*Glycine max* (L.) Merrill.]", different priming treatments are given before one day of sowing with seven treatments and three replication such as hydropriming, osmopriming, halopriming and control. Results indicated relatively higher mean performance of hydropriming for one hour in yield and yield contributing trades such as days to field emergence, number of pods per plant, seed yield per plant, seed yield per ha, test weight and harvest index.

Keywords

Soybean, Seed Priming, Seed Yield

Introduction

Soybean contributes significantly to the Indian edible oil pool. Presently soybean contributes 43% to the total oilseeds and 25% to the total oil production in the country.

Currently, India ranks 4th in respect to production of soybean in the world. It usually fetches higher income to the farmers owing to the huge export market for soybean de-oiled cake. Soybean (*Glycine max* L.) is the only major crop that has witnessed an impressive expansion in acreage and production at the global level. Major soybean growing states in India are Madhya Pradesh, Uttar Pradesh, Maharashtra, Gujarat, Rajasthan, Karnataka and Andhra Pradesh. Soybean was introduced in Maharashtra during the year 1985.

Soybean has proved to be an important crop among oilseed crops in the state but productivity of soybean continuous to be low than its potential. One of the critical factor for low productivity of soybean is low germination. Productivity of crop depends on high germination and better crop stand. Now days, there is much problem related to poor germination and crop establishment.

Seed priming is a tool to enhance the germination and retain high vigour. Several experiment has been conducted which shows advantage of seed priming. Seed priming is not a new technology and has been a recommended practice in many crops in India. But farmers do not appreciate the wide range of benefits from this low-cost, low-risk practice.

Materials and Methods

An investigation entitled "Effect of seed priming on yield of soybean [*Glycine max* (L.) Merrill.]" was carried out at experimental farm of Department of Agricultural Botany, College of Agriculture, Parbhani during *kharif* season of 2016. The experimental design was randomized block design with three replications and seven treatments such as T_1-Hydro priming for 30 minutes, T_2-Hydro priming for 1 hour, T_3-0.5% KNO_3 (Osmo priming for 30 min), T_4- 1% KNO_3 (Osmo priming for 1 hour), T_5- 0.1% NaCl (Halo priming for 30 min), T_6 -0.2% NaCl (Halo priming for 1 hour), T_7-Control.

All the treatments are given before one day of sowing. Days to field emergence were recorded for 70% field emergence of seedling from each treatment in three replications after sowing of seed by counting emerged seedling from total sown seeds. Number of pods per plant was recorded at the time of harvesting from five selected plants in each plot in each replication and average was worked out. Seed yield per plant were recorded from selected plants in each plot harvested separately.

The plants harvested from each plot were threshed and weight of clean produce was recorded in kilograms per plot and converted into quintals per hectare. Weight of the 1000 seed was recorded for test weight. Harvest index was recorded by the following formula.

$$\text{Harvest index (\%)} = \frac{\text{Seed yield (q ha}^{-1})}{\text{Total biological yield (q ha}^{-1})} \text{ X 100}$$

Biological yield (qt/ha) = Seed yield + Straw weight + Pod husk

Where, straw yield (qt/ha) = Stalks + leaves

Results and Discussion

All observations like, days to field emergence, number of pods per plant, seed yield per plant, seed yield per hectare, test weight, harvest index is presented in the Table 1. Seed priming treatment significantly affects days required for field emergence. The treatment T_2 - hydro priming for 1 hour recorded the least number of days for field emergence (4 days) as compare to control T_7 (6 days) followed by treatment T_4 - 1% KNO_3 for 1 hour (4.50 days).

This showed that seed priming treatment 4 and 6 likely to contribute for rapid field emergence. The present findings are in accordance with Eskandari *et al.,* (2011) in cowpea, Zarei *et al.,* (2011) in chick pea and Golezani *et al.,* (2014) in mung.

In case of number of pod per plant data ranged from 26.60 pods (T_7) to 40.13 pods (T_2) per plant. Treatment T_2 - hydro priming for 1 hour recorded highest number of pods per plant (40.13 pods) over rest of treatments and control. All the priming treatments have the significant difference in terms of seed yield per plant.

Seed yield per hectare was found significant. All the priming treatments have the significant difference in terms of seed yield per hectare. Treatment T_2 - hydro priming for 1 hour (28.50qt/ha) recorded highest seed yield per hectare over rest of treatments and control followed by treatment T_4 - 1% KNO_3 for 1 hour (27.91qt/ha) Lowest seed yield per ha was recorded by control (22.01qt/ha).

Test weight was also found to be significant. Treatment T_2 - hydro priming for 1 hour (136.13 g) recorded highest test weight over rest of treatments and control (126.07g).

Harvest index was shown significant when seed treated with treatment T_2 - hydro priming for 1 hour (47.53) recorded highest harvest index over rest of treatments and control (43.88) followed by treatment T_4 - 1% KNO_3 for 1 hour (46.56). Data ranged from 43.88 (T_7) to 47.53 (T_2) for harvest index. The results of number of pods per plant, seed yield per plant, seed yield per ha, test weight, harvest index are in accordance with Rao *et al.,* (1997) in soybean, Bastia *et al.,* (1999) in safflower, Zarei *et al.,* (2011) in chickpea, Mehri (2015) in soybean. The seed treatment with hydro priming for 1 hour was found significantly superior for yield and yield contributing traits.

Table.1 Effect of seed priming on days to field emergence, number of pods per plant, seed yield per plant (g), seed yield per ha(qt/ha), test weight, harvest index

Treatments	Days to field emergence	Number of pods per plant	Seed yield per plant (g)	Seed yield per ha (qt/ha)	Test weight (g)	Harvest Index
T_1 (Hydro priming for 30 minutes)	5.03	31.13	6.67	25.59	131.13	44.81
T_2 (Hydro priming for 1 hour)	4.00	40.13	7.00	28.50	136.13	47.53
T_3 (0.5% KNO_3 for 30 minutes)	5.27	30.13	6.61	24.54	131.20	44.61
T_4 (1% KNO_3 for 1 hour)	4.50	37.73	6.86	27.91	133.87	46.56
T_5 (0.1% NaCl for 30 minutes)	5.77	29.87	6.35	23.36	130.60	44.33
T_6 (0.2% NaCl for 1 hour)	4.73	35.20	6.69	26.40	132.77	45.20
T_7 (control)	6.00	26.60	6.30	22.01	126.07	43.88
SE (m) ±	**0.18**	**1.14**	**0.17**	**0.68**	**1.73**	
CD at 5%	**0.56**	**3.53**	**0.54**	**2.10**	**5.33**	

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