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Research Paper

Effect of seed invigouration treatments on yield and its attributes of soybean

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ABSTRACT

Present investigation was undertaken at the experimental farm of Department of Agricultural Botany, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola to study the influence of seed invigouration treatment on two different lots of soybean of variety JS-335 *viz.*, L_1 and L_2 (72% and 57% germination, respectively) with growth regulators and fungicide on yield and its attributes of soybean. Data revealed that 10 ppm IAA+NAA with 6 hrs hydration (T_1) significantly increased seed yield ha^{-1} and other yield attributes. Treatments T1 (IAA+NAA, 6 hrs hydration), T_2 (IAA+NAA+Thiram) and T_6 (GA_3 50 ppm+Thiram) recorded significantly higher number of pods/plant, number of seeds/pod, 100 seed weight and less no. of days for 50% flowering than control under study. Lot L_1 was superior to lot L_2 in respect of above attributes. In the present study all the seed invigouration treatments showed increased seed yield.

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Key words : Seed invigouration treatments, Yield and yield contributing parameters, Soybean

INTRODUCTION

Soybean [*Glycine max* (L.) Merril] is an important pulse as well as oilseed crop as it contains high quality protein (43.20%) and about 20% cholesterol free oil. It contains 21% carbohydrates, 0.69% phosphorus, 0.0115% iron, 0.024% calcium, vitamin A,B,C,D,E,K and all other essential amino acids (Singh and Saxena, 1986). Total area under soybean cultivation in Maharashtra is 24,400 ha and production is 27,078 tonnes of seed. In Vidarbha area under soybean was 6,431 ha with the production of 7,054 tonnes (Anonymous, 2006). The seeds of soybean, if invigourated before sowing with different growth regulators and chemicals shows better performance with respect to yield and its attributes. Seed invigouration treatments have the beneficial effects in increasing yield due to the stimulating effect of growth regulators on number of pods per plant, number of seeds per pod and 100 seed weight. Seed invigouration treatments also increases physiological efficiency and crop productivity. Hence, present study was undertaken to find out the effect of different growth regulators (10 ppm, 50 ppm) along with hydration on yield an its attributes in soybean.

MATERIALS AND METHODS

The field experiment was conducted at the experimental farm of Department of Agricultural Botany, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. This experiment was carried out in Factorial Randomised Block Design with three replications and seven treatments of soybean cultivar JS-335 with two different lots *viz.*,L_1 (72% germination) and L_2 (57% germination).

The details of treatment are given below.

T_0- untreated (control)

T_1- IAA+NAA (10 ppm, 6 hrs hydration)

T_2- IAA+NAA+Thiram

T_3- Hydration for 16 hours+Thiram (2g/kg) dry dressing after hydration

T_4- Hydration for 6 hours+Thiram dry dressing after hydration

T_5- GA_3 50 ppm *i.e.* hydration in GA_3 50 ppm for 6 hours.

T_6- GA_3 50 ppm+Thiram *i.e.* T_5+Thiram

The treatments were applied to each lot as per the treatment details given above. The seed was immersed in weighed quantity of growth regulators, which were firstly dissolved in small quantity of alcohol, then volume was made up with distilled water in order to get the desired

concentrations. Seeds were dried in drying machine and were immediately dry dressed with thiram.

Days to 50% flowering were recorded by counting number of days on which 50% plants from each plot were bloomed with fully opened flowers from sowing date. This observation was recorded in each plot. Number of pods plant^{-1} were counted at the time of harvesting by counting total no. of pods from each of five observational plants in the plot of each treatment. Mean number of pods plant^{-1} was worked out.

Number of seeds pod^{-1}, 100 seed weight and seed yield plot^{-1} were recorded after harvesting. The data was statistically analysed by standard statistical method for Factorial Randomised Block Design as suggested by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

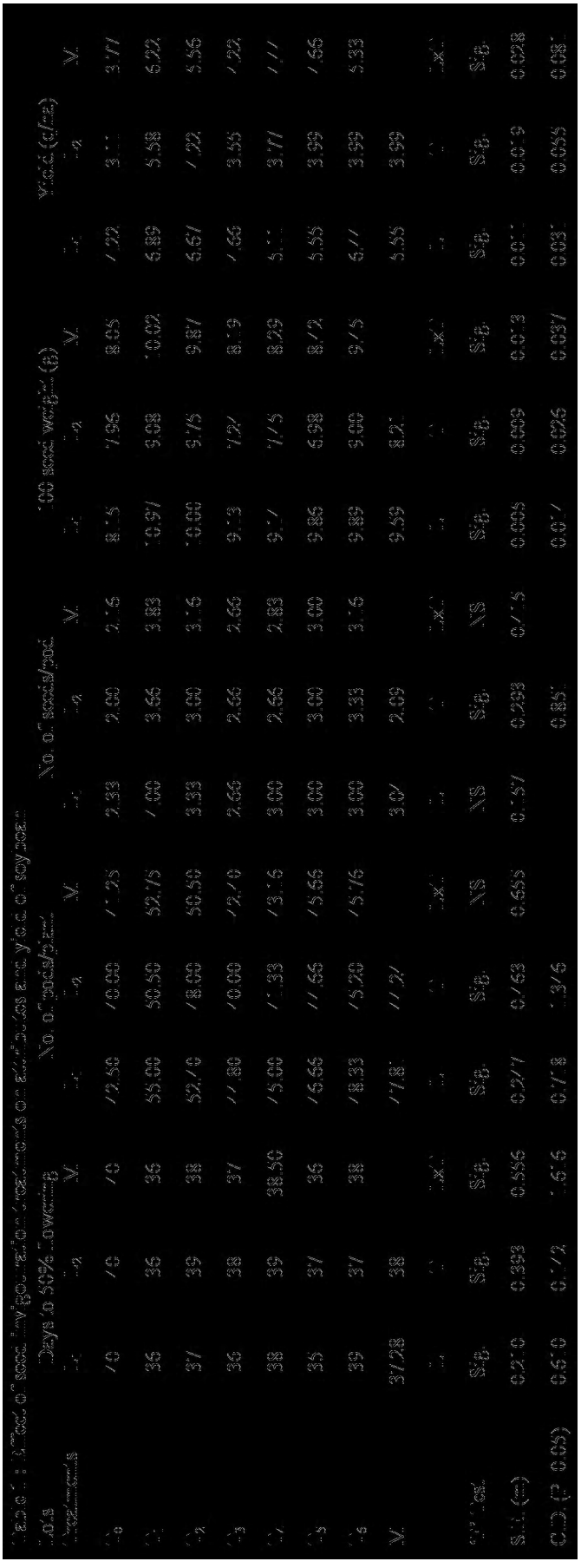
The results obtained from the present investigation as well as well as relevant discussion have been presented under following heads :

Days to 50% flowering :

The data presented in Table 1 revealed that the lots as well as treatments showed significant mean differences for days to 50% flowering. LxT interactions were also significant. Lot L_1 recorded significantly less number of days to 50% flowering than lot L_2. In respect of fortification, treatment T_1 and T_5 noted significantly less days to 50% flowering as compared to T_6, T_4 and T_0 while 50% flowering was delayed in T_3, T_2, T_6, T_4 and T_0 in order. Treatment T_3 and T_2 were at par. Similarly T_4, T_6 and T_2 were at par. L_1 T_5 noted minimum while L_1T_0 and L_2T_0 recorded maximum days. L_1T_0 and L_1T_6 interactions were at par while L_2T_0, L_2T_4 and L_2T_2 were also at par. Similar observations were reported by kwon and Guh (1987)

Number of pods plant^{-1}:

Significant influence of seed invigouration treatments was observed on number of pods per plant for lots and treatments (Table 1). Lot L_1 recorded maximum number of pods per plant (47.81) while minimum in lot L_2 (44.24%). Treatment T_1 and T_2 recorded significantly higher number of pods/plant over rest of the treatments. T5 and T_6 were at par but were significantly inferior to treatment T_2 and T_1. Similarly T_6, T_3 and T_4 were also at par. LxT interactions were non-significant. Similarly, Kwon and Guh (1987) also reported the superiority of invigouration treatment of seeds with IAA and water over control.



Number of seeds pod^{-1}:

Data on number of seeds/pod revealed non significant influence of seed lots on number of seeds/pod (Table 1). Number of seeds per pod in all treatments receiving invigouration were significantly higher than control (T_0). Maximum number of seeds/pod was noticed in T_1 (3.83) while minimum in control T_0 (2.16). The number of seeds/pod in T_2, T_6, T_5, T_4 and T_3 treatment were at par. LxT interactions were non-significant. Kwon and Guh (1987) also reported the similar results.

100 Seed weight (g):

100 seed weight showed significant mean difference amongst lots, invigouration treatment and interactions. Lot L_1 recorded significantly higher 100 seed weight (9.59 g) than lot L_2 (8.21 g) (Table 1). 100 seed weight in all treatment receiving invigouration were significantly higher than control T_0. Maximum 100 seed weight was noted in T_1 (10.02 g) while minimum in control (8.05 g). All seed invigouration treatments (T_1 and T_6) varied significantly among each other. Interaction means for 100 seed weight ranged from 10.97 g to 6.98 g. L_1T_1 and L_1T_2 recorded significantly higher test weight over rest of the interactions. L_1T_5 and L_1T_6 were at par but significantly inferior to L_1T_2 and L_1T_1. Similarly, L_1T_3 and L_1T_4 were also at par and were significantly superior to L_2T_1, L_2T_6, L_1T_0, L_2T_0, L_2T_4, L_2T_3 and L_2T_5. Kwon and Guh (1987) and Thombre *et al.* (1989) also reported similar results.

Seed yield (q ha^{-1}):

Data on seed yield plant^{-1} revealed significant influence of seed fortification treatments for lot as well as treatments. LxT interactions were also significant (Table 1). Lot L_1 recorded significantly higher yield (5.55 q/ha) than lot L_2 (3.99 q/ha). Yield in all treatments receiving invigouration was significantly higher than control (T0). Maximum yield was noted in T_1 (6.22 q/ha^{-1}) while minimum in control T_0 (3.77 q ha^{-1}). All treatments differed significantly among each other. Interactions L_1T_1, L_1T_2 and L_1T_6 recorded significantly higher yield over rest of the interaction combinations. L_2T_1 and L_1T_5 were at par but were significantly inferior to L_1T_1, L_1T_2 and L_1T_6, L_2T_5 and L_2T_6 were at par. Minimum yield was recorded in L_2T_0 (3.11 q ha^{-1}) while maximum in L_1T_1 (6.89 q ha^{-1}). Similar beneficial effects of seed invigouration on seed yield ha^{-1} were reported by chatterjee *et al.* (1985) and Gopal Singh (1995).

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