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 invigoration treatment on two different lots of soybean of variety JS-335 viz., L₁ (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 (T₁) significantly increased seed yield ha⁻¹ and other yield attributes. Treatments T₁ (IAA+NAA, 6 hrs hydration), T₃ (IAA+NAA+Thiram) and T₅ (GA₃, 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 L₁ was superior to lot L₂ in respect of above attributes. In the present study all the seed invigoration treatments showed increased seed yield.

Key words : Seed invigoration 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 invigoration 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 invigoration 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 and 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., L₁ (72% germination) and L₂ (57% germination).

The details of treatment are given below.

\(T₀ \) untreated (control)

\(T₁\) : IAA+NAA (10 ppm, 6 hrs hydration)

\(T₃\) : IAA+NAA+Thiram

\(T₅\) : Hydration for 16 hours+Thiram (2g/kg) dry dressing after hydration

\(T₆\) : Hydration for 6 hours+Thiram dry dressing after hydration

\(T₇\) : GA₃, 50 ppm \(i.e.\) hydration in GA₃, 50 ppm for 6 hours.

\(T₉\) : GA₃, 50 ppm+Thiram \(i.e.\) T₇+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 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$_4$ 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 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$_3$ and T$_4$. 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\(_3\), T\(_4\) and T\(_5\) 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\(_0\)) varied significantly among each other. Interaction means for 100 seed weight showed significant mean difference among each other. Interaction combinations. Lot L\(_1\), L\(_2\), L\(_3\), L\(_4\), L\(_5\) and L\(_6\) were at par. Minimum yield was recorded in L\(_2\)T\(_0\) (3.11 q ha\(^{-1}\)) while maximum in L\(_1\)T\(_1\) (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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