Research Paper E-ISSN NO : 2455-295X | VOLUME : 6 | ISSUE : 4 | APRIL 2020

EFFECT OF PHYTOHORMONES ON SEED GERMINATION OF ABRUS PRECATORIUS L (FABACEAE) AT GAYA REGION.

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ABSTRACT:

The present paper deals with Effect of Phytohormones on seed germination of Abrus precatorius L (Fabaceae).The seed has characteristic dormancy. The ecological factors often influence the germination and growth. The seeds were subjected to different phytohormones such as Indole Acetic Acid (IAA) and Gibberelic acid (GA) and effect on germination was examined at constant room temperature of 30±2°C. The effects of the hormones are promontory under low concentration of 1 and 5 ppm but higher concentration exhibited retarding effect for both scarified and uncertified seeds. Our result shows the identical behavior in many respects, differences do exists in the growth and performances in many respects and confirming differential adaptabilities and fit to be considered as distinct environmental sites.

KEYWORDS:

PHYTOHORMONES, INDOLE ACETIC ACID , GIBBERELIC ACID, ABRUS PRECATORIUS L.

INTRODUCTION

Gaya is one of the thirty-eight districts of Bihar state, India It was officially established on 3 October 1865. The district has a common boundary with the state of Jharkhand to the south. Gaya city is both the district headquarters and the second-largest city in Bihar. Fabaceaous plant Abrus precatorius L, commonly known as jequirity bean or rosary pea, is a herbaceous flowering plant in the bean family. It is a slender, perennial climber with long, pinnate-leafleted leaves that twines around trees, shrubs, and hedges. They possess special status in the organism environment continuum. They have to face the adversities of the environment. Unfavorable environments lead to the reduction in growth and productivity of the plant. For counteracting such effects, plants have to adapt themselves in condition prevailing therein. For any environmental factor there is a range under which performance of the plant can be optimum. Better chance of survival can only be achieved in plants with better capabilities of exploring the factors in such range .Many of the phenotypic characters are more corre3lated with certain edaphoclimatic condition. Therefore, there are certain phenotypes which are better than the other in a given environmental condition. Many of the earlier naturalists analyzed the characters of different plant populations in relation to such factors with the traditional approach. De Candolle[1] pioneered the studies in the variation in the species and populations in the light of newer technique of comparative experimental culture under specific climatic conditions. Darwin *et al.*,[2] realized the importance of variations and adaptations in natural selection. In recent time germination studies under the influence of different hormones has been given due attention for production of biomass with species and varieties under different environmental conditions[3-6].

Study of plant growth and performance in this respect is of practical use as it adds to our understandings of what combination of treatment will give the highest yield. Techniques of the growth analysis were initiated by workers including Blackman[7], Briggs *et al.*[8]. Further modifications were also done by Evans[9]. These studies led to the idea of comparative performances with respect to the growth rate and the habitat.

OBJECTIVE

The objective of the present investigation has been made to understand the Effect of Phytohormones on seed germination of *Abrus precatorius* L (Fabaceae). Of Gaya adjoining ie. Bodh Gaya and Barachatti.

STUDY AREA

In the present investigation, growth regulators Effect on germination of seeds of *Abrus precatorius* L (Fabiceae). Of Gaya adjoining area. Phytohormones on the germination of the seed and radicle growth pattern of seeds collected from the three different populations of Gaya and adjoining area such as Bodh Gaya and Barachatti.

METHEDOLOGY

The matured dried seeds of *Abrus precatorius* L was collected from the field of natural population grown in the different population of district Gaya. Due to the prevalence of the coat dormancy in the seeds the scarified seeds treated with Conc. H_2SO_4 for 30 min. (except for the treatment of scarification time) and thoroughly washed in the running tap water for one hour for ensuring maximum germination. Scarified and uncertified seeds of homogenous size were selected by hand picking and surface sterilized with 0.1 % $HgCl_2$ for 2 min. and then thoroughly washed with distilled water. Five replicate each with 25 seed were taken for each treatment. Seeds

were incubated at 30±2°C for all he treatments except where temperature optima under different constant temperature were to be worked out. For all the treatments the seeds with visible emergence of radicles were taken as germinated (Popay and Roberts[10]) and such seeds were scored every 24 hours till 240 hours after soaking. Initial time lag and time spread (in days) and mean germination percentage were calculated on the basis of mean of replicates. After 96 hours length of the radical was measured in mm and fresh weight of the radicles along with cotyledons (without seed coat was taken on semi automatic mono pan balance. Concentration of growth regulators (IAA, and GA) were prepared in the range of 1, 5,10,25, 50 and 100 ppm.

FOLLOWING TREATMENTS WERE EMPLOYED FOR GERMINATION:

a. **Scarification time**: for determining the optimal scarification time the germinability of seeds were tested after scarifying with Conc. H_2SO_4them for 5 - 60 min. at 5 min interval and then incubated at 30 ± 2°C. Unscarified seeds were taken as control.

b. **Constant temperature:** For finding out temperature optima the germinability of the seeds were tested at 15, 20, 25, 30, 35, 49, and 45° C by placing the replicates in incubators maintained at above said temperatures. Replicates placed at room temperature were taken as control.

c. **Growth analysis:** The following derived attributes considered useful for comparing the growth performance of the three populations were used in the present investigation (Evans[11]).

RELATIVE GROWTH RATE (RGR): RGR (mg/mg/week) = log e W_2- log e W_1/t_2-t_1; where W_1 and W_2 are dry weight at time t_1 and t_2 respectively and t_2-t_1 was 14 days in all treatments. Data were analyzed statistically for test of significance by the analysis of variance (Bailey[12]).

RESULTS AND DISCUSSION

EFFECT OF INDOLE ACETIC ACID:

Data obtained and processed in Table 1 indicate that the initial time lag of germination was 1 day in scarified seeds remained unchanged up to 25 ppm and then it further increased to two days at 50 and 100 ppm. It increased to 2 days at 50 and 100 ppm. There was a differential response among unscarified seeds, while Bodh Gaya and Barachatti ones showed an increasing trend in initial time lag of germination. Gaya seeds displayed a decreasing time lag under concentration up to 5ppm but beyond this it showed increasing trend. Percentage of germination was highest under control lots and highest. Under IAA presence there was a decreasing trend in germination percentage except Gaya seeds which showed increased germination percentage at 1 and 5 ppm. The radicle length and seedling fresh weight increased under lower concentration and higher concentration has shown retarding tends in both parameters. The largest radicle length of 85.14 mm was recorded in Gaya scarified seeds at 1 ppm and shortest radicle length (10.64 mm) in Barachatti unscarified seeds at 50 ppm.

EFFECT OF GIBBERELIC ACID:

The initial time lag of unscarified seeds displayed an increase under increased concentration so far percentage of germination is concerned. A scarified seed of Gaya population was recorded 99 per cent at 5 and 10 ppm. For Barachatti and Bodh Gaya it was maximum 93.45 per cent and 91.27 per cent respectively at 1 ppm.. the unscarified seeds of all the population displayed an increased germination at 1 ppm with overall lesser percentage than scarified seed except above seeds. . Enhancing effect of increasing concentration has retarding effect on radicle length. Maximum radical elongation was observed 110.52 mm in Gaya scarified seeds at 10 ppm. In unscarified seeds maximum radicle length was recorded 33.46 mm at 1 ppm. Seedling fresh weight also showed an increasing trend with Aurangabad seeds (107.81 mg) at 5 ppm and 63.26 mg at 1 ppm among the scarified and unscarified seed respectively.

Enhancing as well as inhibitory effects of IAA as observed here are in the line with those of Chauhan and Palwal[13]. Promontory effect on elongation of radicles and seedling fresh weight was evident inder 1 and 5 ppm concentration of IAA in all the populations. The effect of higher concentrations was inhibitory. The promontory, Kumar and Agarwal[14] as well as inhibitory, Mayer and Poljakoff-Mayber[15] was also reported on effect of IAA. GA delayed initial time lag with increasing concentration in unscarified seeds, while the scarified seeds remained unaffected. The percentage germination was enhanced under lower concentrations of GA, which corroborated with the findings of Sharma and Govil[6]. The application of growth stimulatory substances like GA may probably antagonistic the effect of growth inhibitory substances and intensify the germination mechanism, Kanti et al.,[17].Higher concentrations of GA have also been reported by Kanti Rekha et al.,[18].Gaya seeds (Scarified) tolerated the adverse effect of the Higher concentration of the hormone with 75.20% germination under 100 ppm. Radicle length and seedling fresh weight showed a promontory effect under increasing GA concentration as compared to control.

CONCLUSION

1. In population of Gaya and adjoining area shows the identical behavior in many respects, differences do exists in the growth.

2. The performances in many respects and confirming differential adaptabilities and fit to be considered as distinct environment sites.

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