ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 03, pp.47834-47836, March, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

EFFECT OF VARIOUS SEED TREATMENT ON SEED GERMINATION PARAMETERS IN WILD FIG (*Ficus palmate* L.)

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ARTICLE INFO

Article History:
Received 28th December, 2016
Received in revised form
24th January, 2017
Accepted 17th February, 2017
Published online 31st March, 2017

Key words:

Wild Fig,
Stratification,
GA_3.

ABSTRACT

The present study were undertaken in the Department of Horticulture, School of Agriculture and Allied Sciences, HNB Garhwal University (A Central University), Srinagar Garhwal, Uttarakhand during the year 2014 to study effect of various seed treatments on seed germination parameters in Wild Fig (*Ficus palmate* L.). In this experiment wild fig seeds are given stratification (7, 14 and 21 days at 4^0C) and then GA_3 (250, 500and 750 ppm) treatment to see their effect on breaking dormancy and promot6ing germination. The experiment design was completely randomized block with three replications. The study revealed that the seeds of Wild Fig (*Ficus palmate* L.) treated with T_1S_2 (7days stratification + 500 ppm GA_3) significantly affected germination percentage ,germination rate, height of seedling, fresh weight of seedling, dry weight of seedling and survival percentage of seedling. So it can be concluded that T_1S_2 (7days stratification + 500 ppm GA_3) had the best effect on breaking wild fig seed dormancy and improving of this plant germination and seedling growth.

Citation: Deepak Mewar, M.C. Nautiyal and Dinesh Chandra Naithani, 2017. "Effect of various seed treatment on seed germination parameters in wild fig (*ficus palmate l.*)", *International Journal of Current Research*, 9, (03), 47834-47836.

INTRODUCTION

Wild Fig (*Ficus palmate* L.) in India, locally known as Bedu, is an important plant of Moraceae family which is commonly found growing wild in the Himalayan region. These trees are occasionally found in the forests, but grow well around the villages, in wastelands, fields, etc. (Parmar and Kaushal, 1982). Wild fig is generally a deciduous tree which has alternate, broad, ovate leaves, greenish white and very small, unisexual flowers and deep violet to black syconoid fruit inside which numerous, round and very small seeds are found. In comparison with the cultivated figs, wild fig is same in taste and flavor but they differ in relation to size as they are rather small. Its whole fruit, along with the seeds can be eaten either in unripe stage by cooking as a vegetable or after ripening as fruit. When comes the matter of use Wild fig proves its usefulness again, as it is one of those top edible wild fruits which posses both nutritional and medicinal properties. Nutritionally its fruits contain ample amount of vitamin C and some mineral elements like phosphorus, potassium, calcium, magnesium and iron on the other hand medicinally fruit posses demulcent, emollient, laxative, poultice, gastrointestinal, hypoglycemic, anti-tumour, anti-ulcer, anti-diabetic, lipid lowering and antifungal properties and that's why used as an item of diet in the treatment of constipation and diseases of the lungs and bladder and various other diseases.

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Traditionally stem latex is applied to extract spines deeply lodged in the flesh. But due to negligence, improper knowledge and human activities this plant is depleting day by day. Seed is a crucial stage in any plant life cycle with respect to its survival and establishment of the next generation, as after germination the seedlings are mainly used as root-stocks and for obtaining hybrid plants (Hartmann *et al*., 2002). Wild fig plants are basically produced form seeds in nature, and thus contain many desirable characters like insect, pest, disease resistance as well as to survive in adverse environmental conditions. In current scenario scientists want to incorporate these characters in the cultivated plants, therefore seeds of wild fig are very much important. But seed germination is influenced by internal factors like seed coat, undeveloped embryo or chemical inhibitors (Agrawal and Dadlani, 1995) and thus induces seed dormancy. To overcome these problems various pretreatment are given for example, seed soaking in water (Cetinbas and Koyuncu, 2006), stratification, scarification (Absi, 2010), KNO3 (Furutani and Nagao, 1987) and the application of gibberellin (Cetinbas and Koyuncu, 2006). So keeping in view the above said facts a study was taken to investigate the effect of Gibberellic acid (GA3), Stratification and combination treatments (GA_3 + stratification) on germination of wild fig seeds.

MATERIALS AND METHODS

Seeds for this experiment were extracted by hand, washed, dried in the shade from ripe fruits of wild fig collected from the nearby areas of Department of Horticulture, School of

Agriculture and Allied Sciences, HNB Garhwal University (A Central University), Srinagar Garhwal, Uttarakhand. Whole experiment was carried out in the month of October, 2014 under Randomized Block Design with 16 treatment combinations of stratification and GA_3 and three replication having 20 seeds in each.

For stratification treatment seeds were placed in half sand filled petri dishes and then kept in refrigerator at 4^0C for different time intervals (7, 14 and 21days), similarly GA_3 treatment was done by soaking seeds in different concentration of GA_3 (250, 500 and 750 ppm) for 24 hr and at last for combination of stratification and GA_3 treatment seeds were first stratified after then soaked in different concentration of GA_3 for 24 hr.

Observations

Following different parameters were recorded during the experiment

- Germination percentage
- Germination rate
- Height of seedling
- Fresh weight of seedling
- Dry weight of seedling
- Survival percentage of seedling

RESULTS AND DISCUSSION

Data presented in table 1 regarding germination percentage and germination rate reveal that stratification+GA_3 treatments significantly improved germination percentage and germination rate in wild fig seeds as compared to all other treatments. Among the various treatments maximum germination percentage (93.333%) and germination rate (1.507) was observed in T_1 S_2 (7days stratification+ soaking in 500 ppm GA_3) whereas minimum germination percentage (48.333%) and germination rate (0.767) was recorded in T_0 S_0 (control). Reason behind such results of germination percentage and germination rate is GA_3 play an important role in stimulating seed germination via the synthesis of α-amylase enzyme, and other hydrolysis enzymes which cause hydrolysis of storage materials, including starch, and convert them to simple sugars that move to growing points (Rajabian, *et al*., 2007). Our results are in line with those of Caliskan, *et al*. (2012) who also obtained maximum germination percentage and germination rate percentage in fig seeds when he treated them with GA_3. Data regarding growth parameters (Table 1) shows that treatment of seeds with stratification and GA_3 significantly affected seedling growth parameters like seedling length, seedling fresh and dry weight in wild fig seeds. Seedling raised from stratification and GA_3 (7days stratification + 500 ppm GA_3) treated seeds were more taller (5.167 cm) and has maximum fresh (0.653 g) and dry weight (0.327 g) as compared with other treatments. Whereas seedlings raised from control treated seeds were more shorter (3.267 cm) and have minimum fresh (0.293 g) and dry weight (0.073 g). Such a result is in agreement with those reported by Amooaghaie (2009) on *Ferula ovina* seeds, and Fateh *et al*., (2012) on *Echinacea purpurea* seeds. Stratification breaks dormancy whereas Giberellic acid accelerates germination by inducing the production of hydrolytic enzymes (Mozer, 1980), cell plasticity Taylor and Cosgrove (1989) and activates the reserve food mobilizing system (Hartman and Kester 1990), thus affecting various parameters of seedling including growth parameters. So combination of stratification and GA_3 can be said the main cause of such results of growth parameters of wild fig in our study. Our results presented in Table 1 reveals that stratification and GA_3 treatment significantly affected survival percentage of wild fig seedlings. Maximum survival percentage (86.667%) was recorded in stratification and GA_3 (7day stratification + 500 ppm GA_3) treated wild fig seeds, on the other hand minimum (30.00%) was recorded at control (T_0S_0). These results are strengthened by findings of Bhan and Sharma (2011) on wild apricot seedlings. Stratification effectiveness on breaking seed dormancy and GA_3 on increasing germination as well as seedling growth is major cause behind such results regarding survival percentage in wild fig seedlings.

Table 1.

Treatment	Germination Percentage (%)	Germination rate	Height of seedling (cm)	Fresh weight of seedling (g)	Dry weight of seedling (g)	Survival percentage of seedling (%)
T_1S_1	83.333	1.407	4.867	0.613	0.307	80.00
T_1S_2	93.333	1.507	5.167	0.653	0.327	86.667
T_1S_3	91.667	1.493	4.967	0.633	0.317	83.333
T_1S_0	51.667	0.810	3.467	0.313	0.078	33.333
T_2S_1	68.333	1.230	4.267	0.473	0.236	53.333
T_2S_2	73.333	1.303	4.467	0.527	0.263	63.333
T_2 S_3	71.667	1.286	4.367	0.507	0.253	56.667
T_2 S_0	53.333	0.830	3.667	0.347	0.0867	36.667
T_3S_1	66.667	1.190	4.167	0.453	0.227	50.000
T_3 S_2	63.333	1.083	4.067	0.427	0.213	46.667
T_3 S_3	61.667	1.017	3.933	0.407	0.203	43.333
T_3 S_0	56.667	0.883	3.833	0.373	0.093	40.000
T_0S_1	81.667	1.383	4.567	0.547	0.273	66.667
T_0 S_2	88.333	1.463	4.766	0.593	0.297	73.333
T_0 S_3	86.667	1.447	4.667	0.5667	0.283	70.00
T_0 S_0	48.333	0.767	3.267	0.293	0.073	30.00
Mean	71.25	1.193	4.281	0.482	0.220	57.083
Sem	1.628	0.031	0.042	0.006	0.002	2.747
C.D. at 5%	4.702	0.089	0.122	0.018	0.008	7.934
Significance	**	**	**	**	**	**

*T1 (7 days stratification), T2 (14 days stratification), T3 (21 days stratification), T0 (control). S1 (soaking in 250 ppm GA3), S2 (soaking in 500 ppm GA3), S3 (soaking in 750 ppm GA3), S0 (control).

Conclusion

From the results of the present study it can be concluded that treatment of 7days stratification followed by soaking in 500 ppm GA_3 is best for breaking dormancy and promoting germination in wild fig seeds.

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