EFFECT OF PRE-SOWING TREATMENT ON THE GERMINATION OF GOLLA-BET (*DAEMONOROPS JENKENSIANA*) SEEDS

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ABSTRACT

Seed germination of golla-bet (*Daemonorops jenkensiana*) after pre-sowing treatment was studied. The seeds treated with HCL and H_2SO_4 separately showed 64-68% and 50-68% germination respectively irrespective of different concentration of acid. On removing only scally epicarp, germination of golla-bet increased to 51% without any acid treatment. The results indicate that acid scarification turn the hard seed coat into thin and papery resulting easy infiltration of water to accelerate possible enzyme activities in endosperm.

সারসংক্ষেপ

গোল্লা বেতের বীজ বপনের পূর্বে বিভিন্নভাবে ব্যবহার করে অংকুরোদগমের হার অধ্যয়ন করা হয়। বিভিন্ন ঘনত্বের হাইড্রোক্লোরিক এসিড এবং সালফিউরিক এসিড ব্যবহারে বীজের অংকুরোদগম যথাক্রমে ৬৪-৬৮% এবং ৫০-৬৮% পর্যন্ত পর্যবেক্ষণ করা হয়। এসিড ব্যবহার ছাড়া শুধু মাংশল খোলস ছাড়ায়ে গোল্লা বেত বীজের অংকুরোদগম ৫০% পর্যন্ত পাওয়া যায়। এই ফলাফল প্রতীয়মান করে যে, এসিড ব্যবহারে বীজের শক্ত আবরণ পাতলা হয়ে পানি সহজে অনুপ্রবেশ করে এবং অন্তত্বকে সম্ভাব্য এনজাইম ক্রিয়া তরান্বিত করে।

INTRODUCTION

Golla-bet (*Daemonorops jenkensiana* Griff. Mart.) is one of the valuable structural cane species for cane furniture industry of Bangladesh. Because of increasing demand and lack of proper management, the population of clump of this species is diminishing day by day. However, a large scale cultivation of this species with proper management may improve the situation. Since the clumps of golla-bet are very scanty, propagation through seeds may play a significant role in large scale cultivation. There is a considerable variation between cane species in respect to the germination period and percentage (Dransfield, 1974; Manokaran 1978; Alim and Kamaluddin 1985, Mohiuddin *et al.* 1986). The seed viability period after collection (Manokaran and Wong 1983; Mohiuddin *et al.* 1986) and the type of sowing condition (Mahiuddin and Rashid 1987, Rashid and Mohiuddin, 1988) may affect the germination percentage and period. Moreover, because of hard seed coat of cane seed in association with possible seed dormancy, most species of cane require longer period to germinate. Mori *et al.* (1980) reported that the seeds of *Calamus manan* with fleshy sarcotesta including the hard seed coat showed no germination in three months. The seeds treated with acids like hydrochloric (*Ananthapadmanabha et al.* 1988), gibberellic (Nagaveni and Srimathi, 1981) enhance germination.

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The present study was conducted on pre-germination treatment of golla-bet seeds to enhance germination both in respect of the period and percentage in order to aid a large scale cultivation of this species.

MATERIALS AND METHODS

The ripened fruits of golla-bet were collected from the cane arboratum of the Bangladesh Forest Research Institute, Chittagong in July. The fruits were divided into two lots for using in two separate experiments. These were used in all experiments within 15 days of collection.

In one experiment, scally epicarp and fleshy sarcotesta of fruits were removed manually to get the cleaned seeds. The cleaned seeds of one lot were treated with concentrated hydrochloric acid (HCL) and the another lot with concentracted sulphuric acid (H_2SO_4) separately. In each case seeds were immerged in 5,10 and 20% concentration of acid for a period of 5,10 and 20 minutes in each. The seeds immerged in tap water were considered as treated with 0% concentration of acid i. e. control. The seeds treated with acid were washed in running tap water repeatedly before sowing to make the seeds free from acid. Three replications of 15 seeds in each treatment (concentration of acid including tap water and period of immergence) were sown in polyethylene bag containing a compost of nursery soil and cowdung in a proportion of 3:1, respectively.

In another experiment seeds were sown without acid treatment. In this case, seeds were sown in seed bed of nursery soil and cowdung (3:1, respectively) in four different ways, viz., with both scally epicarp and fleshy sarcotesta (T1), only with fleshy sarcotesta (T2), scally epicarp and fleshy sarcotesta removed cleaned seed (T3) and cleaned seeds immerged in drain water for 48 hours (T4). There were three replications (seed bed) of 250 seeds in each treatment. For both experiments the data were analysed statistically.

RESULTS

The ANOVA shows that irrespective of concentration of acid for both HCL and H_2SO_4, there is no significant effect of seed immergence period on germination percentage. On the other hand, the seeds immerged in 5,10 and 20% concentration of both HCL and H_2SO_4 separately showed significantly a higher germination percentage (64-68 and 50-68%, respectively) than that of 0% (29 and 31, respectively) concentration of acid (Table 1).

Table 1. Mean germination percentage of golla-bet seeds, immerged in HCL and H_2SO_4 of different concentrations separately for various period of time

Name of acid	Concentration of acid (%)				Period of immergence (minute)		
	0	5	10	20	5	10	20
HCL	28.89	64.44	68.14	68.14	54.44	57.22	60.55
H_2SO_4	31.11	50.36	68.14	57.11	51.11	54.44	49.44

However, using the LSD test for both HCL and H_2SO_4 the influence of different concentrations, viz. 5, 10 and 20% were statistically similar. In the case of seeds treated with H_2SO_4 the significant interation term between concentration of acid and period of immergence indicates the possible combined influence of concentration of acid and period of immergence.

In experiments where seeds were sown in seed bed in four different ways without any acid treatment, there was a significant difference in germination percentage among the treatments

(Table 2). Comparing the treatments using LSD showed a higher germination percentage (51%) in T2 (seeds with fleshy sarcotesta) than the treatments T1 T3 and T4 (13, 25 and 35% respectively).

Table 2. Mean germination percentage of golla-bet seeds sown in four different ways (Treatments) without any acid treatment.

Treatments	Number of seed sown	Germination % (Mean ± SE)
T1	250 x 3 rep.	13.17 ± 1.42
T2	250 x 3 rep.	51.50 ± 4.44
T3	250 x 3 rep.	25.50 ± 3.01
T4	250 x 3 rep.	35.17 ± 5.53

DISCUSSION

Seed germination and dormancy are regulated by the relative levels of endogenous inhibito and promotors localised in various parts of the seed in association with impermeable seed coat (Maguire, 1975). The seeds when treated with HCL may enhance germination since acid treatment modify the hard seed coat into thin and papery (Ananthapdmonabha *et al.*, 1988) resulting in possible easy infiltration of water to activate enzyme activities in endosperm. The observation of higher germination percentage in HCL and H_2SO_4 acid treated golla-bet seeds (Table 1) may be an agreement with such mechanisms. Similarly, the seeds sown with fleshy sarcotesta (T2) without any acid treatment also showed higher germination percentage than the other treatments (Table 2). In this case, since fleshy sarcotesta contains some acids, which may activate fermentation resulting in softening of the hard seed coat. The observation of the lowest germination percentage in seeds sown with both scally epicarp and fleshy sarcotesta (T1) may be due to possible inhibitory effect of hard epicarp. Thus the results of this study suggest further insight investigation on seed germination of golla-bet.

CONCLUSION

Golla-bet can be easily propagated from the seeds. More than 50% seeds germinate whether sown with or without acid treatment. The seeds with only fleshy sarcotesta showed the best germination without acid treatment because of possible acid contents in fleshy sarcotesta.

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