# SEED GERMINATION OF *ABUTILON RANADEI* WOODR. & STAPF. CRITICALLY ENDANGERED SPECIES IN WESTERN GHATS, MAHARASHTRA

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#### ABSTRACT

The germination response of *Abution ranadei* to different treatments *viz*. hot water  $60 \pm 2$  °C to  $80 \pm 2$  °C, conc. HCl, conc. H<sub>2</sub>SO<sub>4</sub>, BAP, IAA, IBA, Kinetin and water soaking for 24 h and 72 h, was investigated. The higher percentage of germination ( 86% ) occur in hot water  $60 \pm 2$  °C to  $80 \pm 2$  °C, and lower percentage of germination ( 30% ) occur in conc. H<sub>2</sub>SO<sub>4</sub> for 30 min to 1 h i.e. 30 %. There was no any response on germination by the treatment of hormones and conc. HCl, water soaking for 24 and 72 h.

Key Words: Germination, Hot Water, Abutilon Ranadei

#### **INTRODUCTION**

The genus *Abutilon* Mill Belongs to family Malvaceae and is represented by about 150 species. India is home to 12 species, 2 subspecies and 5 varieties (Paul, 1993; Woodrow, 1897; Flora of India ref.) of these two species and 4 varieties are endemic to India (Tetali *et al.*, 2004). The genus is distributed mostly in the tropical or subtropical parts of the world. Many species are commercially important as they are highly ornamental.

*Abutilon ranadei* Woodr. and Stapf. Was first collected by N. B. Ranade, ex-keeper of the herbarium at the College of Science, Pune. (Woodrow & Stapf., 1894) described it as a new species and named it after Ranade. It is an endemic known so for only from four district of Maharashtra State. According to (Cooke, 1901), it is a rare plant due to its narrow range of distribution and extreme rarity the species has been declared as endangered (Nayar and Sastry, 1987; Venkanna and Das, 2000) or even presumed extinct (Ahmedullah and Nayar, 1986). However it was recollected from its type locality after a lapse of almost 95 years (Mistry and Almeida, 1989; Almeida, 1996; Walter and Gillett, 1997). Since then the species has been collected from eight new localities in Pune, Satara, Kolhapur and Ratnagiri district.

The present study the seed germination of *A. ranadei* is here reported for the first time, the effects of hot water and sulphuric acid treatments on the seed germination of *A. ranadei*.

#### MATERIALS AND METHODS

The seed were collected from different localities from January to March in 2008-2010 from a population growing in wild forest of Torna, Rajghar fort and Shelimb Pune district, Kas plateau Satara district, Amba ghat and Ghotne Ratnagiri district Western Ghats. The seed were kept in polythene bag in dormant condition and germination was recorded in Department of Botany, Dr. Babasaheb Ambedkar Marathwada University Aurangabad. The experiment on germination in hot water  $60 \pm 2$  <sup>0</sup>C and  $80 \pm 2$  <sup>0</sup>C, H<sub>2</sub>SO<sub>4</sub> 20 min., 30 min. and 1 h conc. HCl for 30 min. and 1 h, different hormones such as BAP (6-Benzyl amino Purine), IAA (Indole- 3-acetic acid), IBA (Indole-3-butyric acid) and Kinetin for 2-5 days and water soaking 24 h. and 72 h. respectively.

#### Treatment of Hot water

Collected seeds were kept on two layers of blotting paper in a sterile glass Petri dishes moistened with distilled water. One set of seed is considered as control. Water were taken in beaker and heated up to  $60\pm 2$  <sup>o</sup>C and  $80\pm 2$  <sup>o</sup>C then seeds were poured in that water and after decantation of water the seeds kept for

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germination in Petri dishes and germination percentage was recorded. It shows 86% germination of the seeds. Water soaking treatment shows that there was no response when kept for 24 and 72 h.

## Treatment of Conc. H<sub>2</sub>SO<sub>4</sub>

The seeds were washed thoroughly by distilled water twice then it kept in conc.  $H_2SO_4$  for 30 min. and 1 h respectively. The seed were washed after immersing in conc H<sub>2</sub>SO<sub>4</sub> and kept on double folded blotting paper in glass Petri dishes. The highest percentage of seed germination occurs in conc.  $H_2SO_4$  for 30 min i.e. 50 % and lower percentage of germination was observed in conc. H<sub>2</sub>SO<sub>4</sub> for 1 h i.e. 30 %. No response occurs in conc  $H_2SO_4$  for 20 min.

#### Treatment of Conc. HCl

The seeds were washed thoroughly by distilled water twice, then kept in conc. HCl for 20, 30 min. and 1h respectively. The seeds were washed after immersing in conc. HCl and kept on doubled folded blotting paper in glass Petri dishes it is observed that there is no any response or germination in conc. HCl.

#### Treatment of Hormones

For this experiment IBP (Indole butyric acid) IAA (Indole-3-acetic acid), IBA (Indole-3-butyric acid), and Kinetin were used, conc. of these hormones are 72 h and 96 h (Vinaya, 1997) was taken there is no any response on percentage of germination of Abutilon ranadei seed.

# **RESULTS AND DISCUSSION**

Germination percentage made by the analysis of various observations after the percentage data (Clarke, 1980) there was a good germination in hot water  $80 \pm 2$  <sup>0</sup>C (86 %) and lower percentage of germination (70 %) occur in  $60\pm 2$  <sup>0</sup>C (Table. 1; Fig. A.), conc. H<sub>2</sub>So<sub>4</sub> 30 min. higher percentage of treatment (50%) and lower percentage of germination conc. H<sub>2</sub>So<sub>4</sub> 1 h only 30 % (Table.2; Fig. B). It is observed that there is no response due to conc. HCl (Table. 3). On the different conc. of harmones (Okusanya and Ungar, 1983) for 3 and 9 days shows no any response on germination of Abutilon ranadei seeds.

Table 1: Effect of Hot water on seed germination of Abutilon rander Woodr. & Stapi.				
S. No.	Treatment	Soaking time	<b>Observations in days</b>	Germination (%)
1	Control	0		
2	Hot water	$60 \pm 2 \ 0C$	5	70
3	Hot water	$80 \pm 2 \ 0C$	5	86

#### Table 2: Efffetct of conc. H<sub>2</sub>SO<sub>4</sub> on seed germination of *Abutilon ranadei* Woodr. & Stanf.

S. No.	Treatment	Soaking time	<b>Observations in days</b>	Germination (%)	
1	Control	0			
2	Conc H2So4	20 min.	0	0	
3	Conc H2So4	30 min.	5	50	
4	Conc H2So4	1 hour	5	30	

Table 3: Effect of conc.	HCL 0	on seed germination	of Abutilon ranadei	Woodr. & Stanf.
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S. No.	Treatment	Soaking time	<b>Observations in days</b>	Germination (%)	
1	Control	0			
2	Conc HCl	20 min.	9	0	
3	Conc HCl	30 min.	9	0	
4	Conc HCl	1 hour	9	0	
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The present result indicated that the hot water treatment maintaining the temperature  $60 \pm 2$  <sup>0</sup>C to  $80 \pm 2$ <sup>0</sup>C of with water soaking generally increase the percentage of seed germination. Therefore the evaluated treatments increase the germination of seeds of Abutilon ranadei. Similar trends were found by

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(Muhammad and Amusa 2003) in *Tamarindus indica s*imilarly hot water treatment maintaining temperature at  $60 \pm 2$  0C to  $80 \pm 2$  °C. When treatment of hormones IAA, BAP, IBA and kinetin at 4000 ppm concentration at 30 min to 3 days there was not response on the germination and water soaking for 3 days and 5 days respectively. There was no any response on the germination of *Abutilon ranadei* seed.



PLATE 1

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The result shown fig A indicates that germination of seed treatment of hot water and fig. B. germination of seed  $H_2SO_4$  (Sulphuric acid) and HCl treatment. In conclusion the germination response of this species appears to be of ecological significance and to be linked to the plants distribution in Maharashtra.

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