



STUDY OF SEED GERMINATION TECHNIQUE BY USING TRADITIONAL METHOD IN SONNERATIA SPECIES; *SONNERATIA ALBA* AND *SONNERATIA APETALA*

Paras Parmeshwar Jadhav

Shivaji University Kolhapur. (M. S.), India

ppjadhav2107@gmail.com

Abstract;

In mangroves, reproduction process is typical, mangroves have one of the most unique reproductive strategies in the plant world. Like most mammals, mangroves are viviparous (bringing forth live young). Rather than producing dormant resting seeds like most of flowering plants. But in mangrove like *Sonneratia alba* and *Sonneratia apetala* reproductive method is Cryptovivipary (Greek *kryptos*, hidden) refers to the condition where by the embryo grows to break through the seed coat but not the fruit wall before it splits open. In *S. apetala* seed germination rate is less than *S. alba* in natural conditions, because of the salinity factor as well as pH factor. It was observed that seed germination of *S. alba* and *S. apetala* in a cotton cloth like sprouting of cereals, is also effective method for seed germination. It was also observed that, rate of seed germination in *S. apetala* is more than *S. alba* in artificial traditional method. Sprouting (germinate) cereals in a cotton cloth is a traditional method used by housewife.

Keywords: Reproduction, Viviparous, Crypto viviparous, seed, germination, sprouting

Introduction;

Mangroves are woody, shrubs and trees that are salt and flood tolerant and hence dominate the intertidal areas of lagoons, estuaries and sheltered bays along tropical and subtropical coastlines, (Tomlinson, 1986; Tuffeers et al., 2001; Ball 2002). These tidal forests are of enormous ecological and economic importance. (Walters et al., 2008), providing ecosystem goods (food, medicines and timber) and services (such as Fisheries, nurseries and erosion control) to local communities living behind and within them.

Despite this they are suffering high rates of destruction; currently between 1 to 2 % of the total forest area is lost per year (Duck et al 2007). Hence the conservation and restoration of mangrove ecosystems deserve high priority. Careful consideration of site characteristics and species ecology is needed before attempting to restore degraded mangrove sites. Salinity and hydrology i.e. is period and frequency of flooding) in selected habitus are two of the primary factors that determine the survival and growth of replanted mangroves because different true mangrove species vary in tolerance to such ecological factors. (Allen et al., 2003; HWANG and Chen, 2001; YE et al., 2005; Bosire et al., 2008).

In Devgad taluka Dist. Sindhudurg number of *S. apetala* is very rare and their number decreases day by day due to many reasons like people used trees for different purposes and pollution etc. There is one observation that, seeds of *S. apetala* do not germinate under their canopy, such factor affects on the population of this species. Therefore to increase the population of both species, it is necessary to germinate seeds in the nursery. And germination of seeds in the nursery is also tough method.

The main aim of the current work was to study the 1) seed structure 2) study of seed germination by using traditional method, which is used by housewife for sprouting of cereals in a cotton cloth. 3) To study difference in seed germination percentage in two species of *Sonneratia* under artificial condition, by using traditional method. Till date number of seed germination methods were used to germinate seeds of *Sonneratia alba* and *S. apetala*, but present method is very simple method of seed germination and rate of seed germination is also more. It was observed that seed germination of *S. alba* and *S. apetala* in a cotton cloth like sprouting of cereals, is also effective method for seed germination. It was also observed that, rate of seed germination in *S. apetala* is more than *S. alba* in artificial traditional method. Sprouting (germinate) cereals in a cotton cloth is a traditional method used by housewife.

Sonneratia apetala, Buch, Ham (Sonneratiaceae now Lythraceae) It is a true mangrove, tree, grows up to 6 to 10 meter in height, they produce flowers in the month of Feb. to April (fig 1). fruit formation takes place in the month of June to Aug. Fruits become mature in the month of July **Fruit:** is berry with persistent leathery calyx, green with numerous seeds (fig 3); seeds compactly arranged in 6 to 8 locules, within the fleshy pulp of the placenta.

Seeds: seeds are yellowish mostly 'U' or 'V' shaped, surface irregularly aerotolated (fig 2). Size about 5 to 6 mm. weight 0.09 +0.02 g, hilum middle i.e. within the invaginated portion of the seed. Micropyle position obscure, radicle emerges from any one arm of the seed, exalbuminous, and germination epigeal. Fruit and seed formation takes place from the month of June to August. But fruits are ripened in the

month of July, and fruit season ends at the end of month August.

Sonneratia alba J. Smith (Family-Sonneratiaceae now Lythraceae) It is a true Mangrove, tree grows up to 7 to 10 meter in height. It produce white beautiful flowers in all seasons but number of flowers are more in the rainy season (Fig 1)

and they also produce fruits in all seasons, For germination of seeds collect the seeds from well ripened fruits in the month of July and Aug.(Fig.2)

Fruits: fruits resemble fleshy berries that are round and flattened, with a cup-shaped calyx at the base of the fruit. The calyx is reflected backwards from the protruding style and towards the stalk. Mature fruit is approximately 2-4.5 cm across which ripens to green with a dull surface. When ripe, the fruits dropped off the parent tree and start to decay. The decomposing exocarp would break open to release numerous tiny seeds contained inside. In Fruit, seed formation takes place in the month of May, to September.

Seeds: *S.alba* is a non-viviparous plant, hence it produce 100 – 150 seeds in each fruit which ranges 6 to-7 mm in length, small in comparison to most other mangroves (L.J.Bhosale.2005), seeds are, hook shaped yellowish brown in colored.

Material and methods

Study area; Study area is Devgad, It is taluka place, situated in the District Sindhudurg which is located on the Arabian Sea in the costal kokan region of Maharashtra,India,450km. south of Mumbai. It is located between latitude of 16^o.38’ N, and longitude of 73^o.38’ E. Mangrove forest covers about 11.08 ha of the area (Bhosale 2005).The area contains different types of the mangrove species in the Sindhudurg district but *S.alba* is dominant in creek like Vijaydurg, and Devgad taluka. Species *S.apetala* is occur in the area of small creek of Patthar and Kakshi creek .These two creek joined at village Mitmumbari. Vegetation of *S .apetala* is less than the *S .alba*. The present study focused on the development of new method to germinate seeds of *S .alba* and *S .apetala*, because number of *S.apetala* decreases day by day.

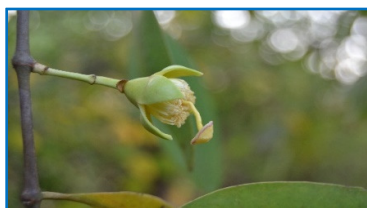


Figure 1: *S.apetala* –Flower



Figure 2: *S.apetala* –seed



Figure 3: *S.apetala* –Fruit

Methods;

1) Matured and ripened fruits of *S.alba* and *S.apetala* fallen on ground were collected. Collection was mainly done by end of July from their different mangrove covers. Fruits of *S .alba* were gathered from Malyai (Kharda creek) and *S .apetala* from Patthar creek .

2) These fruits were placed for rotting in polythene bags for ten days. (From 31st July to 9th August

3) After ten days, softened fruits were rubbed on hand and seeds were collected.

4) Collected seeds were washed with fresh water twice.

5) Seeds were allowed to germinate in a cotton cloth, before it, cotton cloth was well sterilized by boiling in the hot water. It was also useful to remove starch of cloth.

6) These seeds were allowed to germinate in rain water.

Result and Conclusion;

1) Seeds allowed to germinate in the cotton cloth; after ten days of germination period few seeds were germinated in the cotton cloth, but after fifteen days number of seed germination increases .Which is shown in the following table.

Observation table:

Name of plant	Number of seeds for germination	Number of seeds germinated	percent age
<i>S.apetala</i>	42	27	64.29 %
<i>S.alba</i>	33	18	54.54 %

1) From observations it is observed that seed germination under traditional method like sprouting of cereals, is also applicable as a seed germination method in *S .apetala* and *S .alba*

2) Seed germination percentage is more in *S .apetala* than *S .alba*

3) We found, seed germination in a cotton cloth is a reliable and suitable alternative, for seed germination in *S .apetala* and *S .alba*.



Figure 4: *S.apetala* –Seeds for germination in cloth

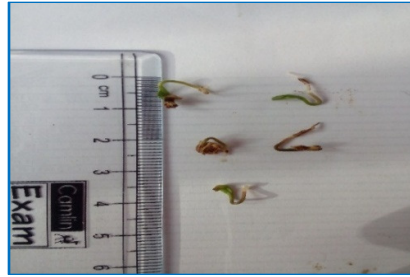


Figure 5: Germinated seeds

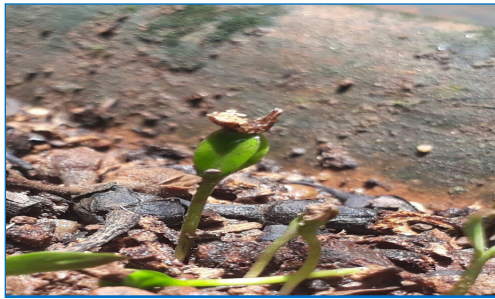


Figure 6: *S.apetala* – propagules of ten days



Figure 7: *S.apetala* –propagules transfer in to pot



Figure 7: *S.alba* ---Flower



Figure 8: *S.alba* ---Fruit



Figure 9: *S.alba* seed

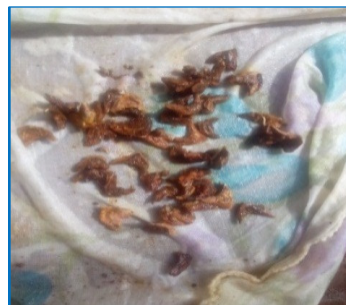


Figure 10: *S.alba*. seeds for germination



Figure 11: *S.alba* :Propagules

Acknowledgments:

Author is thankful to local people and fishermen who helped to complete this work. Also express my gratitude towards to my friend Sachin Mali.

References;

- [1] Allen, J.A., Krauss K. and Hauff R.D. (2003): Factors limiting intertidal distribution of the Mangrove species *Xylocarpus granatum*. - *Oecologia*, **135**:110-121.
- [2] Ball, M.C., (2002): Interactive effects of salinity and irradiance on growth: implications

for Mangrove forest structure along salinity gradient. - *Trees* **16**:126-139.

[3] Bhosale, L.J., (2005): Field Guide to Mangroves of Maharashtra: Pp.214-218

[4] Bosire, J., Dahdouh-Guebas, F., Walton, M., Crona, B.I., Lewis III, R.R., Field, C.,Kairo, J.G., Koedam, N., (2008): Functionality of restored mangroves: a review - *Aquat. Bot.* (in press).

- [5] Duke NC, Meynecke JO, Dittmann S, Ellison AM, Anger K, Berger U, et al. A world without Mangroves? *Science*. (2007); 317:41–42. Doi: 10.1126/science.317.5834.41b.
- [6] Hwang, Y.H. and Chen S.C., (2001): Effects of ammonium, phosphate, and salinity on growth, gas exchange characteristics, and ionic contents of seedlings of mangrove *Kandelia candel* (L.) Druce. - *Bot. Bull. Acad. Sin.* **42**: 131–139.
- [7] Kairo, J. G. and Koedam, N. (2008). Functionality of restored mangroves: a review. *Aquatic Botany*, **89**: 251-259.
- [8] Tomlinson, P. B. (1986). *The botany of mangroves*. Cambridge University Press, Cambridge, United Kingdom.
- [9] Tuffèrs et al., Tuffèrs A., G. Naidoo and Von Willert D.J., (2001): Low salinities adversely affect Photosynthetic performance of the mangrove *Avicennia marina*. *Wetland Ecol. Manage.* **9**: 225-232.
- [10] YE Y., N.F.Y. Tam, C.Y. LU and S. H. Wong, (2005): Effects of salinity on germination, seedling growth and physiology of three salt secreting mangrove species. - *Aqua. Bot.* **83**:193-205.
- [11] Walters, B., Rönnbäck, P., Kovacs, J., Crona, B., Hussain, S. et al., (2008). Ethnobiology, socio-economics and management of mangrove forests: a review. *Aquatic Bot* 89(2), 220–236.