

## SEEDLING BEHAVIOUR AND EARLY GROWTH STATUS OF SEEDLINGS IN *THEVETIA PERUVIANA* (PERS). K. SHUM

YASHWANT RAI

Department of Botany, D.N. College, Meerut, Uttar Pradesh, India

### ABSTRACT

Polyembryony is one of the abnormalities of seedling, which produce more than one seedling from single seed. This could be due to some developmental errors that occur in the seed or embryos developing from additional embryo sacs in an ovule. *Thevetia peruviana* have only one embryo per seed and it produced into one seedling. I had recorded 40% polyembryony (showed twin, triplet, four and five seedlings from single seed) and 50% normal seedlings in *thevetia peruviana*. Total germination of 90 per cent was recorded in *T. peruviana* within 21 days from date of sowing. These are study parameters, germination percentage, seedling behaviour and early growth status in *Thevetia peruviana*. All polyembryony seedlings survival at early growth stages of development in *T.peruviana*. It is new research survival of polyembryony seedlings. I had recorded first time survival polyembryony seedlings in *T. Pervuiana*. This research utility in various fields such as forestry, environment, genetics and embryology.

**KEYWORDS:** *Thevetia peruviana*, Polyembryony, Seedlings

### INTRODUCTION

*Thevetia peruviana*, belongs to the family Apocynaceae and commonly called as yellow oleander or Pila Kanher. *Thevetia peruviana* is grown as an ornamental plant and planted as large flowering shrub or tree standards in garden, parks, road side and road divider. It can grow in a wide range of polluted soil and dump site. It is also called phytoremediative plant. Useful as a landscaping plant in warmer climates as it does not need much maintenance. *Thevetia peruviana* having valuable properties, seed oil was used to make a bio pesticide. The plant parts used for the treatment of various disorders in human being such as, liver toxicity fungal infection, microbial infection, inflammation, pyrexia and relive pain. I was first time reported on polyembryony seedlings and survival all polyembryony seedlings in *Thevetia peruviana*. Morphological abnormalities in seedling as polyembryony, double embryo, twin and triple seedlings, albino and chlorophyll mutant seedlings are widely reported in country.

Such abnormalities are due to several factors such as developmental error during development of ovary, during fertilization, genetic factors or mutation (Gunaga *et al.*, 2008). Polyembryony seedlings are one of the abnormalities of seed which produce more than one seedling from single embryo in a seed. This could be due to some developmental errors that occur in the seed. These twin seedlings are generally discarded from packing stock before transportation of seedling to the planting site. The occurrence of Polyembryony reported that in number of forest economically important species like *Pongamia pinnata* (Vasanth Reddy *et al.*, 2006). Such abnormalities like twin seedlings were recorded in *Terminalia bellerica* in of the commercially important medicinal tree species (Gogate *et al.*, 2012). The utility of polyembryony seedlings are occurrence of two, three, four and five seedlings from a single seed. Polyembryo ny seedlings

are most important for future genetic improvement, plant breeding improvement, forestry, seller of plants and environment conservation programmes.

## MATERIALS AND METHODS

The present study was undertaken at the B-16 Jawala Nagar Ambedker chock district Meerut Uttar Pradesh. *Thevetia peruviana* seeds were collected during the end of April 2013 from Sanjai Van District Meerut, Uttar Pradesh, India. The seeds were sown in pots in the first week of May 2013. The emergence starts from seeds after 9 days of sowing. The total germination percentage of seeds 90 %, (40% polyembryony, seedlings and 50 % normal seedlings) were observed within 21 days from date of sowing. Respectively to observed the seedling behaviour and early growth status of polyembryony seedlings at 30 days

## RESULTS AND DISCUSSIONS

It was observed on daily seed germination counted up-to 21 days from the date of sowing. **The germination percentage of seeds lot was 90%. The results indicate that seeds of *Thevetia peruviana* have polyembryo (two, three, four and five) seedlings produce in a single seed showed table 1, (Figure 3, 4, 5, 6) and single seed produce normal seedling (Figure 2). It was observed that 40 % polyembryony and 50% normal seedlings (Table 1). It was recorded shoot / root, length, Mean 18.2/9.96 cm. twin seedlings and 17.4 /8.54 cm. five shoot seedlings at 30 days after germination period and normal seedling shoot/root length 18.9/8.84, showed results slightly difference compared to normal seedling growth status. Clear results in Table 2 and figure 9, 10, 12.**

Figure 13 separate five shoot seedlings plant. Reporting of such variations is most important for future genetic improvement and conservation plants. However, some research workers on such twin seedlings had recommended to keep leading shoot for higher vigour and remaining shoots can be culled out at earliest possible to use these seedlings for field planting. Gunaga and Vasudeva, (2008). The occurrence of polyembryony has been reported in number of forest economically important species like *Filicium decipiens* Manickam and Kalidass (2008).

Gunaga and Vasudeva (2008) have reviewed such abnormal seedlings recorded in several tropical tree species like *Acacia farnesiana*, *Robinia pseudocasia*, *Terminalia arjuna*, *Tectona grandis*, *Santalum album*, *Shorea robusta*, *Dalbergia sissoo*, *Bombax ceiba*, *Putranjiva roxburghii*, *Nathopodytes nimmoniana*, *Saraca asoca*, *Garcinia indica* and *Mammeasuriga* across the country. Wanage *et al.*, (2010) observed that total germination of 78 per cent was recorded in *Saraca asoca* out of these seedlings, 5.13 percent of seedlings were polyembryony. Rane *et al.*, (2012), reported that the total germination percentage of seed lot was 86. It was observed that 0.33 per cent of twin seedling in *Gloriosa superba* L. The polyembryony noticed during germination studies of *Atylosia scarbaeoides* under laboratory condition. (Kalidass and Mohan 2012.) This research very important in various fields such as forestry, environment, genetics, and embryology.

**Table 1: Total Germination and Polyembryony Seedlings Percentage**

Days	May						
	3	6	9	12	15	18	21
Total germination %	–	–	20	40	75	80	90
Polyembryony seedlings %			10	15	25	30	40

Table 2: The Plant Height of Polyembryony Seedlings at 30 Days after Seed Germination Period

		Shoot Length (cm.) Mean $\pm$ SD	Root Length (cm.) Mean $\pm$ SD
Normal Seedling		18.9 $\pm$ 0.36	8.84 $\pm$ 0.61
Polyembryony Seedling	Twin seedlings	18.2 $\pm$ 0.53	9.96 $\pm$ 0.59
	Five seedlings	17.24 $\pm$ 1.28	8.54 $\pm$ 0.28



Figure 1: Seeds Collected by Yashwant Rai

Figure 2: View of Normal Seedling in *T. peruviana*Figure 3: View of Germinate Seed in *T. peruviana*

Figure 4: View of Twin Seedlings



Figure 5: Shoot/Root Development of Twin Seedling

Figure 6: View of Triple Seedlings in *T. peruviana*Figure 7: View of Four Shoot Seedlings *T. peruviana*Figure 8: View of Five Shoot Seedlings in *T. peruviana*

Figure 9: Growth Status of Twin in Seedlings at 30 Days



**Figure 10: Growth Status of Five Seedlings at 30 Days**



**Figure 11: Close View of Five Seedlings (Polyembryony) Shoot**



**Figure 12: Growth Status of Normal seedling at 30 Days**



**Figure 13: Separate Five Saplings from Polyembryony Seedlings**

## CONCLUSIONS

The twin seedlings exhibited stunted growth and poorly developed root system when compared to normal seedlings and it was observed that the other second shoot after some time perished First shoot enhanced growth of twin seedlings compared to normal seedlings. Early stage growth status of twin seedlings (After germination about 40 days) same growth status of normal seedlings. The utility of twin seedlings most important for future genetic improvement, plant breeding improvement, new research field and forest conservation programmes.

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