

## (II)

### A REPORT ON ABNORMAL SEEDLINGS IN BAEI (*AEGLE MARMELLOS* (L.) CORRÊA)

*Aegle marmelos*(L.) Corrêa commonly known as bael, Bengal quince, golden apple, stone apple and bili. It is the only genus belonging to the family Rutaceae. Religiously, the tree is considered as 'sacred', used in worship of 'Lord Shiva'. The tree grows wild in dry forests of hills and plains of tropical and subtropical region of central and southern India, Myanmar, Pakistan, Bangladesh, Sri Lanka, Northern Malaya and Java islands (Islam *et al.*,1995).

Seedling evaluation is a most prime and reliable character that explores the vigour and nature of growth. As per the international rules for seed testing (ISTA) abnormal seedlings are those seedlings that do not show the potential to develop in to a normal plant when grown in good quality soil and under favourable conditions of moisture, temperature and light (ISTA, 1993). These morphological abnormalities can be visualised by conducting germination test. These abnormalities are unusual and novel to the species.

In order to raise seedlings in nursery, Bael seeds were collected from Pali - Marwar region. The seeds were extracted, washed, depulped and dried in shade for two days. The seeds were soaked in water for 3 hours and sown in germination tray containing sand. Out of 50 seeds sown, 47 seedlings were germinated (94% Germination percentage). Of which, seven were abnormal seedlings with one conjointed twin seedlings, independent shoot with conjointed roots, its number varying from two to four. (Fig.1) The conjointed twin seedlings resembled normal growth like other seedlings. In another seedling, the root growth was better than shoot growth. In two abnormal seedlings, the growth was stunted, even when compared to other abnormal seedlings. The shoot length and root length of the abnormal seedling is given in table 1. The average shoot length and root length of normal seedlings were recorded 12.1 cm and 4.2 cm respectively. After 23 days of germination, the seedlings were transplanted to polybags containing Sand: soil: FYM in the ratio of 1:1:1.

The twin seedling might have emerged as a result of polyembryony. i.e, more than one embryo in a single seed. Such abnormalities may occur due to cleavage of embryo, proliferation of the zygote or development of adventitive embryos from independent sources (Swamy and Krishnamurthy, 1980). It is also reported to occur due to hormonal imbalance (Leroy, 1947), genetic causes (Ganeshaiash *et al.*, 1991), hereditary (Atabekova, 1957), Hybridization (Ernst, 1918; baker, 1960 and Cesca, 1961). Some of the other factors like age of the tree and

orientation of branch angle may also be the reason (Furusato *et al.*, 1957). This type of conjointed twin seedlings has been reported by Venkatesh and Sharma (1974) in *Eucalyptus camaldulensis*. Occurrence of twin seedlings were reported previously by Venkatesh and Emmanuel (1978) in *Bombax ceiba*, Vijayan and Rehill (1987) in *Azadirachta indica*, Dabral (1977) in *Tectona grandis*, Kumar *et al.*, (1977) in *Pterospermum acerifolium*. Similar record of such abnormal seedlings have been reviewed by Gunaga and Vasudeva (2008) in several tropical tree species like *Acacia farnesiana*, *Robinia pseudoacacia*, *Terminalia arjuna*, *Tectona grandis*, *Santalum album*, *Shorea robusta*, *Dalbergia sissoo*, *Bombax ceiba*, *Putranjiva roxburghii*, *Nathopodytesnimmoniana*, *Saracaasoca*, *Garcinia indica* and *Mammeasuriga* across the country.

The malformed seedlings are culled out from nursery because of unclear understanding about the mechanism involved in it. Thus, the phenomenon of seedling abnormalities is still infancy and its possible applications can be researched upon. Reporting of such variations will be helpful in exploring the possibilities of research in tree improvement programmes.



Fig. 1: Abnormal seedlings in Bael (*Aegle marmelos* (L.)

**Table 1:** Growth of abnormal seedlings in Bael (*Aegle marmelos* (L.) Corrêa)

| S.No                       | Shoot length | Root length        | Remarks  |
|----------------------------|--------------|--------------------|--|
| Abnormal seedlings         |              |                    |  |
| 1.                         | 10.1, 11.0   | 2.2, 2.9           | Conjointed Twin seedlings with two shoots and roots. Growth was normal |
| 2.                         | 7.8          | 4.1, 4.2           | One shoot with conjointed roots (2). Root length was larger.           |
| 3.                         | 6.3          | 3.1, 1.2, 1.3      | One shoot with conjointed roots (3) emerged from one embryo.           |
| 4.                         | 6.2          | 3.3, 3.2, 2.0      |  |
| 5.                         | 8.0          | 2.9, 2.4, 2.9, 2.1 | One shoot with conjointed roots (4) emerged from one embryo.           |
| 6.                         | 5.1          | 3.1, 0.9           | One shoot with two roots emerged from embryo. The growth was stunted.  |
| 7.                         | 4.1          | 2.9, 0.7           |  |
| Normal seedlings (Average) |              |                    |  |
| 8.                         | 12.1         | 4.2                |  |

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KEERTHIKA A., NOOR MOHAMED, P.L. REGAR AND A.K. SHUKLA  
 ICAR- Central Arid Zone Research Institute,  
 Regional Research Station, Pali- Marwar, Rajasthan  
 E-mail: lathikaconifers@gmail.com