

NOTES

MORTALITY OF *CASUARINA EQUISETIFOLIA* IN CLONAL SEED ORCHARD IN TAMILNADU, INDIA

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Casuarina equisetifolia, an exotic tree native to Andamans, Bangladesh, Myanmar, Malaysia and Australia, on the mainland of India has become naturalised. *Casuarina equisetifolia* was introduced in the Indian subcontinent in the 1860s (Kondas 1981). The species is widely grown in South India and is a valuable source of fuelwood, building and scaffolding material. A clonal seed orchard was established by Tamilnadu Forest Department at Trichy. Phenotypically superior trees were identified and cuttings from selected plus trees were pretreated with IBA 2000 ppm and Seradix B₂ to stimulate rooting and were kept in specially designed mist tent. The cuttings initiated callus formation in 8 days and root formation was observed in 15 days. In November 1981, rooted cuttings were planted in 3 × 3 m spacing in five blocks. Seed production in the orchard began in 1984.

It has become problematic to maintain the casuarina plantation for different periods due to stem wilt disease. Stem wilt disease of *C. equisetifolia* caused by *Trichosporium vesiculosum* was first noticed in Orissa by Butler (1905). The disease was later recorded in *C. equisetifolia* plantations in Andhra Pradesh, West Bengal, Tamilnadu, Maharashtra, Gujarat, Karnataka and Kerala (Bakshi 1951, Kadambi 1956, Khan & Yadav 1962, Bakshi *et al.* 1972, Kumbhojkar *et al.* 1988, Jamaluddin *et al.* 1989, Mohanan & Sharma 1989, Narayanan & Sharma 1996, Narayanan *et al.* 1998).

Mortality in *C. equisetifolia* clonal seed orchard started in 1986. Randomised collection of diseased material was made from all the five blocks by taking three diseased samples from each block. Clones of *C. equisetifolia* were healthy during the first three years. Mortality began in different patches in all the blocks. Wilted trees initially exhibited deep vertical cracks on the main stem region. Later the bark of infected trees dried and peeled. Typical blister disease symptoms developed in some of the wilted trees, which produced black powdery mass of spores of *T. vesiculosum*. On aging, mortality increased during successive year in each orchard block and the disease became epidemic in 1989. Percentage mortality was 92.7% in block no. 1 and 83.0% in block no. 2 while blocks no. 3, 4 and 5 showed 47.9, 14.3 and 66.5% respectively (Figure 1).

Field observation showed a number of pruning defects in blocks no. 1, 2 and 5 due to silvicultural operation. Such lops attracted initial inoculum of pathogen and developed primary infection point which resulted in stem wilt. After one year of primary infection the wilted stem portion peeled off its barks and developed blister formation. Due to severity of the disease, secondary spread caused by root-to-root contact was observed in blocks 1 and 2.

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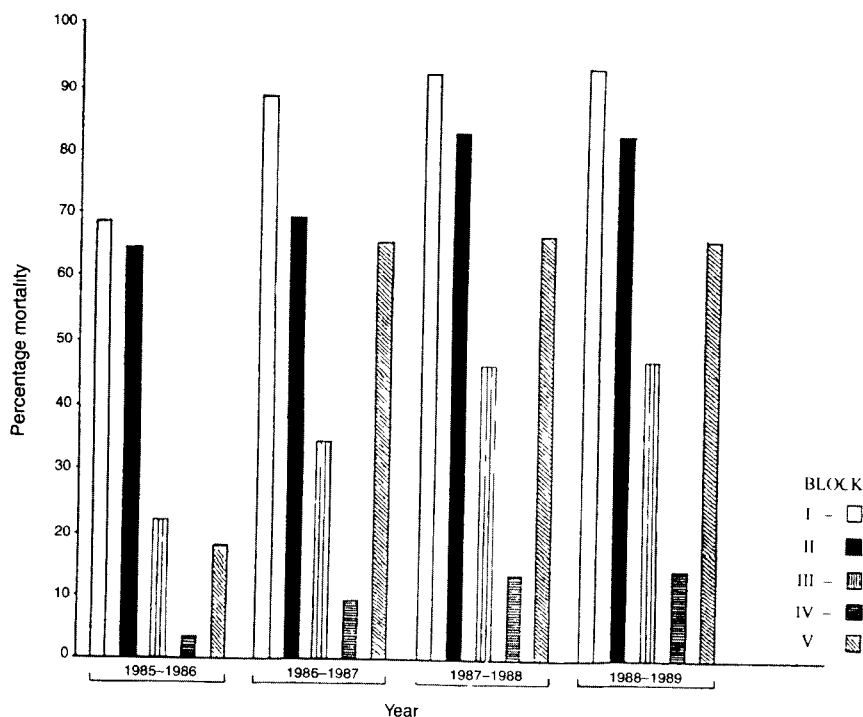


Figure 1 Mortality percentage of *Casuarina equisetifolia* seed clonal orchards

Collection of seeds from the clonal seed orchard began in 1984. The collected cones were spread out on canvas sheets in the sun until the bractioles opened. The seeds were usually separated by shaking and sieving. Between 1984 and 1988 total seed production was 55.5, 46.0, 64.0, 30.0 and 12.0 kg respectively (Figure 2). Sudden fall in seed production was recorded in 1987, which further deteriorated in 1988 due to increased mortality. All clones in the clonal seed orchard were infected by blister bark disease; many plants eventually died due to severity of infection. None of the clones showed any sign of resistance towards *T. vesiculosum*.

Trichosporium vesiculosum, a host specific pathogen, developed an epidemic in clonal orchard. The mortality percentage varied in different blocks. In severely affected blocks mortality percentage reached up to 92.7 percent. According to Mohanan and Sharma (1989), continued water logging or prolonged drought in the rooting zone affects the growth and vigour of *C. equisetifolia* thereby the roots become prone to infection. Narayanan and Sharma (1996), and Jamaluddin *et al.* (1989) also pointed out that the susceptibility of *C. equisetifolia* to blister bark disease increases after three years of age. The infection can be reduced by avoiding the pruning of branches and stem wound which may be primarily infected by *T. vesiculosum* (Marudarajan *et al.* 1950, Bakshi 1951, Mohanan & Sharma 1993). Genetic screening for resistance is a widely accepted strategy with many plant diseases. Although blister bark disease has long been present in India, there has been no systematic screening of *C. equisetifolia* for resistance (Sharma 1995). The observation in casuarina seed orchard did not show any indication of genetic resistance. The seed orchard site should also be distanced from high risk planting sites where repeated disease outbreaks could pose a serious threat to the casuarina plantations.

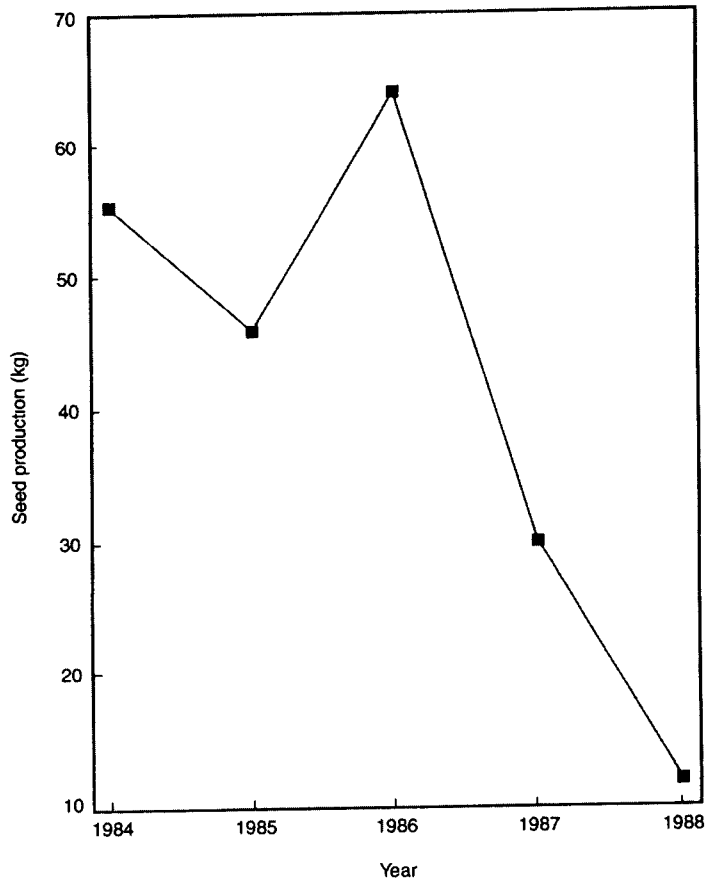


Figure 2 Effect of stem wilt disease on seed production of *Casuarina equisetifolia*

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