OCCURRENCE OF VESICULAR-ARBUSCULAR MYCORRHIZA IN *SUAEDA MARITIMA* (L.) DUMORT—A PIONEER MANGROVE OF THE CHENOPODIACEAE

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MANGROVE forest is an unique ecosystem of plants belonging to several families and adapted to physiological stress due to salinity and waterlogging. The presence of mycorrhiza may be of significance in the plants' adaptive behaviour. Reports on association of vesicular-arbuscular mycorrhiza (VAM) with mangrove roots, specially *Suaeda maritima* (Chenopodiaceae), the primary colonizer of salt marshes, are conflicting. Mason[1] reported the presence of mycorrhizal elements in roots of mangroves, excluding *Suaeda*. Kleca and Vukolov[2] reported the presence of VAM in *Suaeda* roots, which, however, were subsequently found to be either non-mycorrhizal or only very poorly mycorrhizal[3]. Recently, Mohankumar and Mahadevan[4] failed to find VAM in *S. maritima* growing in Pitchavaram mangrove forest in Tamil Nadu, India. We report here the presence of VAM in the roots of *S. maritima* (L.) Dumort growing in the terminal, seabound Gangetic delta in West Bengal, India.

The terminal part of the world's largest delta, known as Sundarban (partly in Bangladesh), criss-crossed by tidal rivers, creeks and channels, is inhabited by about 40 species of mangroves at various stages of succession. *S. maritima* appears as a primary colonizer of riverbed marshes and ridges. The soils are alkaline (pH 7.5 to 8.8), with high soluble salinity (6.9 to 18.5 mmho/cm). The clayey soils have high organic carbon (0.528%) but low nitrogen (0.09%) and low available phosphorus (11.24 ppm). Our search by the usual staining method[5] revealed the presence of typical vesicles in the roots of *S. maritima*. Average root infection intensity of plants collected from five locations varied from 60 to 70% in number infected and 40 to 50% in length of infected roots. Average VAM spore count by wet sieving and decanting method[6] was 92 per 100 g rhizosphere soil. Four species of VAM fungi, viz. *Glomus mosseae* (Nicol and Gerd.) Gerdemann and Trappe, *G. fasciculatum* (Thaxter Sensu Gerd.) Gerdemann and Trappe, *G. multicaulis* Gerdemann & Bakshi and *Gigaspora margarita* Becker & Hall, were present in the rhizosphere soil samples. Only vesicles and connecting hyphae were found in the infected root cortex; arbuscles were not formed.

The Sundarban mangrove forest ecosystem is different from most other mangrove forests of the northern and southern hemisphere. The deltaic land mass of the Sundarban is essentially alluvial in origin. Geological and archaeological evidence[7] show that part of the land mass was strongly mesophytic in recent geological age. Reduction in freshwater flow of upstream rivers and tidal inundation of the land through creeks and channels resulted in formation of hydromorphic saline swamps where mangroves now predominate. This would explain the presence of VAM in the Sundarban ecosystem in contrast to its absence in Pitchavaram[4] and other mangrove forests, which are essentially marine in origin. Herbaceous members of the Chenopodiaceae commonly, but not invariably, lack VAM[8]. The presence of VAM in a Chenopodiaceae species under physiological stress, as seen here and previously[9], suggests that VAM are ecologically significant to plants growing under stress.

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