

## NODULES ON ROOTS OF *CASUARINA EQUISETIFOLIA* L.

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### Abstract

During survey of nodulation in non-legumes of Pakistan, nodules were recorded on roots of *Casuarina equisetifolia* trees growing at Karachi University Campus. These plants were compared with *Casuarina cunninghamiana* on the basis of descriptions provided in flora of the Punjab (Parker, 1921). It was found that they differ from *C. cunninghamiana* in the number of epicalyx, size of the cone and time of flowering. These plants were identified as *C. equisetifolia* from this country.

### Description of nodules :

The root systems of *C. equisetifolia* were profusely nodulated. Nodules were brown in colour and existed throughout the year. Young nodules were ovate in shape while mature nodules were of roughly spherical coralloid mass, 5 cms or more in diameter, composed of close packed radiating nodule lobes. Apex of each nodule lobe gave rise to a root (nodule-root) which showed upward growth (Fig. 1). The production of nodule-root in *C. equisetifolia* is consistent with the observations of earlier workers on different non-legumes. Bond (1956) showed them in *Casuarina equisetifolia* and *C. cunninghamiana*. Khan (1971) observed them on roots of *C. cunninghamiana*. Bond (1976) mentioned their presence in *Ceanothus sumatrana* and *Rubus ellipticus*. Torrey (1976) reported them on roots of *C. cunninghamiana* and Torrey & Callahan (1978) in *Myrica gale*. Such roots were described by Newcomb *et al* (1978) in *Comptonia peregrina*. The cause of upward growth of nodule roots in *M. cerifera* and *C. cunninghamiana* was studied by Silver *et al* (1966) and they related it with auxin production.

### Taxonomic affinity between nodulated non-legumes:

Genera of non-legumes bearing nodules are widely scattered in diversified families of angiosperms. Some are closely related, others are not. They all have the faculty of nitrogen fixation. The question of determining taxonomic affinity between these genera has been a matter of discussion (Morrison & Harris, 1959; Bond, 1967; Rodriguez-Barrueco, 1968; Khan, 1972; Akkermans (1978). Khan (1972) showed that orders of nodulated

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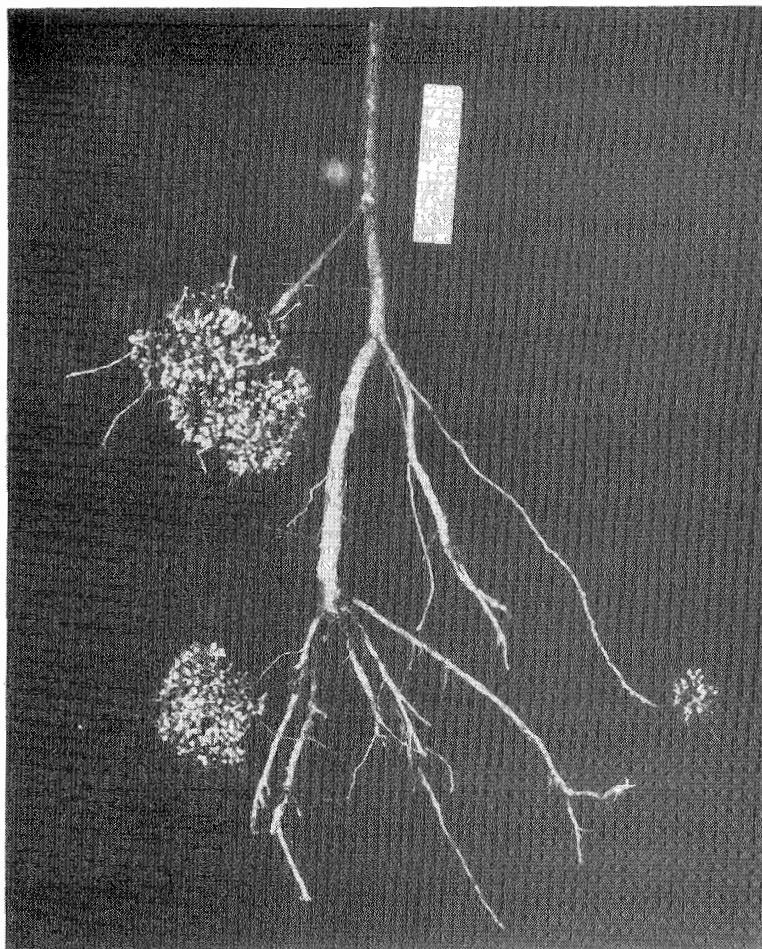


Fig. 1. Coralloid root nodules of *Casuarina equisetifolia*.

non-legumes appear more closely related according to the system of classification of flowering plants (Takhtajan, 1969). However since 1972, a large number of non legumes have been reported to bear root nodules (Athar, 1980). We have visualized the taxonomic affinity between nodulated non-leguminous genera reported till 1980 by their positions in Engler (1954), Hutchinson (1964), Takhtajan (1969) and Dehlgren (1975) systems of classification and we still find them more closely related according to Takhtajan's system of classification.

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