Microstructural analysis of pollen and genetic diversity study in species of *Jasminum* L. from Kerala using RAPD markers

Minor Research Project Report
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Executive Summary

Pollen morphological studies were made on twenty-six taxa of the genus *Jasminum* L. collected from different parts of Kerala using LM and SEM on acetolysed pollen grains. The pollen grains were in general medium-sized or large, 3(4)-zonocolporate and subprolate, oblate-spheroidal or prolate spheroidal with reticulate exine ornamentation. The range of pollen size recorded in the present study is much higher than the earlier reports of 19.5 to 63 µm for polar diameter. Although pollen size has been correlated with flower size, style length and anther length, no such correlation was observed in the present study.The heterobrochatemuri are mostly flat and smooth, sometimes with granular warts. The brochi were narrow or broad, with the tall muri encircling deep lumina, except in *J. auriculatum,* with short muri and shallow lumina. The luminal floors were also warted, open or closed, sometimes plugged with wax. In several taxa, they appeared smooth and perforated, with the warts united to form plated lumina. The taxa studied clearly showed four categories of pollen grains based on mural architecture and luminal size such as :*(1)Pollen with very irregular muri and narrow elongated lumina(J. grandiflorum), (2) Pollen with irregular muri and narrow short lumina(J. azoricum), (3) Pollen with more or less round muri and broad lumina(J. auriculatum) and (4) Pollen with very closely placed muri and very short lumina, appearing almost porous (J. ritchiei).*But these four pollen categories did not show any correlation with the existing morphological sectional groups within the genus.Warts, when present, were small or medium-sized, regular or irregular, appearing as small protuberances, granular or globular structures. They were very crowded in *J. laurifolium* and *J. multiflorum*, but in moderate or less numbers in the remaining taxa studied. The

major palynological features appear to be highly conserved in the genus, with only slight variations in the size and regularity of the brochi, presence and absence of warts on luminal floors etc. These differences are too minor for correlation with the existing subdivision of the genus into five sections based on their leaf arrangement and flower colour. Hence pollen morphology cannot be depended upon as a single major aspect capable of elucidating the complex intra-specific ramifications within the genus.

The initial proposal for this project was submitted with the aim of analyzing the inter-relationships between the members of the genus *Jasminum* from India using RAPD markers. However, a perusal of molecular literature comparing the efficacy of RAPD and ISSR markers in plant systematic studies revealed that ISSR markers are much more efficient than RAPD markers in unraveling systematic complications.Forty accessions belong to 23 species of *Jasminum* L. from India mostly from Kerala and Tamil Nadu, corresponding to ca. 44% of ca. 50 species of the genus reported from India, are included in the present study. Among the studied materials, 6 taxa are endemic to Western Ghats and Peninsular India (*J. brevilobum*, *J. calophyllum*, *J. agastyamalayanum*, *J. malabaricum*, *J. cordifolium* and *J. trichotomum*). This is the first genetic diversity study of the genus *Jasminum* in India.The NJ obtained using ISSR analyses consist of three main clusters: The Major Cluster I consists of 10 accessions of 6 species having compound and opposite or subopposite leaves.Although ISSR NJ clustering and PCoAanalysis failed to group the *Jasminum*accessions based on geographical origin, the distinction of sections within the genus appears to be partially substantiated with the two major sections viz. *Unifoliolata* and *Trifoliolata*falling into separate major clusters. Further the results also expose the divergent groups within these two major sections.