and the fitted curve are shown in figure 1.

The present observation shows a wide range of inter-
and intraspecific variability in the nitrogen-fixing
capacity of *Nostoc* which differs significantly from the
normal. It is thus clear that if algal nitrogen fixation is
aimed at increasing the nitrogen economy, the selec-
tion of efficient strains is as important as defining
ecological stresses and finding means to overcome
them.

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5. Elderton, W. P. and Johnson, N. L., *Systems of

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**SCANNING ELECTRON MICROSCOPY AND GERMINATION STUDIES OF POLLENS IN THE GENUS IPHIGENIA (KUNTH)**

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The genus *Iphigenia* (2n = 22) has six species in India,
of which *I. pallida* Baker, *I. stellata* Blatter and *I.
magnifica* Ansari et Rolla Rao, are widely distributed in
the western regions of Maharashtra. These species are
mainly classified based on the perianth colour, size and
shape of the fruit and position of raphae. In recent
years palynological characters have been considered as
stable identity to differentiate the species. Light
microscopic study of pollens in *I. indica* has been
reported. But with the advent of scanning electron
microscopic (SEM) application to pollen study many
more details about the pattern of exine stratifications are
unravelled which is the main approach here. In this
note, SEM studies of pollens in the three species of
commercial importance, namely *I. pallida* Baker,
*I. stellata* and *I. magnifica* are reported.

**Methodology:** Matured anthers of deep yellow colour
were plucked just prior to their anthesis and pollen
gains were tested for viability with a mixture of iron
aceto-carmine and glycercine (1:1). Prior to the SEM
studies pollen grains were acetolysed and SEM studies
were carried out at the National Chemical Laboratory,
Poona. Germinability test of pollen grains were made
in a range of sucrose solutions from 2 to 6% at room
temperature (23–25°C) by hanging drop technique.
Germination counts were made after 24 hr when the
pollen tubes have emerged from most of the pollen
gains.

**Pollen morphology**

*I. pallida*—medium-sized pollen grains (36.36–27.7
× 27.7–19.09 μ), monocolpate, prolate, saucer-shaped,
radially symmetrical, colpus long, finely defined,
colpus membrane granulate, exine margin supporting
with microchinate projections. Ornamentation tectum perforatum, muri relatively thick, pointed

<table>
<thead>
<tr>
<th>Genus and Species</th>
<th>Pollen grain size range*</th>
<th>(L × B) in microns average*</th>
<th>Ratio of polar to equatorial axes (P/E)</th>
<th>Pollen class</th>
<th>Pollen shape</th>
<th>Ornamentation types</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>I. pallida</em></td>
<td>36.36 – 27.27 × 27.27 – 19.09</td>
<td>34.09 × 24.27 ± 1.14 ± 0.87</td>
<td>1.44</td>
<td>ME</td>
<td>Prolate</td>
<td>Tectum perforatum, muri pointed at end</td>
</tr>
<tr>
<td><em>I. stellata</em></td>
<td>36.36 – 22.73 × 31.82 – 22.73</td>
<td>28.46 × 26.63 ± 1.34 ± 0.77</td>
<td>1.07</td>
<td>ME</td>
<td>Prolate spheroïdal</td>
<td>Rugate, muri interrupted and arranged in short curved sections</td>
</tr>
<tr>
<td><em>J. magnifica</em></td>
<td>27.27 – 22.75 × 25.00 – 22.27</td>
<td>25.27 × 23 ± 0.61 ± 0.21</td>
<td>1.1</td>
<td>M1</td>
<td>Prolate spheroïdal</td>
<td>Tectum perforatum to microreticulate</td>
</tr>
</tbody>
</table>

*Mean of 25 readings; ± = S.E.
Figure A. Pollen grains of Iphigenia (SEM, acetolysed). 1–5. I. pallida. 6–8. I. stellata. 9–12. I. magnifica. (5,8 and 11—Surface views of outer layer × 20000).

Table 2 Germination behaviour in different sucrose concentrations in Iphigenia

<table>
<thead>
<tr>
<th>Genus and Species</th>
<th>Pollen viability (%)</th>
<th>Pollen germination (%) at sucrose concentration (%) of</th>
<th>Dist. water</th>
<th>2</th>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. pallida</td>
<td>71.34</td>
<td></td>
<td></td>
<td>13.5</td>
<td>64.27</td>
<td>29.59</td>
</tr>
<tr>
<td>I. stellata</td>
<td>91.77</td>
<td></td>
<td></td>
<td>10.55</td>
<td>64.43</td>
<td>32.9</td>
</tr>
<tr>
<td>I. magnifica</td>
<td>71.31</td>
<td></td>
<td></td>
<td>41.66</td>
<td>9.66</td>
<td>30.25</td>
</tr>
</tbody>
</table>
towards end, lumina narrowly opened and irregular.

*I. stellata*—pollen grains medium-sized (36.36–22.73 × 31.82–22.73 µ), monocolpate, prolate spheroidal, colpus, long broad, finely-defined, deeply sunken, colpus membrane granulate, exine margin continuous and spinous. This type of ornamentation differs distinctly from the other two species. Ornamentation more distinctly rugate and muri-stratified, often distinctly interrupted and arranged in short curved sections. Muri usually simplicolumellate or duplicolumellate.

*I. magnifica*—small pollen grains (27.7–22.75 × 25–22.7 µ), monocolpate, prolate spheroidal, plano-convex, colpus finely defined, long broad, exine continuous with well-defined margin and frequently adorned by microechinate spines. Ornamentation varies from a tectum perforatum to microreticulate or finely reticulate, muri relatively thick, lumina irregular to circular in shape.

**Pollen Germination**

Although percentage of pollen viability both in *I. pallida* and *I. magnifica* are on par (71%) their responses of germination to sucrose medium are varied. Lower sucrose concentrations (2%) stimulate pollen germination in *I. pallida* (table 2) whereas it inhibits the pollen germination in *I. magnifica*. In contrast to this, there are high pollen viability (91.77%) of *I. stellata*. They germinate better in 2% sucrose concentrations (table 1).

Thus it is suggested that such a large range of pollen size, ornamentation variations, and varied responses to germination behaviour of pollens supports the heterogenous nature of the genus *Iphigenia*.

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**ON THE OCCURRENCE OF DENDROBIUM LAWIANUM LINDL IN KERALA**

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The genus *Dendrobium* Sw is the largest genus among the orchids. Hooker, Gamble and Abraham and Vatsala have reported only 12 species of this genus from South India. During the survey of the orchids of the Kerala Forests the authors could collect 15 species of this genus. A specimen of *Dendrobium* in its vegetative condition was collected in 1983 from Sholayar, Trichur District, Kerala at an altitude of 500 m. This species was found to be localized in their natural habitat. This specimen flowered in cultivation in the Institute garden during 1984 and 1985. On critical taxonomical study this specimen was found to be *D. lawianum* Lindl which has so far been recorded only from the Western Ghats of Karnataka. The

![Figure 1. Dendrobium lawianum Lindl an addition to the flora of Kerala](image-url)