most commonly followed. The present study reveals the varying germination behaviour of the dimorphic seeds of *Indigofera hochstetteri*, a common rainy season legume in the Indian desert.

During seed collection of legumes of Indian desert, two types of seeds were discovered in this species which differed in seed coat pattern as yellow and yellow-mottled. The results on imbibition and germination of seeds are presented in tables 1 and 2.

### Table 1 Weight (mg) and imbibition (%) in dimorphic seeds of *I. hochstetteri*.

<table>
<thead>
<tr>
<th>Seed type</th>
<th>Seed colour</th>
<th>Weight (mg) (100 seeds)</th>
<th>Imbibition % (in hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Yellow</td>
<td>141</td>
<td>0 1.4 10.0</td>
</tr>
<tr>
<td>B</td>
<td>Yellow-mottled</td>
<td>156</td>
<td>0 0 5.1</td>
</tr>
</tbody>
</table>

### Table 2 Effect of varying conditions and pretreatments on germination behaviour of dimorphic seeds of *I. hochstetteri*.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Duration</th>
<th>Seed type</th>
<th>1 2 3 4 5 6 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous light</td>
<td>5 min</td>
<td>B</td>
<td>35 50 55</td>
</tr>
<tr>
<td>Continuous dark</td>
<td>5 min</td>
<td>B</td>
<td>20 30 75 80</td>
</tr>
</tbody>
</table>

This chemical scarification for 10 min increased the germination to 80% in type A after 4 days, while it was 60% in type B only after 7 days. Moreover, 20% germination in type A could be observed after 1 day; while in type B this happened only after 3 days. This further proved that seeds of type B possessed harder seed coat.

Owing to this variability in seeds, the occurrence of polymorphism can lead to better establishment of the plant species in varied ecological conditions, especially in deserts; and hence a preliminary step toward evolution. Further work is in progress.

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**Fungal Infection of Pearl Millet Seeds Through Colonisation of Persistent Antherlobes—A Hitherto Unrecorded Aspect**

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Stigma, Nectory, ovary wall, pericarp and the integuments of the seed coat have been reported as entry points of seed infection for several fungi. Mclean reported that the drying petals of crucifers
provide a foothold for the mycelial invasion of *Sclerotinia sclerotiorum* originating from airborne ascospores into the primordium of siliqua. But none of the literature published so far claims the infection of seeds by fungi after colonising the antherlobes.

The present investigation was carried out with the pearl millet cultivar IP 7042. It was observed that the antherlobes remain attached to the earhead up to the grain filling stages even after anthesis (figure 1). On such earheads moldy growth was observed after torrential showers (figure 2). The persistent antherlobes were carefully separated from the earhead which, upon incubation on wet blotters at $22 \pm 1^\circ$C for 7 days, revealed the presence of pearl millet pathogenic fungi like *Drechslera setariae*, *Cladosporium cladosporoides* and *Fusarium* sp.

A careful examination of the infected earhead under stereo binocular microscope revealed the mycelial invasion of these fungi from the persistent antherlobes on to seeds through the region of attachment (figure 3). The seeds separated from the infected earheads upon incubation on sterile wet blotters for seven days confirmed the presence of the above said fungi and showed poor seed germination. The conidia of these fungi were successfully trapped on the experimental pearl millet plot using vertical cylinder traps. Thus, these airborne fungi first colonise the antherlobes. After getting a foothold on the persistent antherlobes, they colonise the seeds leading to seed infection resulting in crop loss in the form of poor quality seed. In the earheads of the same cultivar, in which antherlobes were mechanically removed, showed drastic reduction in seed infection. Report of this type of invasion of seeds by fungi is the first of its kind.

The exact reason for the preferential ability of the antherlobes to support such fungal growth is yet to be unravelled. The antherlobes retain some amount of pollen even after dehiscence. Pollen is reported to enhance the per cent germination, length of germ tube and rate of infection of many pathogenic fungi like *Helminthosporium sativum*, *Septoria nodorum*<sup>7</sup>, *Phoma betae*<sup>8</sup>, *Botrytis cinerea*<sup>9,16</sup>, *Fusarium graminearum*<sup>11</sup> and *Drechslera turcica*<sup>12</sup>. Experiments conducted during the current investigations have demonstrated the pollen of pearl millet enhancing the germination of spores of fungi like *Drechslera setariae* and *Cladosporium cladosporoides* showing that it is a good nutritive medium.

It can be said that these pearl millet pathogenic fungi first colonise and grow on persistent antherlobes which is a nutritive medium because of the presence of pollen in them. Their growth is supported by high humidity which is often common during the crop periods. Later they invade the seed tissues through the region of attachment of the persistent antherlobes.

Thus, persistence of antherlobes is a pre-disposing factor for earhead and seed infection in some of the elite cultivars of pearl millet. In breeding programmes, plants which do not retain antherlobes after anthesis should be selected and incorporated in reconstituting the high yielding cultivars.

The authors are grateful to Professor K. M. Safeulla for his constant encouragement.

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NUCLEOLAR AMPLIFICATION DURING METAXYLEM DIFFERENTIATION IN ROOT MERISTEM OF ALLIUM CEPA VAR. VIVIPARUM

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The Srinagar clone of Allium cepa var. viviparum is triploid (2n = 3x = 24) but it has a single nucleolar chromosome1–3. Accordingly, the interphase nuclei organise a single nucleolus. While squashing root tips of some plants raised in experimental plots, a few nuclei were found to display substantial variation in the number as well as size of nucleolus. Some were found with an exceptionally enlarged nucleolus. Others displayed nucleolar budding. A few cells had binucleolate nuclei (figures 1–4). Differential nucleolar condition in various zones of developing roots is

Figures 1–4. 1–3. Parts of longitudinal sections of roots of Allium cepa var. viviparum. Note the presence of binucleolate nucleus in central row (figure 1) 2–3 show large and irregular nucleoli in the same region. 4. A row or cells, showing the phenomenon of nucleolar budding. (scale – 10 μm)