ment and each experiment was repeated thrice. The cultures were maintained at 25 ± 5°C in diffuse light under 50–60% relative humidity.

Shoot buds did not develop in the controls, i.e., on explants inoculated either directly on WM or after being immersed in autoclaved distilled water. On the other hand, 1–15 shoot buds differentiated from the radicular end and hypocotyl of embryos immersed in kinetin solution prior to inoculation on WM (Fig. 1).

![Fig. 1. Dendrolobium falcata (L.f.) Ettings. 4-week-old culture of embryo which was immersed in kinetin solution (2 mg/ml) for 5 minutes prior to inoculation on WM. Note the shoot buds differentiated from the radicular end and hypocotyl, X 6-2.](image)

From embryos immersed in kinetin solution for 1–5 minutes buds appeared after about a week of inoculation. However, when they were immersed for a longer time (20, 40 or 60 min.), bud differentiation occurred only after about 2 weeks. Best result was obtained by immersion for 15 min. in 2 mg/ml kinetin solution: after 4 weeks buds differentiated in about 85% cultures of embryos, and the maximum number of buds developed per explant was 17. Some of these buds grew into shoots after another 2–3 weeks. Buds also differentiated on the embryos inoculated directly on WM supplemented with kinetin (2, 5 or 10 ppm).

These buds were comparable in morphology to the buds which differentiated after immersion. The minimum time required for the buds to develop in such cultures, however, was about 12 days.

It is interesting to note that kinetin can induce bud differentiation in explants immersed in it even for one minute. This shows that the action of kinetin in bud initiation is very quick. As far as we know, this is the first report of immersion of explant in the phytohormone solution prior to its inoculation in the medium of tissue culture. This technique can be profitably be utilized to study the mechanism of action of phytohormones specially during organogenesis.

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POLYMITHOSIS IN THE MICROSPORIES OF ELEPHANT FOOT YAM

Amorphophallus campanulatus, otherwise known as elephant foot yam, is an important subsidiary food crop found in tropics. While screening the germplasm a clone was isolated, which showed 52±0% pollen sterility while the other clones showed pollen fertility above 90%. Microsporogenesis was studied in detail to identify the causes of high pollen sterility.

The PMCs showed 14 bivalents at diakinesis (Fig. 1) and M1 and later divisions were also regular resulting in normal tetrads which disjuncted into microspores. About 50% of the microspores developed in the usual way. The microspore nucleus divided into large vegetative and a small well stained generative nuclei. At the time of anthesis, the generative nucleus divided and the pollen grains became trinucleate (Fig. 2).

The remaining microspores behaved in a different manner. When the microspore nucleus divided the resultant nuclei were identical in shape and size and frequently, the second division followed immediately (Fig. 3). The division proceeded further resulting in microspores having up to six nuclei and the microspores began to show vacuolation and incipient exine could be also discernible (Fig. 4). Later, the microspore wall differentiated into distinct exine and intine (Fig. 5).

Occasionally cross wall formation took place immediately after the first division (Fig. 6) and it continued further and a number of microspores was found having as many as 5 cells (Fig. 7). Such multicellular microspores subsequently developed deep clefts (Fig. 8) and the individual cells get separated. The occurrence of micropollen with single nuclei along with normal pollen grains in the mature anthers (Fig. 9) further demonstrated that they were the product after the liberation from the multicellular microspores. In
the mature anther; the pollen fertility was found to be only 15% (Fig. 10).

FIGS. 1-10. 1. Diakinesis with 14 bivalents, × 800. 2. Normal pollen with 3 nuclei, × 240. 3. Young microspore with 4 nuclei, × 400. 4. Microspore with incipient exine and showing 4 nuclei and vacuolization, × 400. 5. Pollen with 3 nuclei, × 400. 6. Young microspore with a cross wall, × 400. 7. Microspore with 2 cells, × 400. 8. Multicelled microspore showing deep clefts among the cells, × 400. 9. Normal pollen (←) and micropollen (→), × 150. 10. Fertile and sterile pollen, × 90.

Supernumerary divisions in the microsporocytes have been widely reported in a number of plant species\(^2\) and as a consequence of these divisions the microsporocytes could produce groups on 16–20 cells. Pollen grains having eight nuclei and closely resembling the embryo sacs and known as 'Nemec Pollen' are known to occur in a few plants under special conditions and attributed the origin of abnormality to the duplication of generative nuclei\(^3\)–\(^5\). Though, the multinucleate pollen observed in the present study did not resemble in any way with the embryo sac, the phenomenon of multicellular microspores and consequent liberation of micropollen from them is rather interesting and being reported for the first time.

The polytosis in the elephant foot yam represent an interpolation of events not represented in its normal life history and attributed to the absence of some regulatory factor controlling the nature and stage of divisions as suggested in maize\(^2\). The polytotic character of maize has been shown to be due to a recessive mendelian gene\(^1\). The occurrence of polytosis in about half of the microspores makes one to suspect, the plant itself is heterozygous for this attribute and consequent of meiosis and segregation in PMC's half the microspores developed into normal pollen grains while the remaining half of the microspores which received the recessive gene responsible for polytosis became polytotic because it found immediate expression due to the haploid status of microspores.

The role of tapetal in the resulting partial pollen sterility can be ruled out because both fertile and sterile pollen were present inside the same anther sacs. Hence the 32% pollen sterility encountered in the present clone is due to the occurrence of polytosis in about half of the microspores.

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**COCHLIOBOLUS NODULUS, A NEW RECORD TO INDIA**

A FUNGUS with black fruiting bodies was found by the authors on dry culms, leaves and leaf sheaths of *Eragrostis pilosa* (Linn.) Beauv. during September-October, 1974. The fungus was identified as *Cochliobolus nodulosus* Luttrell which has not been reported previously from India on this host. However, it has been reported by Luttrell\(^1\) from Georgia on *Elymus* sp. Isolation was made on PDA. Numerous pseudothecial bodies of the fungus developed after 10 days, incubation, measuring 155–10–564·00 μ × 183·50–705·00 μ, Ostiolar beak 78·70–141·00 μ × 169·00–282·62 μ;