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LAEVIGATOSPORITES OVALIS WILSON AND WEBSTER WITH ITS SPORANGIUM FROM LIGNITIC BEDS OF RATNAGIRI DISTRICT

OCCURRENCE of Lignite in Ratnagiri District was reported in 1871 by Wilkinson.[4] Since then several other geologists have also added to the list of exposural sites in this district, mainly from well sections. Palaeobotanical information on these beds is entirely lacking. The present communication records some commonly encountered sporangia containing spores from the lignite encountered in two well sections on Ratnagiri–Pawas Road at third Dharmashala stop.

Sporangium (Fig. 1) stalked, ovoid, 300·00 μm long, 225·00 μm broad in the middle; wall single-celled in thickness; annulus vertical, cells rectangular, transversely extended, 72·0 × 34·0 μm, radial walls highly thickened, thickness of common wall 6·8 μm; stomium prominent, 51·0 μm in vertical extent, cells 44·2 × 17·0 μm, transversely elongated; other cells of sporangial wall thin, rectangular, vertically oriented, 85·0 × 29·0 μm, thickness of common wall 1·7 μm; sporangial stalk multilayered, cells vertically elongated, ± rectangular, about 51·0 × 17·0 μm, thin-walled.

FIGS. 1–3. Fig. 1. Sporangium, × 1,900. Fig. 2. Sporangial bit with spores, × 1,900. Fig. 3. Isolated spore, × 4,000.

Spores psilate, monolete, bilateral, concavoconvex, 32 × 40 × 32 μm; laesura simple, 26·0 μm long, margin slightly thickened, ends pointed (Figs. 2, 3).

The above description of the spores agrees with that of *Laevigatosporites ovalis* described by Wilson and Webster[5] from the Tertiary coal of Montana, U.S.A. and hence these spores have been attributed to *L. ovalis* Wilson and Webster.

In India, the sporae disperse of *L. ovalis* have been hitherto recorded from the Tertiary deposits of Warkalli, Neyveli (Ramanujam[1]) and the Cauvery basin of South India (Venkatachala and Rawat[3]).

Wilson and Webster[5] attributed the affinity of *L. ovalis* with such genera of polypodiaceae as *Asplenium*, *Athyrium*, *Aspidium*, *Blechnum* and *Thylepteris* which produce plano-convex to concavo-convex, smooth-walled, monolete spores. As there is uncertainty about the preservation of perine during fossilization, it was not possible to determine whether the dispersed spores of *Laevigatosporites ovalis* were perinous or non-perinous.

The structure of the sporangium described here alongwith these spores confirms the affinity of the latter with the family Polypodiaceae. It may be noted that no trace of perine could be seen even in those spores found inside the sporangium (Fig. 2), suggesting that *L. ovalis* is a non-perinous morphotype.

All the genera mentioned above except *Athyrium* have perinous spores. The spores of some species of *Athyrium* are perinous but those of the nonperinous species are granulose to rugulose. A comparison of these spores with the living members of Polypodiaceae (Santha Devi[2]) suggests their affinity with the members of the subfamily Platyserioideae with smooth-walled spores.

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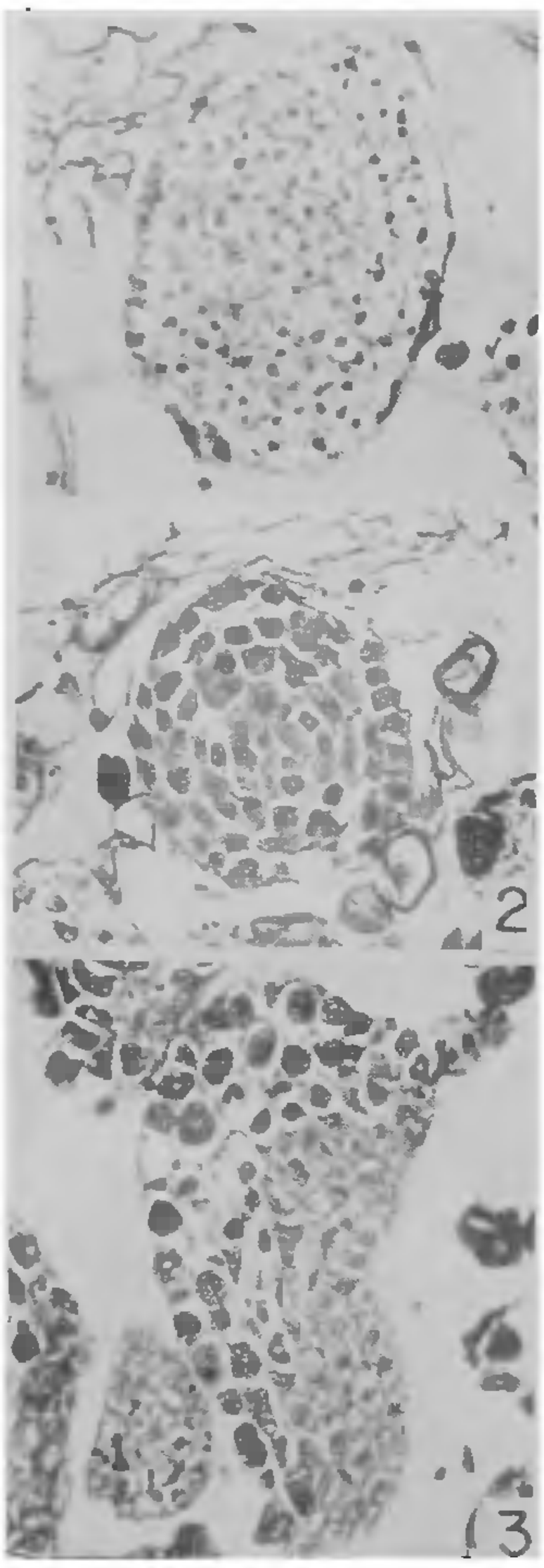
CHIMERAL EMBRYOIDS OF POLLEN ORIGIN IN TOBACCO

PRODUCTION of haploids from anther cultures of tobacco has been demonstrated by various authors[1]. There are reports of haploid production using tetrad, uninucleate and binucleate pollen grains[2]. However, certain facets concerning the ontogeny of embryoids

from pollen, still remain unexplained. The mode of origin and the destinies of vegetative and generative cells have been matters of controversy. An embryoid, largely constituted of vegetative cell derivatives has been demonstrated in *Datura innoxia*[3], *Nicotiana tabacum*[4], *Datura metel*[5] and *Hordeum vulgare*[6]. On the other hand, Devreux *et al.*[7] suggest the participation of generative cell in embryoid development. An embryoid derived from divisions of generative cell has been recently reported in *Hordeum vulgare*[8].



FIGS. 1–3. Fig. 1. L.s. of an embryoid derived from vegetative cell, ×300. Fig. 2. T.s. of an embryoid derived from generative cell, × 300. Fig. 3. L.s. of a chimeral embryoid, × 300.

Anthers from fresh flower buds of *Nicotiana tabacum* cv. 'Fluc-Cured Virginia Special' were cultured on Murashige and Skoog's[9] medium supplemented with 1 mg/l benzylaminopurine. The aseptic culture techniques were in accordance with the published literature[10].

An analysis of ontogeny of embryoids arising from bi-celled pollen grains in the present study, reveals the existence of three distinct pathways: (*a*) the derivatives of the larger vegetative cell alone contribute to the formation of the embryoid; the cell are vacuolate with lightly stained protoplast (Fig. 1); (*b*) those of the generative cell alone make up the embryoid; the constituent cells possess deeply stained protoplast (Fig. 2) and (*c*) derivatives of both vegetative and generative cells contribute to the formation of the embryoid resulting in a chimera (Fig. 3), the chimeral portions exhibiting the histological characters respectively of (*a*) and (*b*). Histological differences between the chimeral regions in different staining schedules thus confirm the existence of the above three pathways. Furthermore, there is always a degree of plasticity among the pollen grains of a single anther since the co-existence of the three pathways is noticed *in situ*. The chimeral pattern which is highly variable, essentially depends on the extent of sectorial and topographical participation of the two cells, vegetative and generative. The histological features, characterising the three pathways persist till late stages of embryoid development and they are likely to be carried on to the plantlets also, a programme that is under investigation.

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