any stomata or pores. The nectary tissue can be differentiated into a secretory and sub-secretory zone. The secretory zone is oval in shape and composed of palisade-like parenchyma cells with dense cytoplasmic contents and prominent nuclei. The sub-secretory zone consists of polygonal parenchyma cells. The vascular supply to the nectary consists of both xylem and phloem strands and it ramifies in the sub-secretory tissue. Branched, non-articulated laticifers also enter into the nectary in association with phloem. The vascular supply represents one of the branches of secondary vein (figure 1). The gross anatomy, mode of distribution and the vascular supply show that these structures can be considered as extra floral nectaries[2].

Notes: Undershrubs, rare in forest undergrowth. Flowers creamy yellow. Calycine nectaries are present along the margin. Unsegmented secretory disc in male flowers is extra staminal in positions.
Illu. Keshav et Yog. *op. cit.*, figures 1–4.
Exsiccata: *MV* (Toranmal) 1548. Fls. & Frs. January.

The authors thank DST (T.J) and MAB (M.V) for financial assistance and Mr. Vinoth Thomas for assistance.

31 December 1987; Revised 14 March 1988

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PRODUCTION OF UNISEXUAL PROGENY IN RICE GALL MIDGE *ORSEOLIA ORYZAE* (WOOD-MASON)

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SOME insects, viz. Hessian fly, *Mayetiola destructor* (Say)[1] and sorghum midge, *Contarinia sorghicola* (Coq)[2] of the family Cecidomyiidae, and others of the closely related family Sciaridae[3] produce unisexual progeny, i.e., broods either exclusively male or exclusively female. The rice gall midge, *Orseolia oryzae* (Wood-Mason) (Diptera: Cecidomyiidae) is a serious pest of rice in India. The adult fly lays eggs on leaf sheath or leaf blade and the eggs hatch after 3–4 days. After hatching the maggots enter the plant, feed on growing points in the tillers and produce 'silver shoots' within 15–20 days. The affected tillers do not bear any panicles. Since no information is available on the question of production of unisexual progeny in rice gall midge, investigations were undertaken.

Newly emerged unmated male and female gall midges were collected separately by covering individual silver shoots with mylar tubes prior to adult emergence. One pair of these adults was then caged on five 25-day-old potted rice plants of the variety T(N)1. After 24 h of mating and oviposition, the mylar tubes were removed and the potted plants were kept in a humidity chamber at 80% RH for 4 days for incubation of eggs. The potted plants were then shifted back to normal humid conditions for development of the maggots. About 15 days after oviposition when 'silver shoots' appeared, the individual pots were again covered with triacetate tubes of bigger size for collection of adults. The number of male and female gall midges that emerged — representing the progeny of one mated female — was recorded. Ten pots (5 plants/pot) were used as 10 replications. The experiment was repeated once every month from July 1979 to June 1980.

The results revealed that of the 120 individually mated females studied, 51 produced all-male and 69 all-female progeny. None produced both male and female progeny. Further, temperature effects did not account for the production of unisexual progeny. The overall ratio of females producing male progeny to females producing female progeny was 1:1.35.

In another experiment designed to reveal the existence of parthenogenesis, 10 mated and 10 unmated gall midges were individually caged on five T(N)1 plants as described earlier. Mated females oviposited a significantly higher number of eggs (89/female) compared to unmated females (31.2/female). However, no such difference was reported by Hidaka *et al*[4] possibly because a fewer number of replications were maintained in their study. While over 99% of the eggs laid by mated female hatched resulting in silver shoot formation in 57% of the tillers, none of the eggs laid by unmated female hatched and consequently no silver shoot was observed. This ruled out the existence of parthenogenesis in rice gall midge.

Painter[1] discounted differential death rates between the sexes of Hessian fly as a mechanism for the unisexuality of individual broods. Baxendale and Teetes[2] also reasoned that in sorghum midge unisexual broods were not the result of differential larval mortality. In arrhenotokous insects the mated females

produce only female progenies while unmated females reproducing parthenogenitically produce only males. However, in rice gall midge parthenogenesis did not occur and differences in temperature in different months also did not account for the phenomenon of unisexual broods. The mechanism for the production of unisexual progeny in rice gall midge is yet to be elucidated.

30 November 1987; Revised 16 January 1988

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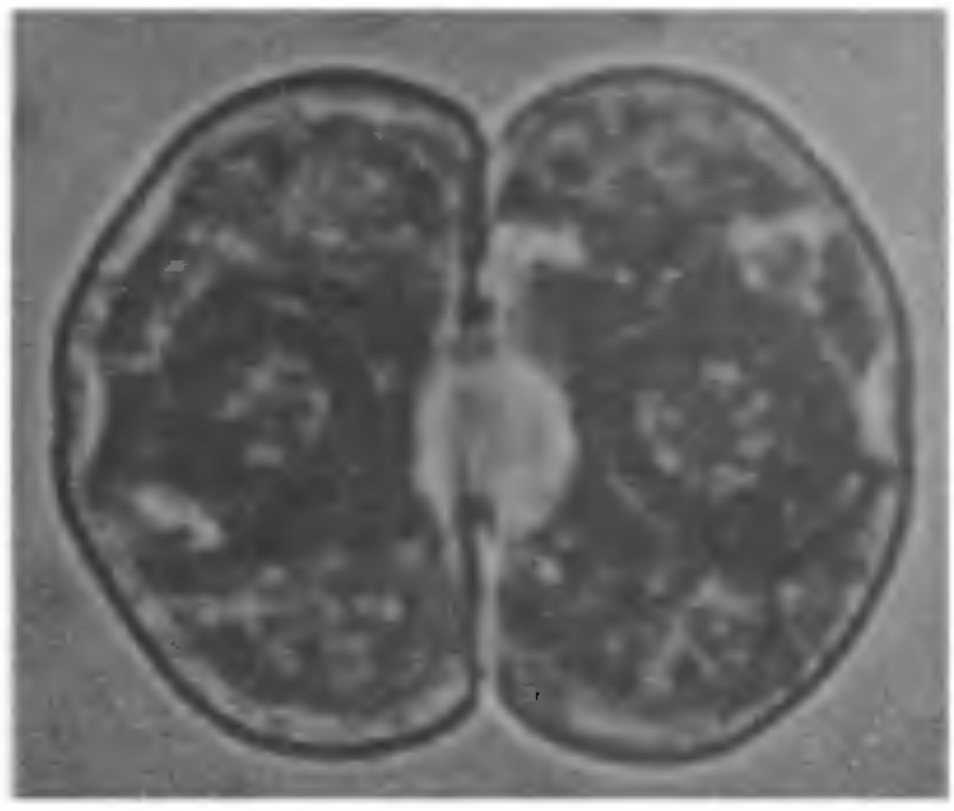

Figure 1. *Cosmarium wembaerensis* Schmidle. Cell under light microscope (×2000).

COSMARIUM WEMBAERENSIS SCHMIDLE UNDER SEM

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DESMIDS are difficult materials for SEM studies, as they secrete copious quantities of mucilage. Various methods have been tried earlier to remove this mucilage to get good micrographs[1]. Scanning electron microscopical studies of certain Desmids include seven species of the genus *Cosmarium* (*C. bioculatum*, *C. botrytis*, *C. contractum*, *C. cucumis*, *C. formosulum*, *C. praemorsum* and *C. subtumidum*). In the present investigation the surface ornamentation of one of the placoderm desmids, *Cosmarium wembaerensis* Schmidle was studied using SEM.

The alga was collected from a Czechoslovak natural locality in October 1985 and isolated and grown in Chu 10 inorganic medium under laboratory conditions, employing 16 h light and 8 h dark period at a temperature of 18–22°C. The freshly inoculated healthy growing culture was selected for fixation. Cells were fixed by standard glutaraldehyde/Osmium procedures and then dehydrated by various grades of acetone (30, 50, 70, 90 and 100%). Lastly, the sample was dried and shadowed with gold and carbon. The observations were made at 15 kV in a scanning electron microscope installed at Ceske-Budejovice.

The species is small, $1\frac{1}{3}$ times as long as broad, sinus deep, closed, lower part of the side diverging, straight, upper portion strongly convergent. Lateral summit and apex rounded. Semicell in top view broad elliptical and slightly swollen. The cell typically measures 22–24 μ in length, 18–19 μ in breadth and isthamus 6–7 μ^2. The cell shows quite a smooth surface under LM (figure 1). It was frequently observed that desmids show a lot of mucilage accumulation, which would obscure the cell surface (figure 2). The incubation of specimens in a solution of the polysaccharidase preparation. Glusulase, proved useful for removing the mucilage. The cells developed their typical surface ornamentation only after the semicells became mature. The cells of *Cosmarium wembaerensis* show mucilage forming a reticulate pattern on its surface (figure 3). The mucilage pores are arranged in a regular group in a specific pattern. The surface ornamentation and the arrangement of mucilage pores are also shown in the lateral and top views (figures 4 and 5). It was typically observed in this species that on the apical region there is a slight depression in the wall. This depression seems to be beset with numerous mucilage pores all round its periphery, arranged in a circle (figures 6 and 7). All these observations would further help in the taxonomic identification of the species.

The authors are grateful to Dr Ruzicka, Czechoslovakia, for rendering the taxonomic identification of the species and also for selecting the micrographs. One of the authors (VV) is thankful to the authorities of Kakatiya University and UGC for being