ble amount of the alkaloid solasodine, which is used as a starting material for the partial synthesis of contraceptive agents, corticosteroids and sex hormones.

The maximum yield of the berries was obtained when the crop was raised during monsoon[2] and the maximum alkaloid content was found in the pale yellow stage of the berry[3-5]. Thus the berries of monsoon crop harvested at appropriate stage of maturity are to be dried and stored for regular supply to the industry. Presently, most of the industries reley upon dried berries for their steroid raw material. Since the conditions of drying the plant material are known to affect the solasodine content[6,7], it is necessary to evaluate the effect of various drying conditions on the solasodine content of the berries.

The berries of uniform size at the pale yellow stage of maturity were harvested from a pot grown plant. One berry was analysed fresh and rest were quartered and dried separately under different conditions *viz.*, 80° C, 60° C, 40° C, sunshine (37–22° C) and open shade (34–22° C). After drying to constant weight, individual berry was powdered and solasodine content was estimated following the method used earlier[8]. The experiment was repeated in ten replicates, selecting the berries from separate plant for each replication.

The solasodine content in the fresh berries and after drying under different conditions are presented in table. It is evident from the data that average solasodine content of fresh berries was maximum, which is significantly reduced on drying. The maximum losses in extractable solasodine were noted in shade and sundried samples. The extent of this decrease appears to be related with the time required for drying under a particular condition. The pericarp of the berry is much fleshy and takes longer time for complete drying under low temperature conditions. Large number of fungi have been found to be associated with the seed material of this plant[9]. The longer drying time seems to be congenial for fungal growth and subsequent degradation of the alkaloid.

The present experiment indicates profound effect of drying conditions on the alkaloid content of the berries. This aspect has been overlooked in the available reports on *S. viarm* Dunal. Wide variation in the solasodine content, ranging between 0.32 to 5.4% on dry weight basis, have been reported so far. These differences could be partially due to variation in the drying condition used prior to estimation. It is therefore suggested to standardize the drying condition for proper assessment of the solasodine content. Drying at 60° C may be recommended for industrial and estimation purposes as minimum loss occurs under this condition.

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FUNGAL SPORES FROM THE HOLOCENE SEDIMENTS OF TRIPURA, INDIA

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LITTLE is known about the palaeomycology of Tripura, except for two brief unpublished reports[1,2]. Only two published papers exist from India on the quaternary fungal elements[3,4]. However, considerable literature is available on the fossil fungi from other geological periods elsewhere from India.[5].

Peat samples were collected from the Holocene sequence of the Khowai and Sonai valleys, West Tripura District (figure 1) as part of the programme to unfold the Quaternary history of the intermontane river valleys of Tripura. The peat deposits occur as thin lenses (1–2 m) within a feebly oxidised to unoxidised sand-silt-clay sequence of fluviatile origin. C^{14} dating of the samples by the Birbal Sahni Institute of Palaeobotany, Lucknow has given the age of

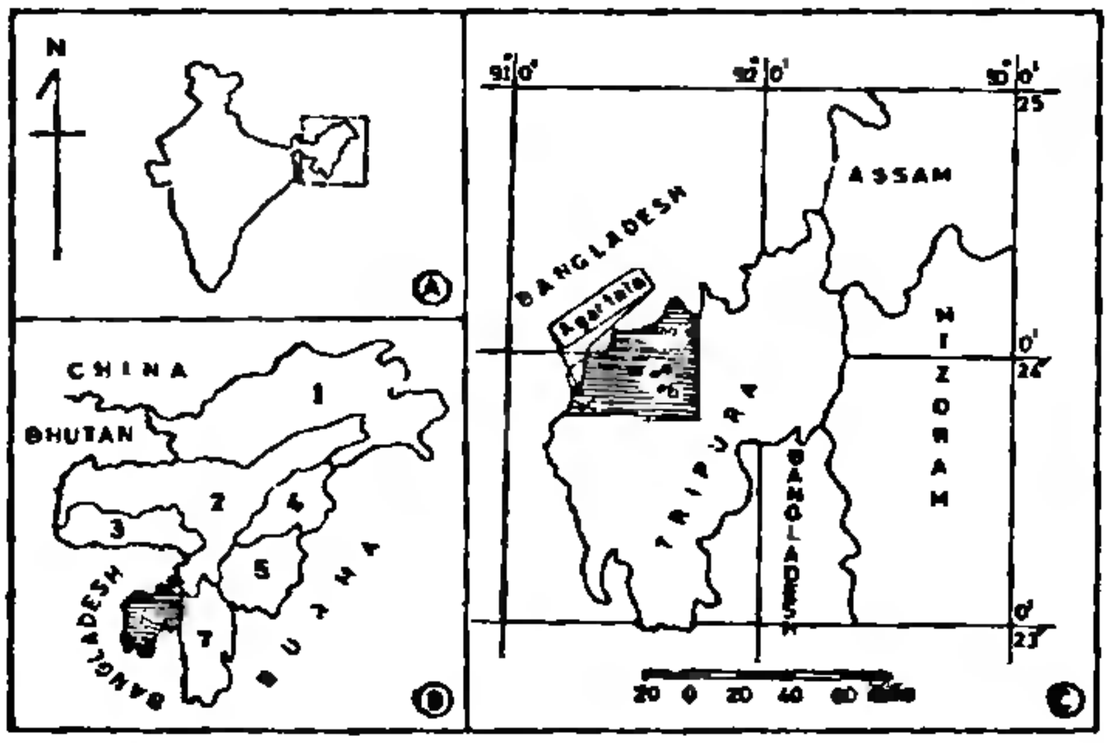

Figure 1. Location map of Tripura State in India. A, map of India; B, map of NE region, India which includes 1-Arunachal Pradesh, 2-Assam, 3-Meghalaya, 4-Nagaland, 5-Manipur, 6-Tripura and 7-Mizoram; C, map of Tripura showing the Khowai and Sonai valley with fossil sites *a*-Kalyanpur, *b*-Laltila, *c*-Sekerkot.

3340±140 to 3450±110 Y.B.P. Further, the samples have yielded a rich assemblage of fungal spores which show close semblance with the Neogene fungal spores of the Warkalli and Quilon beds of Kerala, reported by Ramanujam and Rao[6].

The fungal spores recovered comprise *Inapertisporites, Monoporisporites, Meliola, Diporisporites, Dicellaesporites, Dyadosporonites, Diporicellaesporites, Multicellaesporites, Pluricellaesporites, Ornasporonites, Foveoletisporonites, Fusiformisporites, Retihelicosporonites* and *? cf. Spegazzinia* (Figure 2). These findings and their biostratigraphic significance are reported in this communication.

In the above assemblage, barring *Inapertisporites*, the rest of the spores are known from the Warkalli and Quilon beds. Ramanujam and Rao[6] pointed out that there is striking difference between the Palaeogene[5,8-11] and Neogene[6,7] fungal spores of India. They also stated that most of the fungal spores of the Warkalli and Quilon beds may constitute markers for the Neogene deposits of the country. From the present study, it is found that almost a similar assemblage is encountered in the Holocene sediments of Tripura. The Holocene age of the sedimentary formations, surmised initially on the basis of geomorphological, stratigraphical and pedological criteria, has been subsequently corroborated by C^{14} dating by the BSIP. It follows from the current studies that the fungal spores from the Neogene Strata of Kerala cannot be considered as index fossils for the Neogene sediments of India, for the fact that their distribution appears to extend up to the late Holocene.

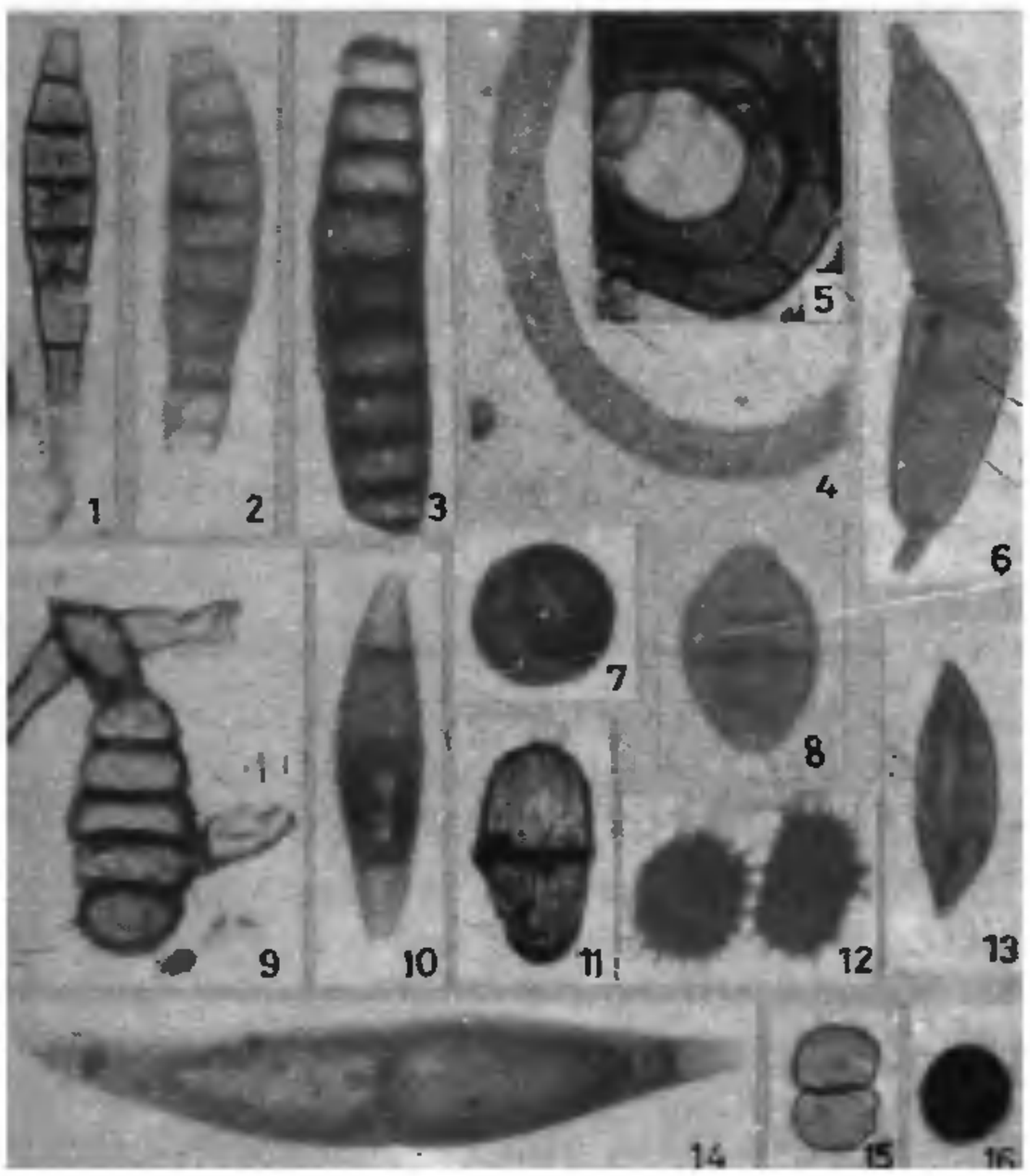

Figure 2. Fungal spores from the Holocene sediments of Tripura. All the spores are magnified 750 times. All the slides are kept in author's (MNVP) palaeobotanical collection. 1, *Pluricellaesporites*. 2, *Multicellaesporites*. 3, *Foveoletisporonites*. 4,5, *Retihelicosporonites*. 6,14, *Dyadosporonites*. 7, *Monoporisporites*. 8, *Ornasporonites*. 9, *Meliola*. 10, *Diporicellaesporites*. 11, *Fusiformisporites*. 12, *? cf. Spegazzinia*. 13, *Diporisporites*. 15, *Dicellaesporites*. 16, *Inapertisporites*.

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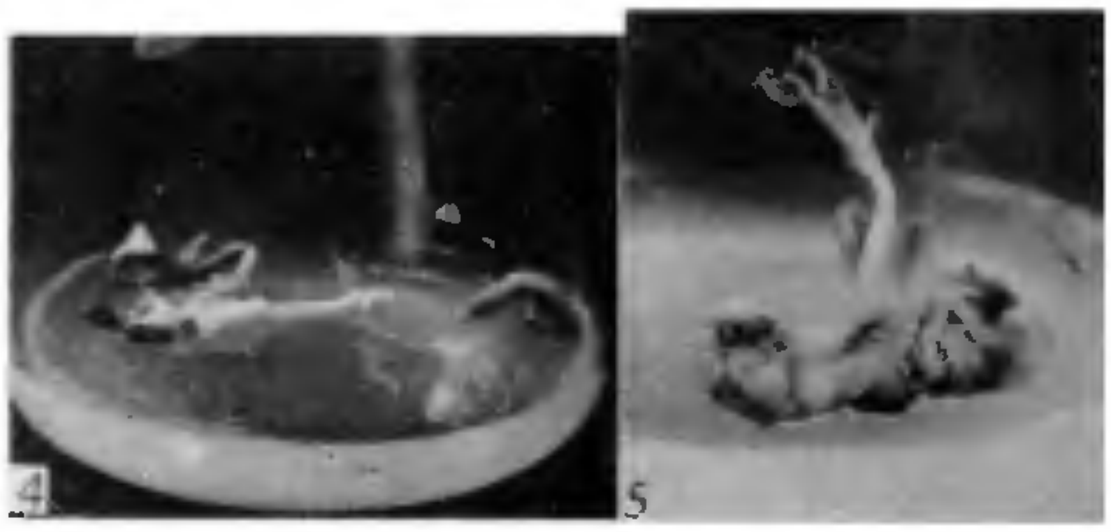

Figures 4,5. 4. Direct rooting from leaf. 5. Direct regeneration from shoot.

EFFICIENCY OF CALLUS INITIATION AND DIRECT REGENERATION FROM DIFFERENT EXPLANTS OF CASTOR (*RICINUS COMMUNIS* L.)

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TISSUE culture techniques offer the possibility of cloning desired genotypes and the recovery of new variant types for the improvement of genetic stocks. Earlier reports on tissue culture in castor were limited only to endosperm callus[1,2]. The present investigation was undertaken to study the differences in callusing ability of different seedling explants and the effect of certain hormones in callus initiation and organogenesis. Root, shoot and cotyledonary leaf were excised from 10-day old seedlings of HC 6 variety and its induced dwarf mutant and inoculated onto the media[3] supplemented with 2 mg/l of 2,4-dichlorophenoxy acetic acid (2,4-D), 0.5–2 mg/l of benzyl amino purine (BAP) and 0.5–2 mg/l of napthalene acetic acid (NAA). All the cultures were incubated under continuous light at 25 ± 2° C for callus initiation. Three-week old callus were then subcultured on a medium containing 2,4-D.

The callusing ability of the shoot was maximum (90–98%) followed by root (88–91%) and leaf (73–83%). The shoot and root explants took 3–6 days for callusing, whereas the leaf callused within 9–14 days (figures 1–3).

Of the different hormones tested 2,4-D was very effective in inducing callus in seedling shoot and leaf, whereas the initiation of root callus was poor as compared to the medium supplemented with BAP. The shoot explants inoculated with BAP (0.5–2 mg/l) resulted in the development of whole plant within 10–20 days with a frequency of 25–30% and these might have originated from the pre-existing meristems present in the original explants (figure 5). This technique may be utilised for clonal multiplication of pistillate lines which are difficult to maintain by conventional methods. The seedling root, shoot and leaf explants inoculated with NAA (0.5 mg/l) resulted in the differentiation of roots in addition to callus from the cut ends, while higher concentrations (1–2 mg/l) completely inhibited the growth of the callus as well as formation of the roots (figure 4).

Preliminary results indicate that the dwarf mutant callused with a higher frequency than the control and 2,4-D was more efficient in inducing callus of shoot and leaf. Rooting was observed from all the explants

Figures 1–3. Callus initiation from **1.** root; **2.** shoot and **3.** leaf.