TABLE III

A comparison of volatiles of aspergilli produced under two different techniques

Aspergillus spp.	% germination of test spores											
	Emanation Agar Technique						Paired Petri Plate Technique					
	A. solani		*R. nigricans*		*T. viride*		*A. solani*		*R. nigricans*		*T. viride*	
	I	II	I	II	I	II	I	II	I	II	I	II
A. flavus II ..	33	87	37	82	28	95	34	88	25	76	52	97
A. niger ..	24	92	21	83	20	93	50	92	21	79	49	95
A. terreus I ..	50	91	21	78	18	97	25	97	19	83	40	100
A. terreus II ..	48	95	19	89	17	100	22	94	20	81	22	88

I—Spore germination on pre-activated agar discs placed in the experimental chamber for 10 days.
II—Stimulation of spore germination after removing the agar discs to an ordinary moist chamber.

column II). This suggested an extremely labile nature and fungistatic action of the inhibitory principle(s). Thus soil inhabiting fungi of the genus *Aspergillus* appear to be strong producers of volatile sporostatic factors which have a positive role in ecology of soil fungi especially in the realm of soil fungistasis.

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BRYOPHYTES AS ROCK BUILDERS—SOME CALCICOLE MOSSES AND LIVERWORTS ASSOCIATED WITH TRAVERTINE FORMATION AT SAHASRADHARA, DEHRA DUN

ALTHOUGH tufa-building bryophytes and other plants have aroused a good deal of interest among ecologists of various countries of Europe and America[1-3], no such work has so far been carried out in India. Further the need for such studies is emphasized by the ecosensitive character of bryophytes which are the most active agents in building a biogenic rock like calcareous tufa or travertine. Accordingly the present study of the bryophytes associated with travertine at Sahasradhara was undertaken to fill up this long standing gap in our knowledge. Out of active tufa-building bryophytes, *Barbula gracilenta, Bryum cellulare, Hymenostyliella involuta, Vesicularia montagnei* and *Asterella maculata* are being reported for the first time as tufa-builders. The pottiaceous *Hymenostyliella involuta* previously known only from the Luzon Island in the Philippines (Bartram)[4] has recently been reported from Dehra Dun (Vohra)[5]. The tufaceous nature of this moss is, however, not mentioned in either of the two above-mentioned reports. In the present study, it forms an epiphytic association with the filamentous blue-green alga *Petalonema alatum*, var. *indicum* colonizing the bare boulders of limestone and all tufaceous seeps. Among other associates of tufa formation are calcareous algae like *Chroococcus, Gloeothece, Merismopedia, Petalonema alatum* Berk. var. *indicum* Rao, *Cladophora, Nitzschia, Pinnularia, Tabellaria* and *Cosmarium* and even among these *Merismopedia, Petalonema alatum* var. *indicum, Pinnularia* and *Tabellaria* are being reported as participants in tufa formation for the first time. Besides, the above forms, a few angiosperms like *Colocasia esculenta* (Linn.) Schott. var. *stolonifera, Didymocarpus pedicellata* R.Br., *Epipactis consimilis* Wall., *Eupatorium glandulosum*, H.B. & K., *Itea nutans* Royle and *Primula floribunda* Wall. have also been found to help in building tufaceous rock although they do so only when their exposed parts become covered with an algal or bryophytic felt.

The present study has, to some extent, helped in resolving the controversy about the physico-chemical factors involved in travertine deposition. In particular it shows that biological factors like thick algal felts and dense moss polsters induce the development of travertine mainly by providing spongy surfaces which can absorb, retain and expose copious thin films of water for effective evaporation and consequent diffusion of CO_2 from the calcareous spring water thus causing the precipitation of $CaCO_3$ in the form of travertine. The mineral matter (calcite) hardens round the mosses taking the mould of their forms and these and other plants act as nuclei around which travertine is deposited.

The vigorous growth rate of these organisms (algae and mosses) seems to exceed the rate of carbonate deposition so that the process of getting cemented below and growing above is continued and the tufa also "grows" up.

These observations generally confirm the views held by Emig[6-7] about the role of plants in the mechanism of travertine deposition at Oklahoma. They also point to the calcicole character of the tufaceous bryophytes, algae and other plants and their indicator value. It would indeed be worthwhile trying some of the angiosperms growing on tufa for cultivation in alkali soils.

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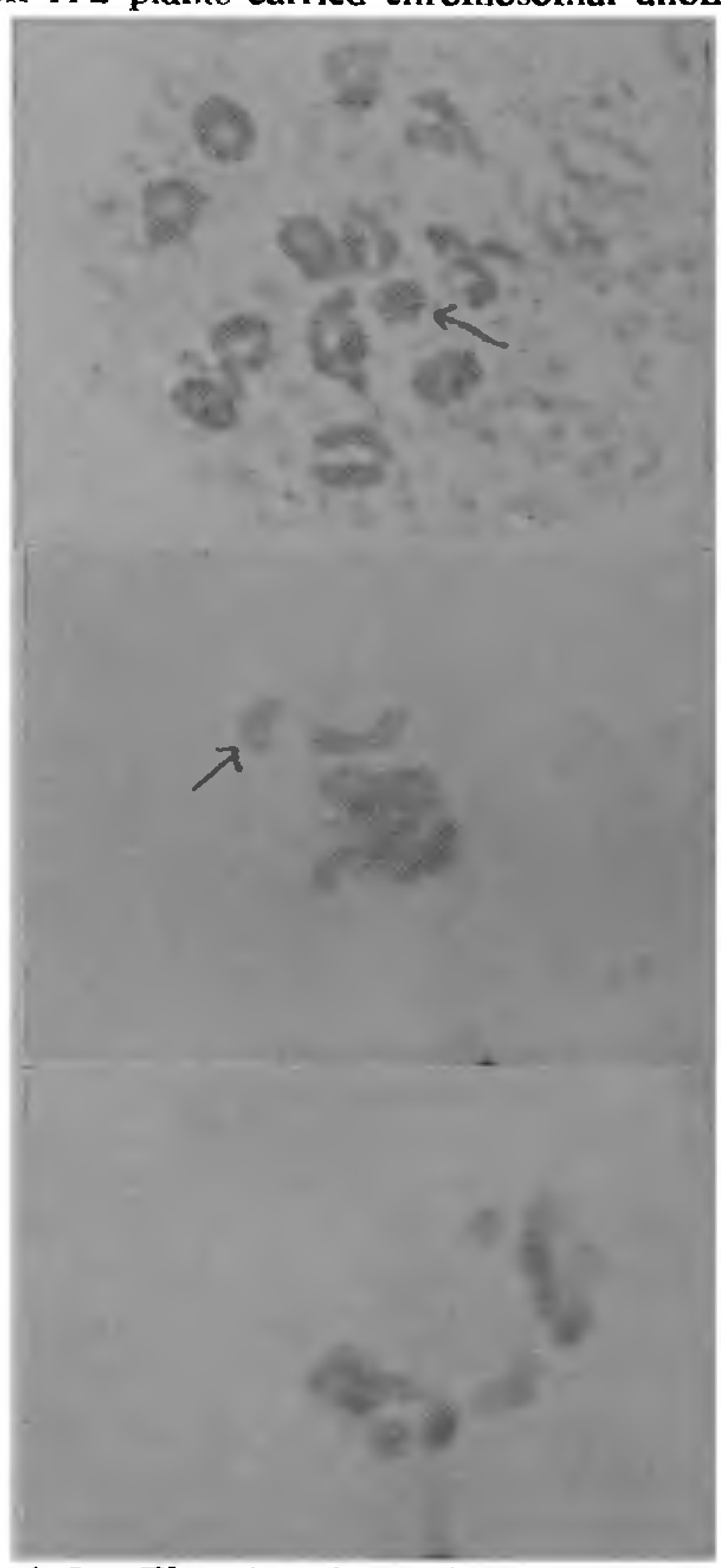
X-RAY INDUCED ANEUPLOIDY IN *CAPSICUM ANNUM*

THE induction of aneuploidy has been useful in breeding crop plants. Experiments in bread wheat[1] demonstrate the possibility of transferring beneficial chromosomes from comparatively less useful types *via* aneuploids. Breeding for aneuploids with a view to identifying the chromosomes and linkage groups has also been described in other crops such as barley[2], tomato[3] and groundnut[4]. The occurrence of aneuploids in members of Solanaceae was reported by Hermsen[5]. The present study concerns the behaviour of the aneuploid chromosome in meiosis from X 2 generation obtained from X-ray irradiated seeds following presoaking.

The seeds of *Capsicum annum* ($2n = 24$) obtained from National Seed Corporation of India, Warangal Branch, were soaked for 6 hours and exposed to radiation at 4000 rads. Meiosis in these plants was studied after fixing the flower buds in acetic acid-alcohol (1 : 3) and squashing the anthers in aceto-carmine. Mitotical and meiotical aberrations and morphological variations were observed in X 1 generation which were continued to X 2 generation in order to stabilize the mutants.

In meiotic studies of X 2, 90% of their pollen mother cells revealed the presence of an extra chromosome (Fig. 1). Observations on the morphological variations, meiotic aberrations and their subsequent behaviour indicated that all the mutants and their X 2 plants carried chromosomal anomalies.

(1)
(2)
(3)



FIGS. 1–3. Fig. 1. An extra chromosome at Diakinesis (arrow) × ca. 2,000. Fig. 2. The irregular orientation of the extra chromosome at metaphase I (arrow) × ca. 2,000. Fig. 3. Anaphase I with lagging and a bridge (× 2,000).