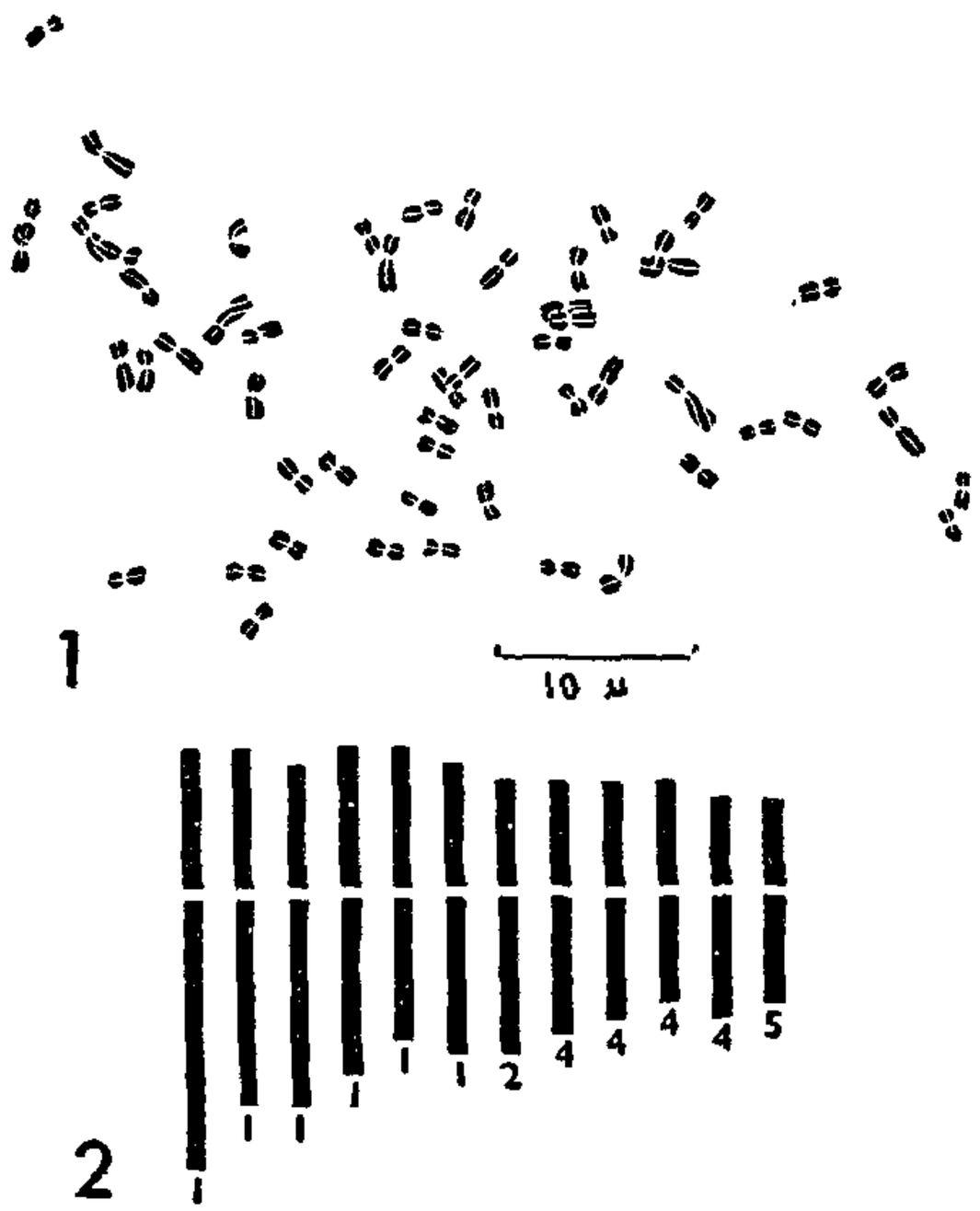

FIGS. 1–2. Fig. 1. Somatic metaphase, × 2000. Fig. 2. Idiogram of an haploid complement. Numbers below idiogram represent pair/pairs under each category.

hence the karyotype is symmetrical. The karyotype formula determined is 8^{A} (SM) + 2^{B} (M) + 14^{B} (SM) + 8^{C} (M) + 26^{C} (SM).

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1. Pal, M., I, *Proc. Indian Acad. Sci.* 1964, **B 60**, 347.
2. Roy, R. P. and Mishra, N. C., *Proc. 49th Ind. Sci. Comgr.*, Pt. 3, Abstracts, 1962, p. 335.

PHYTOALEXIN PRODUCTION BY GERMINATING SEEDS OF *MUCUNA UTILIS*

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PHYTOALEXINS are antimicrobial substances produced by plants following infection and have a significant role in disease resistance[1]. Phytoalexin production by leguminous plants infected by fungi, bacteria and virus has been reviewed[2]. Ingham[3] claimed that the hypocotyls of *Mucuna deeringianum* inoculated with *Helminthosporium carbonum* produced cajanol along with genistein, 2-hydroxy genistein, dalbergioidin and isoferreirin.

The wild leguminous plant, *M. utilis* which is used by the tribals in southern Tamil Nadu as a source of protein, has attracted us for its disease resisting capacity. We report our results on the production of phytoalexins by germinating seeds of *M. utilis* inoculated with *Curvularia spicata.*

Seeds (35 g) soaked in water for 48 h were cut and inoculated with *C. spicata* spores (10^6 spores/ml). The seeds were completely covered with the fungus and became brown after 7 days of incubation at room temperature in a moist chamber. Seeds similarly incubated but not inoculated with fungal spores served as control. The seeds were immersed in 300 ml of 90% ethanol, homogenised in a blender at high speed for 2 min and filtered through Whatman No. 41 filter-paper. The extract was concentrated to 50 ml and extracted with equal volumes of ethyl acetate for 5 times. After flash evaporation, the residue was dissolved in 7 ml of ethanol. The crude etxract was streaked on tlc plate coated with silica gel G and developed in chloroform-ethanol (100-3 v/v) solvent. After spraying with diazotized *para*-nitroaniline reagent[4], 4 major bands designated as A, B, C, D were located.

In some experiments, the plates after air drying were sprayed with spore suspension of *C. spicata*[5] (10^6 spores/ml) and incubated in dark at 30 C for 3 days in a moist chamber. Inhibitory zones developed in two bands. In control, only one antifungal zone was present, which was not found in the treated one. The silica gel was scraped, eluted in ethanol, evaporated to dryness and the residue dissolved in 3 ml of 30% ethanol. Toxicity was assayed against spore germination of *C. spicata and H. oryzae in* cavity slides. Bands A and B completely inhibited the spore germination of *C. spicata* and *H. oryzae* whereas the bands C and D caused only 50 and 20% inhibition of spore germination, respectively.

The four bands were separately scraped and purified by further in tlc in benzene-ethyl acetate-methanol (25–8–4 v/v) solvent. Rf values, colour of the substances after reaction with dinitroaniline reagent and UV absorption maxima are listed in Table I.

The substance with Rf values of 0·09 (first solvent) and 0·58 (second solvent), coincided with authentic kievitone. The UV absorption maximum of kievitone in ethanol was at 293 nm and formed a reversible spectral shift in ethanolic NaOH to give an absorption maximum at 330 nm. The concentration of kievitone was estimated as 37·55 μg/g of seed material.

Clearly *M. utilis* inoculated with *C. spicata* produced a spectrum of phytoalexins and kievitone is the major phytoalexin. According to Ingham[3], cajanol and related substances accumulated in the hypocotyls

TABLE I

Rf values, colour and spectral properties of phytoalexins of Mucuna utils

Tests	Phytoalexins			
	A	B	C	D
Rf values :				
Chloroform–ethanol (100–3, v/v)	0·05	0·09	0·13	0·24
Benzene-ethyl acetate-metharol (25–8–4, v/v)	0·45	0·58	0·63	0·68
Colour after DNA spray	Orange yellow	Bright orange	Orange yellow	Orange yellow
UV spectra :				
λ_{max}–EtOH (nm)	285	293	288	290
λ_{max}–ethanolic NaOH	..	330	..	..

of *M. deeringianum* inoculated with *H. carbonum*. We did not find any of these substances. *Phaseolus vulgaris*, another legume produced large quantities of kievitone, when inoculated with *Rhizoctonia solani*[6]. Evidently kievitone is one of the general phytoalexins[7] produced by leguminous plants.

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1. Mahadevar, A., *J. Scient. Ind. Res.*, 1979, 38, 156.
2. —, *Biochem. Rev.*, 1978, 49, 51.
3. Ingham, J. L., *Z. Naturforsch.*, 1979, 34B, 159.
4. Randerath, K., *Thin-Layer Chromatography*. Academic Press, New York, 1964, p. 249.
5. Mahadevan, A., *Methods in Physiological Plant Pathology*, Sivakami Publications, Madras, 1975, p. 82.
6. Smith, D. A., Van Etter, H. O. and Bateman, D. F., *Physiol. Plant Path.*, 1975, 5, 51.
7. Mahadevan, A., *Acta Phytopath.*, 1973, 8, 391.

CYTOMORPHOLOGICAL BEHAVIOUR OF DOUBLE TRISOMIC IN PEARL MILLET [*PENNISETUM AMERICANUM* (L.) K. SCHUM]

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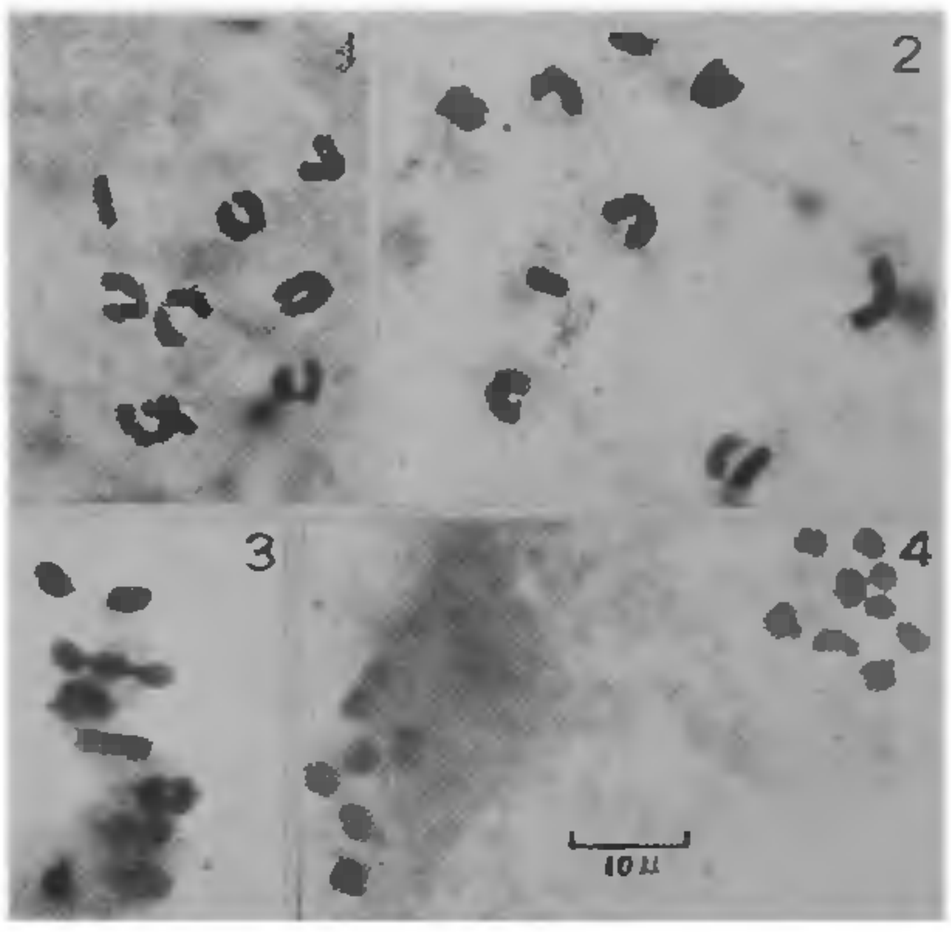
THE progressive increase in the number of chromosomes is rather common in polyploid plants; but it is relatively rare in diploids (Darlington[1]). In studies reported here two double trisomics were isolated in the progeny of triploid pearl millet. Although the occurrence of such plants was reported previously by Gill *et al.*[2] no detailed observations on their cytomorphology have been made. Both double trisomics studied here are distinguishable from their diploid sibs by their reduced plant height, leaf length, width, ear length and width. But number of tillers in both cases were significantly very high.

The frequencies of various configurations observed at diakinesis and MI (Figs. 1 to 3) are given in Table I. From the data it can be seen that about 55% PMC's of diakinesis and 76% of MI form $5^{II} + 2^{III}$ in the



FIGS. 1–4. Different chromosome associations at diakinesis and Metaphase I and distribution of chromosomes at Anaphase I in double trisomic of *Pennisetum americanum*. Fig. 1. Diakinesis, $6^{II} + 1^{III}$ (4-shaped) $+ 1^{I}$. Fig. 2. Diakinesis, $7^{II} + 2^{I}$. Fig. 3. Metaphase I, $6^{II} + 1^{III} + 1^{I}$. Fig. 4. Anaphase I, 9–7 distribution of chromosomes.