COWPEA—A LOCAL LESION HOST FOR PEA MOSAIC VIRUS

SREENIVASAN AND NARIANI[1] reported the occurrence of a mosaic disease of pea (*Pisum sativum* L.) from India and on the basis of their studies on transmission, host range and physical properties they identified the virus as a strain of *Pisum* virus 2 A. In a search for a local lesion host for this virus it was observed that some varieties of cowpea (*Vigna sinensis* Savi.) produced distinct countable local lesions on the inoculated cotyledonary leaves (Fig. 1). Experiments were carried out to determine the utility of the cowpea variety *Pusa Phalguni*, as a local lesion host and the properties of the virus using this host were examined.

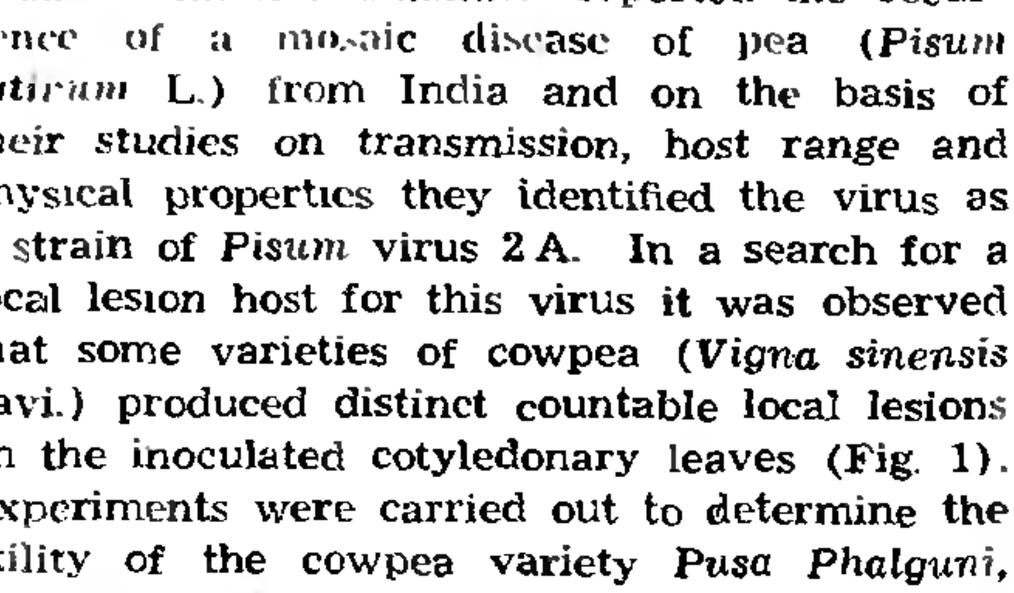


FIG. 1. Necrotic local lesions due to pea mosaic virus (Pisum virus 2 A) on cowpea varieties (1) I-C 8267. (2) Pusa Phalguni.

The culture of the virus was maintained on broad bean (*Vicia faba* L.) plants. The sap obtained from infected leaves of broad bean served as inoculum. The test plants of cowpea variety, *Pusa Phalguni*, were raised in 4-inch pots filled with sterilized soil and kept inside the insect-proof glass-house. Inoculations were made when the cotyledonary leaves were fully opened. In the first experiment dilution-end-point of the virus was studied by inoculating the test plants with the inoculum diluted to different concentrations in distilled water, and it was observed that the end-point was between 1 : 3000–5000.

In another experiment the thermal death point of the virus was determined by inoculating cowpea plants with the inoculum exposed for ten minutes to different temperatures, and it was found that the thermal death point ranged between 60° and 65° C. These properties are slightly in variance with those reported by Sreenivasan and Nariani[1] and this may be due to use of inoculum from broad bean instead of pea and also use of more sensitive local lesion host. Cowpea varieties have been reported to produce necrotic local lesions when infected with strains of cucumber mosaic virus,[2-4] alfalfa mosaic virus from potato,[5] foliar necrosis and interveinal chlorosis of tomato[6] and potato virus Y.[7] The results reported here suggest that cowpea variety *Pusa Phalguni* can be used for the bioassay of pea mosaic virus *Pisum* virus 2 A and this is the first report of cowpea as a local lesion host for pea mosaic virus.

Our thanks are due to Dr. S. P. Raychaudhuri for providing necessary facilities and to Sri. H. C. Phatak for the photographs.

Division of Mycology and Plant Pathology, I.A.R.I., New Delhi-12, *November* 9, 1966.

V. V. CHENULU.
J. SACHCHIDANANDA.

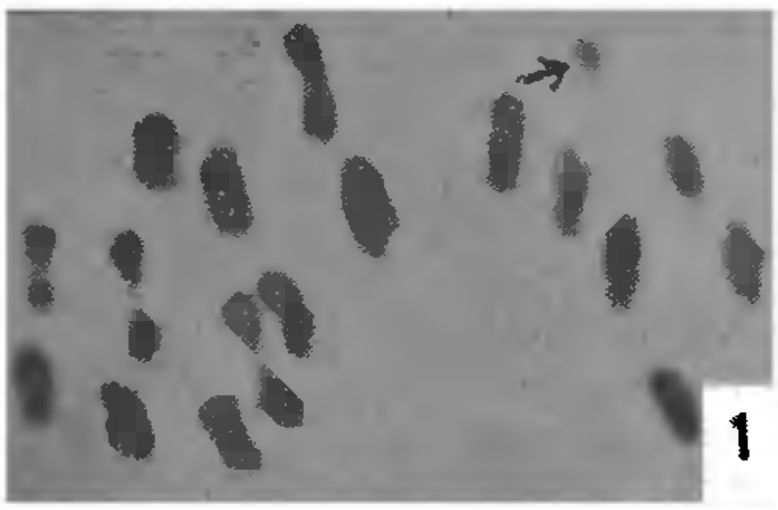
1. Sreenivasan, T. N. and Nariani, T. K., *Indian Phytopath.*, 1966, **19**, 189.
2. Smith, K. M., *Ann. appl. Biol.*, 1935, **226**, 536.
3. Price, W. C., *Phytopathology*, 1934, **24**, 743.
4. Fulton, J. P., *Ibid.*, 1950, **40**, 729.
5. Oswald, J. W., *Ibid.*, 1950, **40**, 973.
6. Miller, P. M., *Ibid.* (Abstr.), 1953, **43**, 480.
7. Bagnall, R. H., Larson, R. H. and Walker, J. C., *Wisc. Agric. Exp. Stat. Res. Bull.*, 1956, **198**.

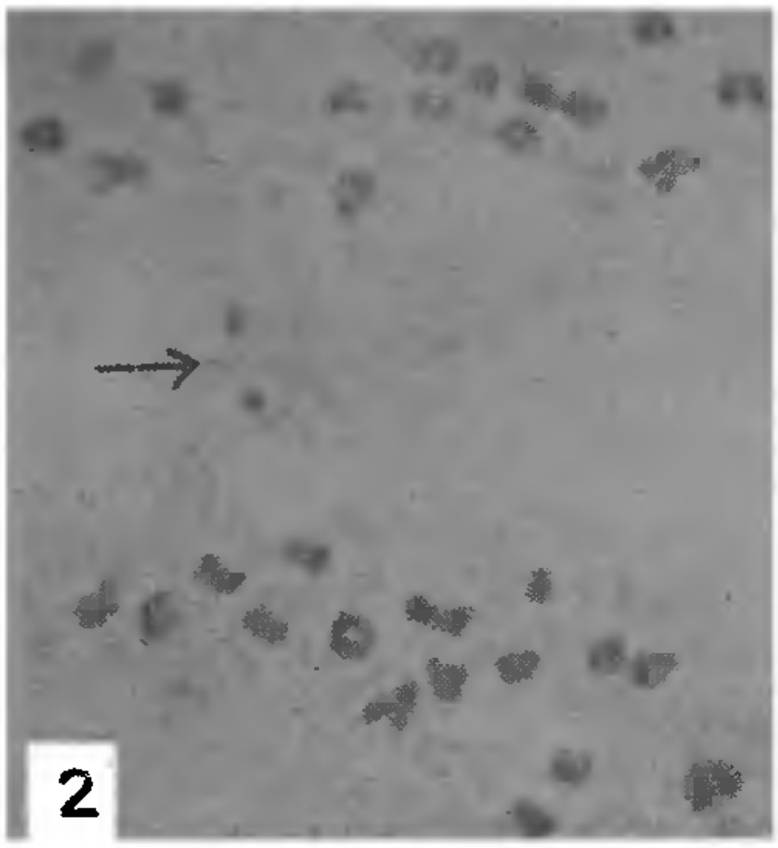
OCCURRENCE OF ACCESSORY CHROMOSOMES IN *PANICUM MAXIMUM* JACQ.

Panicum maximum is a complex taxon comprising several distinct forms with chromosome numbers as $2n = 18$, 36, 32 and 48 (*see* Carnahan and Hill, 1961). While carrying out cytotaxonomic investigations in 20 collections ($2n = 32$) of this grass, the presence of accessory chromosomes was encountered in the collections from Assam and Bengal. So far as known to the author this is the first report on the presence of accessory chromosomes in *P. maximum*.

The number of accessory chromosomes in P.M.C.'s of *P. maximum* varied from 0 to 5, though the cases with 5 accessories were rather rare. The accessory chromosomes did not show any pairing between themselves as was earlier observed in *P. coloratum* (Jauhar, 1963). At metaphase I, when the normal chromosome configurations oriented themselves at the equator, the accessory chromosomes showed a tendency to go towards the periphery (Fig. 1). At anaphase and telophase I, the accessory univalents generally divided (Fig. 2), the products

getting included at random to the two poles. Sometimes the distribution of the accessories to the two poles was equal but quite often all of them moved to one pole only.





FIGS. 1–2. Fig. 1. Metaphase I showing one accessory chromosome (arrow). Fig. 2. Anaphase I showing one dividing accessory chromosome (arrow).

In *P. maximum* accessory chromosomes appear to have arisen from the normal chromosomes and seem to be of significance from evolutionary standpoint. Because of the predominance of $x = 9$ for the entire genus *Panicum*, it appears likely that in *P. maximum*, $x = 8$ might have been derived from a higher number and possibly from forms with $x = 9$ as the basic number, especially in view of the fact that diploid form of *P. maximum* is reported to possess $2n = 18$ chromosomes (de Wet, 1954). The present forms of this species with $2n = 32$ chromosomes appear to owe their origin to autotetraploidy followed by chromosome reduction and the accessory chromosomes are the by-products of such reduction.

It is significant to note that as early as 1954, Virkii visualized that in animals accessories may be formed as a by-product when species formation is associated with a change from a higher to a lower chromosome number. Carnahan and Hill (1961) were also of the view that the presence of accessory chromosomes may represent a stage in the evolution to a higher or a lower basic chromosome complement. Another point of interest is that, unlike in *P. coloratum* (Jauhar, 1963), the accessory chromosomes in *P. maximum* do not pair between themselves nor do they show any affinity with the normal chromosomes. It would appear, therefore, that the accessories in this species have had an ancient origin and have undergone differentiation in the course of evolution. The presence of such accessory chromosomes could be plausibly treated as evidence of reduction in chromosome number during the evolution of *P. maximum*.

I am grateful to Dr. A. B. Joshi, Dr. M. S. Swaminathan and Shri S. Ramanujam for advice and helpful suggestions during the course of this investigation.

Division of Genetics, PREM P. JAUHAR.
Indian Agri. Res. Institute,
New Delhi-12,
November 29, 1966.

1. Carnahan, H. L. and Hill, H. D., *Bot. Rev.*, 1961, **27**, 1.
2. de Wet, J. M. J., *Cytologia*, 1954, **19**, 97.
3. Jauhar, P. P., *Doctoral Thesis*, I.A.R.I., Delhi, 1963.
4. Virkii, N., *Ann. Acad. Sci. Fenn.*, Ser. **4 A**, Biol., 1.

DIOECISM AND MONOECISM AS TAXONOMIC CRITERIA IN CHAROPHYTA

IT is well known that monoecious and dioecious conditions are used as taxonomic criteria for evaluation of species both in higher as well as in lower plants. In systematics of Charophyta also these criteria have played an important role (*cf.* Pal *et al.*[1]), and several species were established on the basis of their dioecism (*e.g.* species listed in Table I, column 1). Recently, Wood,[2] Wood and Imahori[3] have presented a new classification of Characeæ. The revision has resulted in a drastic cut in the number of species, as a result of either relegating several existing species to intraspecific level or by combining several species into one. In doing so, they considered certain criteria as of considerable importance (*e.g.*, row of stipulodes, extent of stem cortication and cortication of basal segment of the branchlet, etc.), in the delimitation of the species, while other criteria (*e.g.*, nature of stem cortication, position of gametangia and sex, etc.), were not considered to be so important. Monoecious and dioecious conditions, in their opinion, are not to be considered as important criteria as they "reflect minor genetic variation". They also considered that dioecious taxa represent genetic strains of monoecious