Cathranthus roseus, *Datura metel*, *D. stramonium*, *Nicotiana glutinosa*, *N. tabacum* 'Samsun NN', *N. tabacum* 'White burley', *N. plumbiginifolia*, *N. clevandalii*, *Petunia hybrida*, *Zinnia elegans*, *Gomphrena globosa*, *Vigna sinensis*, *Cucumis sativus*, *Dianthus barbatus*, *Calendula officinalis*, *Phlox drummondii* and *Beta vulgaris* were ineffective; none of the plants developed symptoms for a whole month.

These tests revealed that the diseased chrysanthemum did not carry tobacco mosaic virus, chrysanthemum aspermy virus, chrysanthemum virus B; because these agents are easily transmissible to other hosts.

Electron microscope studies (dip preparations) have failed to demonstrate virus-like particles or other structures of possible etiological significance. However, symptomatology, transmission and host range studies revealed that the present disease causing agent was very close to chrysanthemum chlorotic mottle virus described by Dimock *et al.*[2]. Further studies are in progress for ascertaining whether this agent is a viroid.

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SEASONAL PERIODICITY OF CYANOPHAGE AC-1

THE lytic cyanophage AC–1 was first isolated by Venkataraman *et al.*[1] and subsequently Sharma *et al.*[2] described its structure. The present communication deals with the magnitude and seasonal incidence of this phage in a waste stabilization pond.

The waste stabilization pond located near the Agronomy Division of the Indian Agricultural Research Institute, New Delhi, was examined over a 20-month period during 1975 and 1976 for the seasonal distribution pattern of AC–1. Waters from waste stabilization ponds in Nagpur and Ahmedabad as well as the fresh water from Ganges at Hardwar were also examined for the presence of this phage. On every 20th of each month, one litre samples were collected for the assay. Lysis of *Anacystis nidulans* was used as the basis for detecting the presence of the phage. For direct phage counts 50 ml of water were filtered and 10 ml portion of the filtrate was shaken with 0·2 ml of chloroform, allowed to settle for 30 min. and plaque assayed[3], using 1 ml of the treated sample and 1·5 ml of the host alga *Anacystis nidulans*. Salt blanks were used to detect the possible introduction of extraneous cyanophage into the system.

Plates were incubated at 30°C under continuous illumination provided by a bank of fluorescent tubes at a light intensity of 4000 lux. After an incubation period of 10 days the plaque counts were made.

The water sample was also tested against 15 other blue-green algal species, one green alga and 4 heterotrophic and one photosynthetic bacteria (Table I). Most of the blue greens were cultured in Watanabe medium[4] to which A_5 micronutrient solution[5] was added. For *Spirulina platensis*, the medium was supplemented with 18 g $NaHCO_3$/l and *Chlorella* was cultured in Craig and Trelease medium[6]. Cultures in specialized media were *Azotobacter*[7] and *Rhizobium* spp.[8] *Rhodopseudomonas* was cultured under anaerobic conditions in Van Niel medium[9], supplemented with sodium propionate, yeast extract and peptone.

TABLE I

Organisms tested for their susceptibility to cyanophage AC–1 (+ susceptible; — nonsusceptible)

Organisms	Susceptibility
Blue-green algae	
Anabaena spp. (5 strains)	—
Anacystis nidulans	+
Aulosira fertilissima	—
Calothrix brevissima	—
Chroococcus minor	+
Nostoc commune	—
Nostoc muscorum	—
Nostoc punctiforme	—
Plectonema boryanum	—
Plectonema nostocorum	—
Spirulina platensis	—
Tolypothrix tenuis	—
Green alga	
Chlorella vulgaris	—
Bacteria	
Azotobacter chroococcum	—
Rhizobium leguminosarum	—
Rhizobium meliloti	—
Rhizobium trifolii	—
Rhodopseudomonas capsulatus	—

AC–1 could not be detected either in the waste stabilization pond waters from Nagpur and Ahmedabad or in the Ganges water. Particularly striking were the relatively high yields in the samples from the Waste stabilization pond inside the Indian Agricultural Research Institute Campus. Fig. 1 shows the seasonal incidence of AC–1 in this pond over a period of 20 months. Though differences were noticed in the absolute number of plaque forming units during 1975

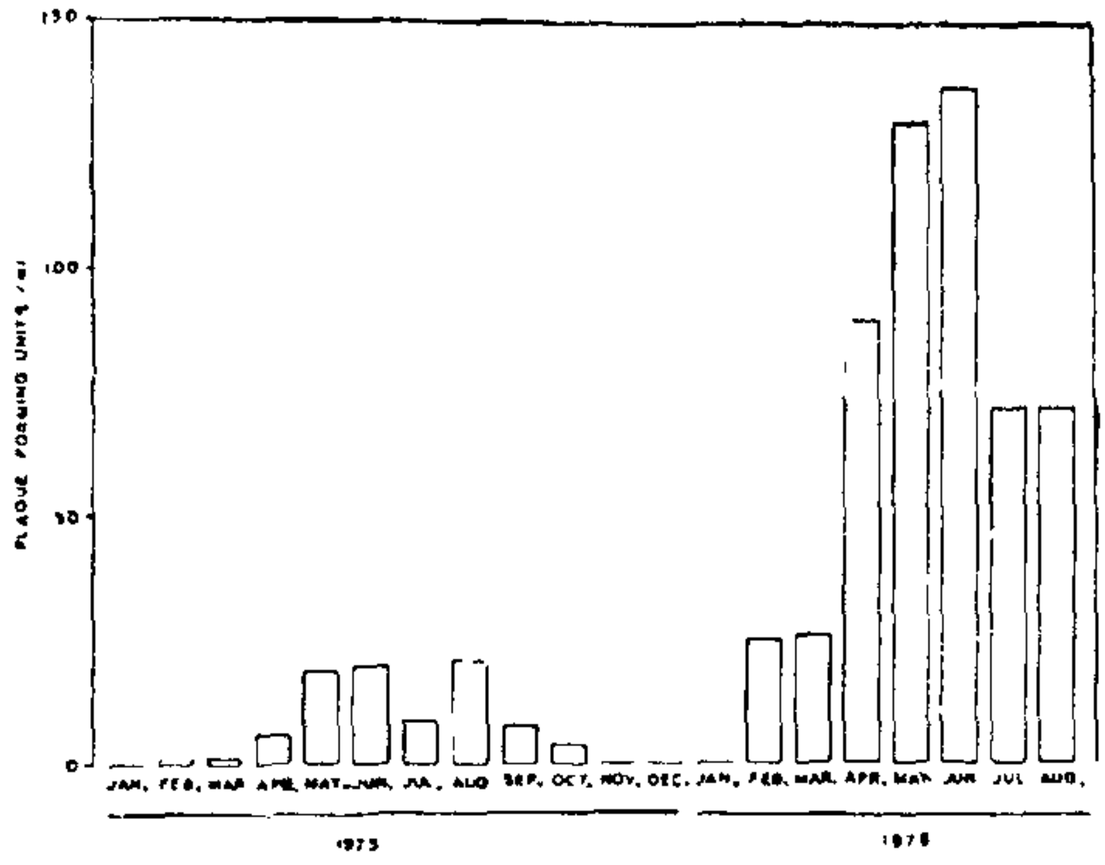

FIG. 1. Seasonal incidence of Cyanophage AC–1 in the waste stabilization pond inside the Indian Agricultural Research Institute Campus, New Delhi, during 1975 and 1976.

and 1976, the pattern of seasonal distribution was fairly similar during both years. The phage was found to be completely absent during the winter months from November to January and the titer was high from May to August with a maximum in May and June (135–140 PFU/ml) (Fig. 1). Climatic conditions might account for the pronounced fluctuations observed during different months. It is also possible that the high incidence of the phage during the summer months might have resulted in a degeneration of the host population leading to a paucity of the host cells in the subsequent months. Consequently the phage titer would be too low to be detected.

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CHROMOSOME STUDIES IN *OCIMUM*

DURING a course of study on the genus *Ocimum*, which is of commercial importance, certain interesting observations were recorded. The two species of this genus included in the present report, namely, *O. carnosum* Link. *et* Otto and *O. viride* Willd.. had both been reported to possess $2n = 64$ chromosomes[1]. A cursory examination of these species, collected from different areas, has shown a different chromosome number during the present investigation. As such, a detailed investigation of the karyotypes of these species has been carried out with the aid of refined techniques.

The seeds of *O. carnosum* and *O. viride* were collected from Jardin Botanique de l'Université Louis Pasteur de Strasbourg (France) and Experimental-*cum*-Botanic Garden of the Department of Botany, University of Calcutta, respectively.

For the study of the somatic chromosomes, several trials of pretreatment were given, of which an 1 : 1 aqueous mixture of α-bromonaphthalene and aesculin with a little bit of saponin was found to be the most suitable. Root-tips were kept for $1\frac{1}{2}$ h at 14–16° C for pretreatment. Fixation was done in propionic alcohol (1 : 2) for 3–4 h and for staining the usual aceto-orcein squash technique was followed.

The observations made are as follows :

O. carnosum Link. *et* Otto.

$2n = 48 = 2A + 2A' + 44C$

The diploid chromosome number in this species is $2n = 48$ (Fig. 1). All the chromosomes have been grouped under three types, namely, A, A′ and C (*see* idiogram). Both the A and A′ type chromosomes show secondary constrictions. But, in A type, the two lower arms are equal in length, while in A′ type, the two upper arms are equal in length. The rest of the chromosomes, belonging to type C have median to submedian primary constrictions. Variation in chromosome number ($2n = 51$) has also been observed, where six chromosomes were seen to have secondary constriction. The length of the chromosomes varies from 2·295 μm to 0·972 μm.

O. viride Willd.

$2n = 38 = 4B + 34C$

The somatic chromosome number is $2n = 38$ (Fig. 2). All the chromosomes have been grouped under two types, namely, B and C (*see* idiogram). Type B shows satellited chromosomes, while type C consists of the rest of the chromosomes with median to submedian primary constriction. Length of the chromosomes ranges between 1·86 μm to 1·12 μm.

The present study on *O. carnosum* and *O. viride* has indicated clearly $2n = 48$ and 38 chromosomes, respectively. In view of the observations recorded earlier (see Sobti[1]), it appears that the species have several cytotypes in nature. Due to the commercial