

membrane and the cuter, the cell wall (Fig. D.) The cytoplasm contains huge electron leucant zone with strands of DNA-like material. The organism appears to multiply by budding (Fig. E).

The constant presence of bacteria-like organism (BLO) in the phloem sieve elements of greening infected plants strongly suggest a casual relationship between the BLO and greening disease in the present study, and is similar to organism associated with various geographical forms of greening⁵. But the organism appears to be morphologically different and also entirely unrelated to bacteria-like organism observed in the xylem vessels of young tree decline affected citrus trees³.

Bove *et al.*¹ established the positive effect of penicillin-G on the greening disease affected citrus plants, and proposed a more appropriate term 'Gracilicute-like bacterium' for the organism associated with greening disease.

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1. Bove, J. M., Bonnet, P., Garnier, M. and Aubert, B., *Proc. 8th I.O.C.V.*, 1930 (In press).
2. Catling, H. D., Garnier, M. and Bove, J. M., *FAO Plant Prot. Bull.*, 1978, 26, 16.
3. Feldman, A. W. and Hanks, R. W., *Proc. 8th I.O.C.V.*, 1930 (In press).
4. Garnier, M. and Bove, J. M., *Fruits*, 1977, 32.
5. —, Latrille, J. and Bove, J. M., *Proc. 7th I.O.C.V.*, 1976, p. 13.
6. Naidu, R., Govindu, H. C. and Ramakrishna, K., *Proc. 8th I.O.C.V.* (Abstract), 1979.
7. Raychaudhuri, S. P., Nariani, T. K., Lile, V. C. and Singh, G. R., *Proc. 5th I.O.C.V.*, 1972, p. 35.
8. Nariani, T. K., Raychaudhuri, S. P. and Viswanath, S. W., *Curr. Sci.*, 1971, 40, 552.

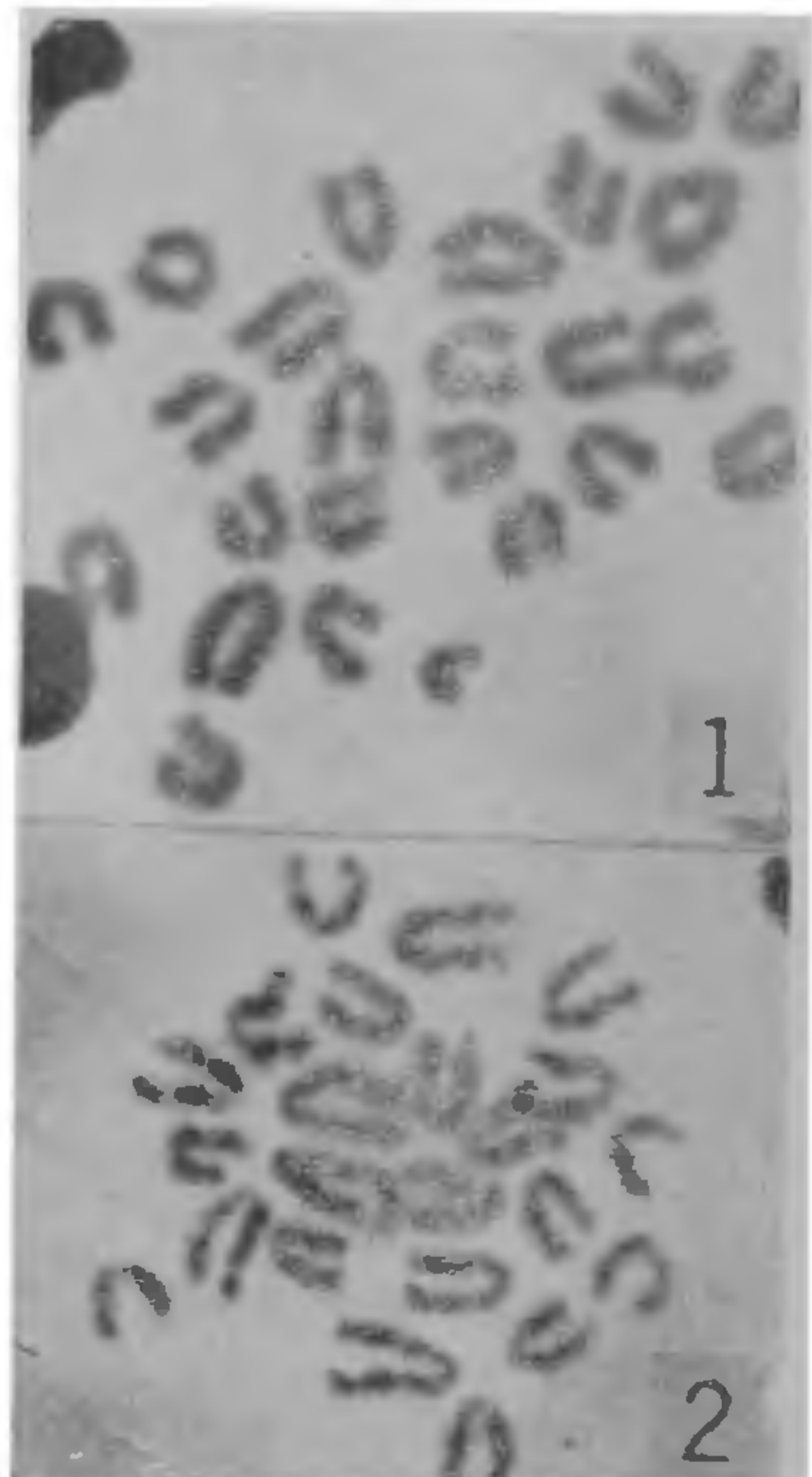
A NEW KARYOTYPE IN A TELEOST FISH

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FISHES exhibit great morphological variability and one might expect a great diversity in their karyotypes. However, this has not been found to be wholly true. Several orders and families have been found to possess similar karyotypes. For example, 48 acrocentric chromosomes are common in many species, particularly in the comparatively recent order Perciformes¹⁻⁴.

In fact, Ohno⁵ suggests that this karyotype may be ancestral and perhaps was present in the primordial teleost *Leptolepis*.

It has generally been found that karyotypes with less than 48 chromosomes tend to possess some biarmed chromosomes; thus their origin can be explained on the basis of Robertsonian principle. As far as we are aware, there is no report in teleosts where the karyotype is composed of a substantially small number of chromosomes, all of which are also acrocentric. We have found in the teleost, *Monopterus alba* (Zuiew) (Family Symbranchidae, Order Symbranchiformes) a karyotype of 24 chromosomes all of which are acrocentric. Specimens of this freshwater mud-eel were obtained in living condition in Imphal (Manipur State) and were processed for chromosomal analysis. Kidney cells from the female were chosen and gave good results. The usual colchicine-KCl-acetic methanol-air drying technique was applied and the slides were stained with diluted Giemsa solution⁶. The karyotype was found to be composed of 24 acrocentric chromosomes (Figs. 1, 2). It will be of



FIGS. 1 and 2. Somatic metaphases from the kidneys of female specimens of *Monopterus alba* (Zuiew).

interest to analyse the other related genera, *Amphipnous* and *Symbranchus* to know about the possible derivation of the presently determined karyotype.

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1. Roberts, F. L., *J. Morphol.*, 1964, 115, 401.
2. —, *Prog. Fish Cult.*, 1967, 29, 75.
3. Denton, T. E., *Fish Chromosome Methodology*, Thomas, Springfield, Illinois, 1973.
4. Chiarelli, A. B. and Capanna, E., *Cytotaxonomy and Vertebrate Evolution*, Acad. Press, London.
5. Ohno, S., "Protochordata, Cyclostomata and Pisces," In *Animal Cytogenetics* (B. John, ed.), Chordata 1, Borntraeger, Berlin, 1974, 4, 1.
6. Rishi, K. K., *Copeia*, 1979, 1, 146.

STUDIES ON INTERFERON INDUCTION BY FIVE STRAINS OF WEST NILE VIRUS IN BRAINS OF SUCKLING MICE

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In a previous study¹, it was reported that thirty-seven arboviruses, belonging to different antigenic groups could be divided into three groups—high, moderate and low inducers—depending on their ability to induce interferon in brains of suckling mice. However, only one strain (prototype and/or topotype) of each virus was used in that study. Different strains of a virus²⁻³ including some arboviruses⁴⁻⁷, are known to differ in their ability to induce interferon. In the present

study, interferon inducing abilities of five strains of WN virus isolated from bat, mosquito and human sources have been determined. Further, an attempt has been made to correlate this property with other biological properties described earlier^{8,9}.

Details regarding the strains employed in the study are listed in Table I. Virus pools were prepared in brains of Swiss albino suckling mice and stored after lyophilization at -20°C . Viral infectivity titrations were done in 3-4 week old Swiss albino mice by intracerebral inoculation. Preparation of interferon was similar to the method described earlier¹⁰. Approximately 2.6-3 dex LD₅₀ of each virus strain was inoculated intracerebrally into groups of 3-day old mice. The actual dose inoculated, determined by back titration, is given in Table II. Brains of mice inoculated with different strains were harvested simultaneously at the end of 72 hr, and processed for infectious virus, interferon and complement fixing (CF) antigen as described earlier¹. CF test was done using hyper-immune ascitic fluid having a homologous titre of 1:128. The assay of interferon was done in L-M cell line using vesicular stomatitis virus plaque reduction method. Standard mouse interferon (G-002-904-511) from NIH and "mock" interferon from normal mouse brains served as controls. One unit of interferon in our system was equal to approximately three international units.

The results are presented in Table II. Bat (68856) and mosquito (G 2266, G 22886) isolates induced higher amounts of interferon as compared to human (672698, P 4230) isolates. No relationship could be observed between infectious virus, CF antigen titres and titres of interferon (Table II). Comparing the infectious viral titres of five strains, all seem to be equally pathogenic⁸ in suckling mice. Correlation between titres of viruses and amount of interferon induced is not apparent, probably due to varying

TABLE I
West Nile virus strains employed for interferon induction

WN virus strain	Passage level (infant mice)	Source of isolation	Year	Locality
68856	M 47	<i>Rousettus leschenaulti</i>	1968	Horabail (Karnataka)
G 22886	M 7	<i>Culex "vishnui"</i>	1958	Sathuperi (Tamil Nadu)
G 2266	M 10	<i>Culex "vishnui"</i>	1955	Sathuperi (Tamil Nadu)
672698	M 35	Human	1967	Kaisodi (Karnataka)
P 4230	M 8	Human*	1956	Poona (Maharashtra)

* Laboratory infection.