

of blood DPG with exposure to cold (Table II) suggests the possibility that enhancement of blood DPG observed in hypoxic condition could partly be due to hypothermia induced by hypoxia.

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KARYOTYPIC STUDY IN *TINOCALLOIDES MONTANUS* A. N. BASU (HOMOPTERA: APHIDIDAE)

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Out of 3917 species¹ of aphids known taxonomically, only 526 species^{2,3} have been recorded for their cytology throughout the world. The genus *Tinocalloides* Basu⁴ was discovered and established by Basu in 1969. *T. montanus* is the sole representative⁵ of this genus which belongs to sub-family Drepanosiphinae of tribe Phyllaphidini¹. This aphid is one of the major pests of cherry in India. Generally this aphid reproduces parthenogenetically but its alate males have also been recorded⁴. Though this species has been described taxonomically, its cytology is unknown.

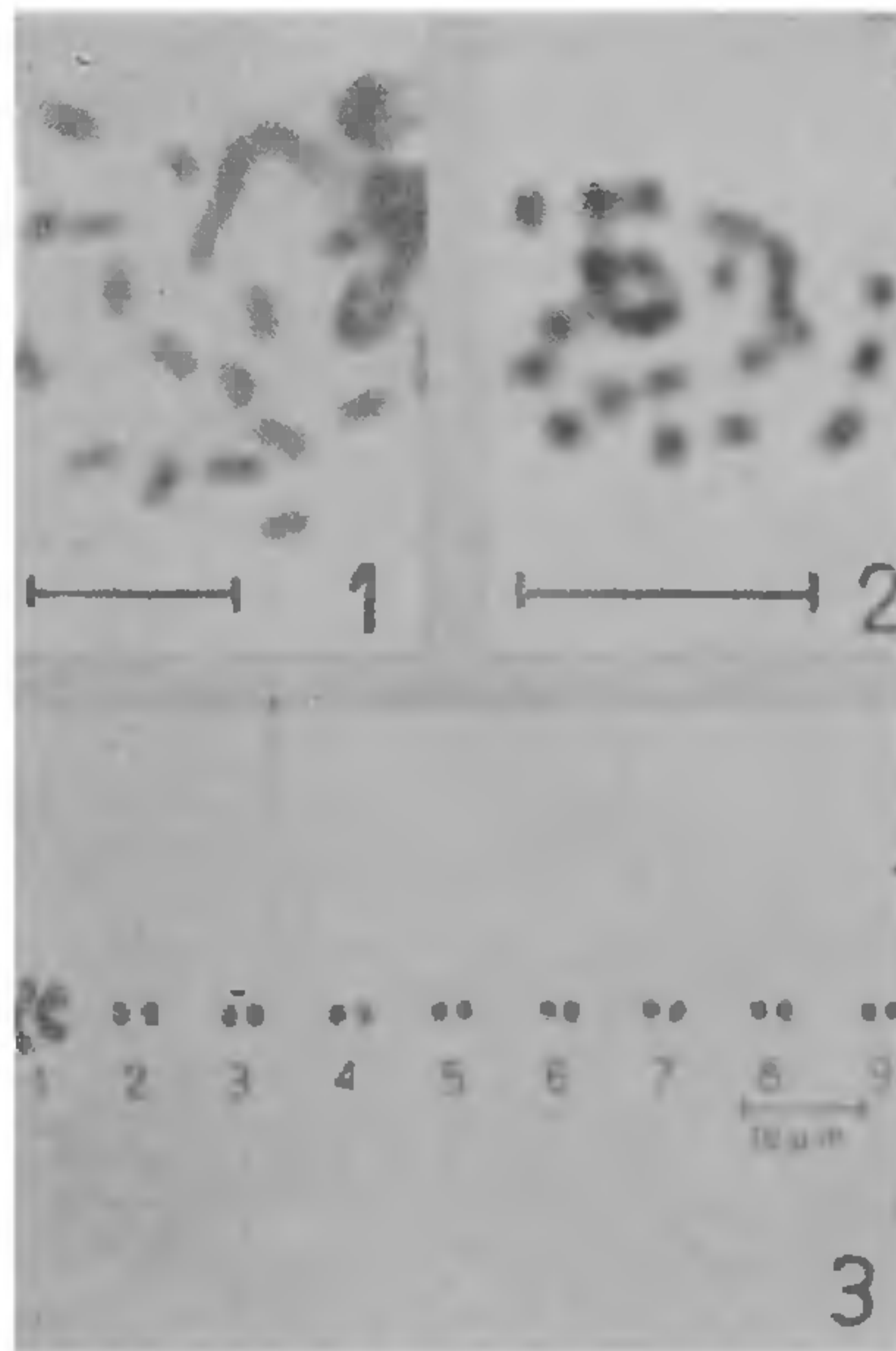
The present communication deals with the diploid chromosome number, chromosome morphology, karyotype and their metrical data, which is the first report for the genus *Tinocalloides* as well as to this species.

Aphids (alate and apterous viviparous females and nymphs) were collected from Shillong (Meghalaya),

infesting host-plant, *Prunus persica* (family—Rosaceae) in November 1979. From alate and apterous viviparous parthenogenetic females, the embryos were dissected out and the permanent cytological preparations were made following the conventional air-dry method of Kurl and Narang⁶ using 10% Giemsa stain in 0.1 M phosphate buffer of pH 6.8. Metrical data of chromosomes were taken as described elsewhere⁷.

At pro-metaphase and metaphase the diploid chromosome number was found to be 18 (Figs. 1 and 2). This number was established after counting 46 well-spread prometaphase and metaphase complements, from a single sample analysed.

Assuming the chromosomes of approximately equal lengths to be homologous, the karyotype (Fig. 3) was prepared from metaphase plate, which depicts the presence of one long pair and eight short pairs of chromosomes. The metrical data for all the chromosomes are given in Table I. The chromosomes ranged between 8.58 and 2.73 μ m from the longest to the shortest. The longest chromosome is nearly three times bigger in length than the shortest one. The mean TCL in microns is 69.97 ± 4.84 . There are no



FIGS. 1-3. Photomicrographs of somatic chromosomes of *T. montanus*. Fig. 1. Prometaphase ($2n = 18$). Fig. 2. Metaphase ($2n = 18$). Fig. 3. Karyotype prepared from Fig. 2.

TABLE I

Metical data of somatic chromosomes of *Tinocalloides montanus*, analysed from 16 metaphase complements

Chromosome No.	Mean actual length in microns \pm S.E.	Mean relative percentage length \pm S.E.
1	8.58 \pm 0.73	14.04 \pm 0.47
2	8.58 \pm 0.73	14.04 \pm 0.47
3	2.73 \pm 0.21	4.48 \pm 0.05
4	2.73 \pm 0.21	4.48 \pm 0.05
5	2.73 \pm 0.21	4.48 \pm 0.05
6	2.73 \pm 0.21	4.48 \pm 0.05
7	2.73 \pm 0.21	4.48 \pm 0.05
8	2.73 \pm 0.21	4.48 \pm 0.05
9	2.73 \pm 0.21	4.48 \pm 0.05
10	2.73 \pm 0.21	4.48 \pm 0.05
11	2.73 \pm 0.21	4.48 \pm 0.05
12	2.73 \pm 0.21	4.48 \pm 0.05
13	2.73 \pm 0.21	4.48 \pm 0.05
14	2.73 \pm 0.21	4.48 \pm 0.05
15	2.73 \pm 0.21	4.48 \pm 0.05
16	2.73 \pm 0.21	4.48 \pm 0.05
17	2.73 \pm 0.21	4.48 \pm 0.05
18	2.73 \pm 0.21	4.48 \pm 0.05

morphologically distinguishable sex elements amongst these chromosomes. No primary or secondary constriction was observed in any one of the chromosomes. The chromosomes are of orthodox homopteran type, i.e., holocentric. This is in concordance with the earlier reports^{8,9}.

In interphase nuclei no discernible structures could be observed. At prophase intermingled chromosome threads appeared which took light stain as compared to pro- and metaphase chromosomes. At prometaphase (Fig. 1) the chromosomes are randomly distributed while at metaphase the chromosomes are very compact (Fig. 2). No anaphase and telophase could be observed even from a large number of slides prepared. Meiotic cell division could not be studied as no sexual form was available in the material.

To the best of our knowledge, this is the first report on the chromosomes in *T. montanus*. Since this species is the sole representative of the genus *Tinocalloides* no correlation can be established between congeneric species. Other genera within the tribe Phyllaphidini exhibit the chromosome numbers, ranging from $2n = 6$ to $2n = 40$ ^{2,3}. Although, there is some consistency in the chromosome numbers within the congeneric species of a few genera^{2,3}, the tribe Phyllaphidini shows a heterogeneous group of aphids for their chromosome numbers. Out of

total cytologically known species of the tribe, nearly 23% species show $2n = 18$ chromosomes². As such no cytotaxonomical conclusion can be drawn on the basis of their chromosome numbers. Extensive studies are needed to establish the cytotaxonomic significance among the different genera of the tribe.

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ASSOCIATION OF BACTERIUM-LIKE ORGANISM WITH CITRUS GREENING IN INDIA

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GREENING disease is prevalent in almost all the citrus growing states of India and is transmitted by an oriental citrus Psylla, *Diaphorina citri* Kuw¹ caused by mycoplasma-like organism (MLO)². On the other hand, gram negative bacteria-like organism (BLO) has been shown to be associated with greening in other countries^{1,2,5}. The present paper reports the electron microscopy of the organism associated with greening disease of citrus in India.

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