RECORD OF AZIMUTHAL EFFECT ON COTTON BOLLWORMS

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OBSERVATIONS on boll formation and damage by bollworms on locules were recorded. The data showed that the percentage boll formation was more in western and northern directions, being 30 and 32%, respectively, than the other two directions. The former showed azimuthal effect while the latter had magnetic azimuth.

Locules damaged by bollworms showed positive azimuthal effect, infestation on an average being 40% facing east direction followed by 23·2% in western direction. North and south directions had low and equal distribution.

This finding has practical implication of spraying the field from east to west direction and *vice versa*. It will give better coverage. Hence higher control than at random spray.

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NEW RECORDS OF PREDACEOUS BEETLES ON BROWN PLANTHOPPER IN INDIA

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BROWN planthopper, *Nilaparvata lugens (Stal)*, a potentially destructive rice pest, has a large natural enemy complex suppressing its population. Manjunath *et al.*[2] reported four species of Coccinellids namely, *Coccinella arcuata* (F.), *C. repanda* Thunb., *Menochilus sexmaculata* (F.), *Veranica discolor* preying on this bug from Karnataka. *Paederus fuscipes* Curtis (Staphylinidae, Coleoptera) was found to be a potential predator of this pest in Malaysia (Peter *et al.*[3]), Japan, Taiwan and Thailand (Chiu[1]).

During April 1979, two species of Coccinellids, namely *Coccinella billieti* (Mulsant) and *Oenopia* sp. and two species of *Staphylinids*, namely, *Paederus fuscipes* and *P. melampus* Er., were found feeding on nymphs of *N. lugens* in the field. Both coccinellids and *P. melampus* are new predators to be reported for this pest and *P. fuscipes* is the first record of the predator of the pest from India.

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EFFECT OF EXPOSURE OF RATS TO LOW TEMPERATURE ON SODIUM AND POTASSIUM HOMEOSTASIS IN BLOOD

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BIOCHEMICAL changes induced by hypoxia have already been studied in detail in this laboratory[1–3]. In a previous communication[3], we have already reported that acute hypoxia significantly changes red cell membrane permeability as revealed by influx of Rubidium-86 and Sodium-22. Hypoxia lowers body temperature[1–4], of laboratory rats and since at high terrestrial elevation low ambient temperature along with low atmospheric pressure are prevalent, it was proposed to study the effect of low ambient temperature alone on red cell membrane permeability and associated changes in blood.

Materials and Methods

Adult male Sprague-Dawley rats, 6 months old, were kept at 5°C for 5 and 24 hours respectively. Sodium[5] and potassium[6] of plasma and red cells were measured colorimetrically. Influx and efflux of sodium and potassium in erythrocytes were studied *in vitro* using Sodium-22 and Rubidium 86[7]. Blood 2–3 Diphosphoglycerate (DPG)[8] and Reduced Glutathione (GSH)[9] contents were estimated by colorimetric methods.

Results and Discussion

Maintenance of rats at 5°C for 5 and 24 hours resulted in a lowering of body temperature by 0·6°C and 1·2°C respectively[1,4]. Results in Table I reveal that exposure to cold for 5 hours at 5°C has no effect on influx and efflux of Rubidium 86 and Sodium 22 in red cells *in vivo* in rats. Similarly, concentrations of sodium and potassium of plasma and red cells in rats with short-term cold exposure were same as

TABLE I

Influx and efflux of Rubidium-86 and Sodium-22 in erythrocytes of cold-exposed rats

(Data represent mean ± S.E M., of 6 8 animals)

Group	Influx of ^{86}Rb cpm/ml cell	Influx of ^{22}Na cpm/ml cell	Efflux of ^{86}Rb cpm/ml cell	Efflux of ^{22}Na cpm/ml cell
Exposed to 25° C	53115±700	2831±50	7135±30	3975±140
Exposed to 5° C for 5 hours	51623±900	2861±70	7155±30	3985±140
Exposed to 5° C for 24 hours	84934±3000**	3463±300*	6170±85**	4850±100**

* $P < 0.05$, ** $P < 0.001$.

Influx of ^{22}Na : 0·25 ml red cells 1 μci ^{22}Na incubated with potassium ringer solution at 37° C/90 min, centrifuged and counts taken.

Efflux of ^{22}Na : 0·25 ml red cells, 1 μci 22 Na incubated with potassium ringer solution at 37° C/3 hours, centrifuged, washed red cell incubated at 37° C/30 min, centrifuged and counts taken in supernatant.

TABLE II

Sodium, potassium, DPG and GSH of blood of cold-exposed rats

(Data represent mean ± SEM of 8–12 animals)

Group	Sodium meq/litre		Potassium meq/litre		DPG µmol/ gm Hb	GSH mg/100ml blood
	Plasma	Red cell	Plasma	Red cell		
Exposed to 25° C	185·7±2·6	20·6±1·2	6·5±3·7	69·1±3·7	16·3±0·4	22·5±1·0
Exposed to 5° C for 5 hours	191·1±3·1	21·2±1·4	6·8±0·2	63·7±3·9	20·5±0·9***	24·8±1·1
Exposed to 5° C for 24 hours	193·4±1·7*	22·8±1·8	6·7±0·3	80·9±1·8**	23·7±0·7***	19·7±1·1

* $P < 0.02$; ** $P < 0.01$; *** $P < 0.001$.

Sodium : Precipitated as soidum uranyl zinc acetate and colcrimetrically estimated.

Potassium : Potassium is precipitated as cobaltinitrite, decomposed by alkali and liberated nitrite estimated colorimetrically.

DPG : DPG is enzymatically hydrolysed to 3-phosphoglyceric acid and P^i, which is estimated colorimetrically.

GSH : DTNB used to reduce GSH forming yellow coloured substance and measured colorimetrically at 412 nm.

control (Table II). In contrast, exposure of rats for 24 hours at low temperature led to increased influx and decreased efflux of Rubidium-86 along with increased red cell potassium. Increased influx and efflux of Sodium 22 in red cell in *vitro* with an increase in plasma sodium have been observed in experimental rats with continued exposure to cold for 24 hours. It is presumed that increased efflux of sodium might have contributed to enhanced plasma sodium.

It has been shown that DPG in blood regulates potassium homeostasis[10] and that GSH of blood significantly increases[3] in acute hypoxia, the concentration of DPG and GSH were determined in the present series of experiments. Cold exposure significantly increases blood DPG. A similar increase has been observed under acute hypoxia[3] conditions. In contrast to hypoxia state,[3] cold exposure did not alter GSH contents of blood of experimental rats. Increase

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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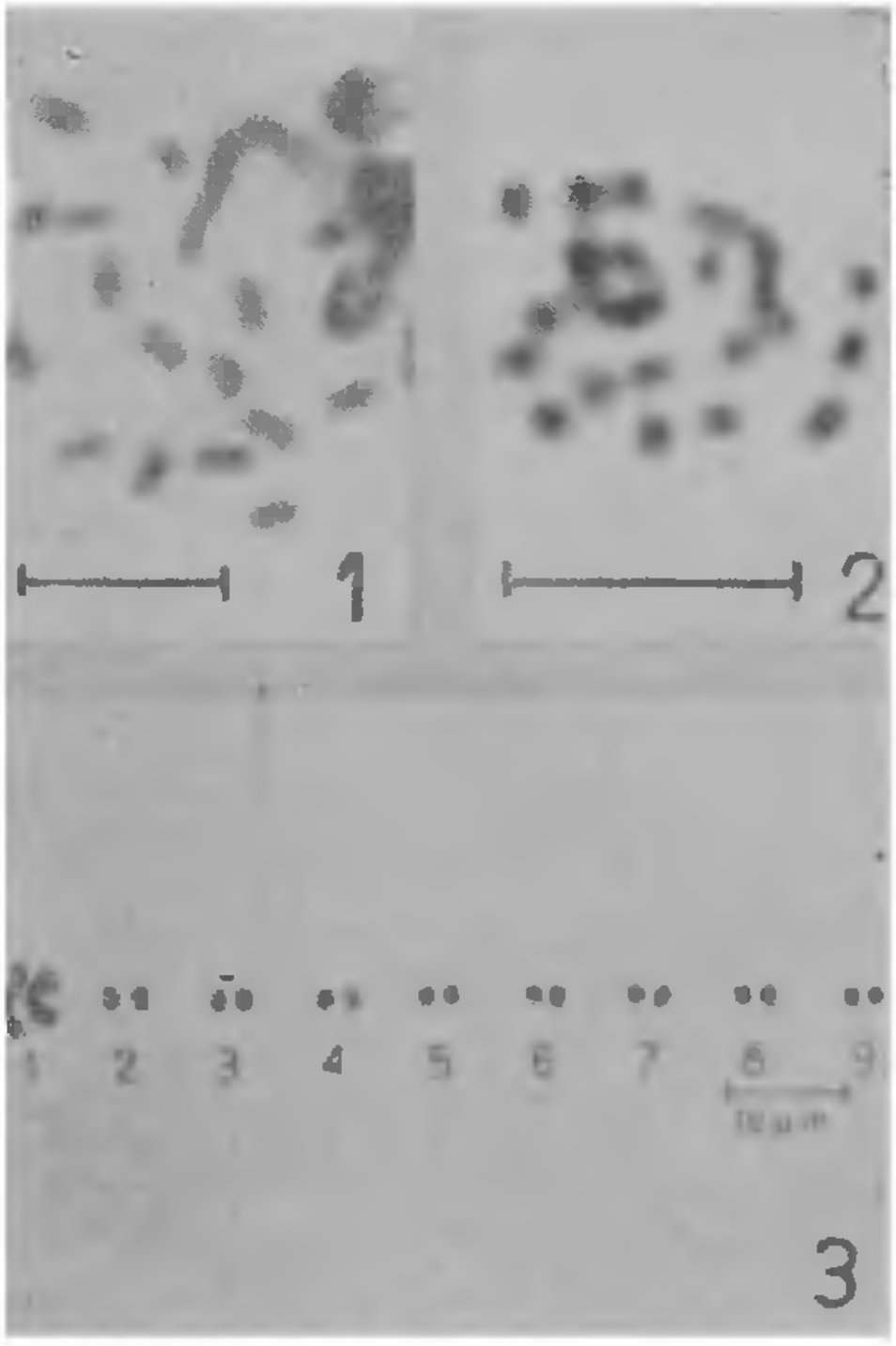
Out of 3917 species[1] of aphids known taxonomically, only 526 species[2,3] have been recorded for their cytology throughout the world. The genus *Tinocalloides* Basu[4] was discovered and established by Basu in 1969. *T. montanus* is the sole representative[5] of this genus which belongs to sub-family Drepanosiphinae of tribe Phyllaphidini[1]. This aphid is one of the major pests of cherry in India. Generally this aphid reproduces parthenogenetically but its alate males have also been recorded[4]. 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 Narang[6] using 10% Giemsa stain in 0·1 M phosphate buffer of pH 6·8. Metrical data of chromosomes were taken as described elsewhere[7].

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 μm 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 $\pm$ 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.