ON THE CHROMOSOMES OF A CRICKET, *LIOGRYLLUS BIMACULATUS*

According to Japanese workers the X-chromosome in crickets is metacentric. The two exceptions are *Cyrtoxiphus ritsemæ* and *Homœogryllus japonicus* (Ohmachi [1,2]). The present work reports on the X-chromosome and the diploid number of chromosomes in an Indian cricket from Ballygunge in Calcutta.

Testes and ovaries of the material were fixed in Flemming's without acetic acid and also in Belling's modification of Navaschin's mixture. The gonads after sectioning were stained in both iodine crystal violet and Feulgen's stain. The chromosome number was found to be $2n=23$ in the male and $2n=24$ in the female. The complement in the male is composed of (1) an unpaired, metacentric X-chromosome, (2) a pair of V-shaped chromosome and (3) 10 pairs of rod-shaped ones of various sizes (Fig. 1).

1 2 3

FIG. 1. Spermatogonial metaphase of *Liogryllus bimaculatus* × 2270.
FIG. 2. Metaphase plate from the follicle cell of ovary × 2625.
FIG. 3. Side view of first meiotic metaphase showing the "X" lying off the plate. × 1750.

The sex chromosome was found to be the biggest in the complement with two arms unequal. It showed almost always an irregular outline and never became fully nucleinated like the autosomes even at late spermatogonial metaphase stages. The female complement differed from that of the male in having a pair of metacentric X-chromosomes (Fig. 2). The sex chromosomes of the female set were studied from the follicle cells of the ovary and they did not show any heteropycnotic behaviour. The X-chromosome in the prophase of meiosis in the male resembled sometimes a bent rod, split along its length and highly nucleinated, and at other times a compressed mass situated at the periphery of the nuclear membrane. In the first meiotic metaphase this chromosome formed an accessory plate in most cases (Fig. 3), and also showed negative heteropycnosis. Lagging of the sex chromosome was noted in some nuclei. The second division metaphase plates contained either 11 or 12 chromosomes showing that the first meiotic division of the male is reductional for the sex chromosome.

The work was carried out in the Cyto-genetical Laboratory of the Department of Zoology, Calcutta University. Thanks are due to Dr. S. P. Ray Chaudhury for criticism and to Prof. B. R. Seshachar, Bangalore, for identification.

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NECROSIS IN TOMATO (*LYCOPERSICUM ESCULENTUM* MILL.)

Tomato Plants (*Sutton's Early Market Variety*), when inoculated with leaf extract of potato plants showing severe crinkling and mottling, repeatedly produced veinal necrosis and necrotic spots. The disease was reproduced easily by sap inoculation to healthy tomato plants (Fig. 1).

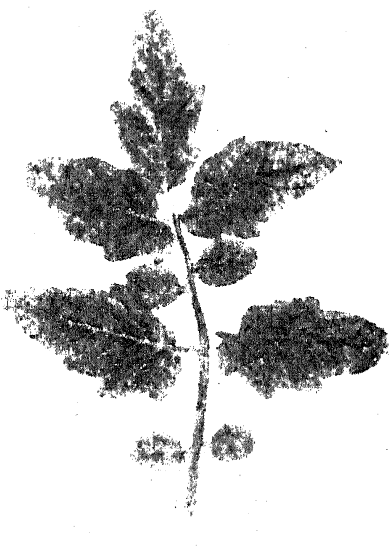

FIG. 1

The inoculation tests were mostly conducted during February-March at Delhi in the insect proof house. The first symptom of the disease in the form of curling of leaves with slight inward rolling of margins appears 20 to 22 days after inoculation, followed by both veinal and foliar necrosis. Necrotic streaks are also produced on the petioles. Transient mottling is observed only in early stages. The infected plants are dwarfed and tend to shed their leaves.

The disease from tomato plants was tarnsmitted to *Nicotiana tabacum* L., *Datura stramonium* L., *Solanum nodiflorum* Jacq. *Petunia hybrida compacta* Vilm., by mechanical inoculation but no symptoms were produced on plants of *Lagenaria leucantha* (Dusch.) Rusby. On *Nicotiana tabacum*, variety *Harrison's special*, five days after inoculation circular mottle was observed. This was followed by vein clearing of younger leaves and green vein banding. In the case of *Datura stramonium* (Fig. 2) persistent, interveinal mottle was observed 5 to 10

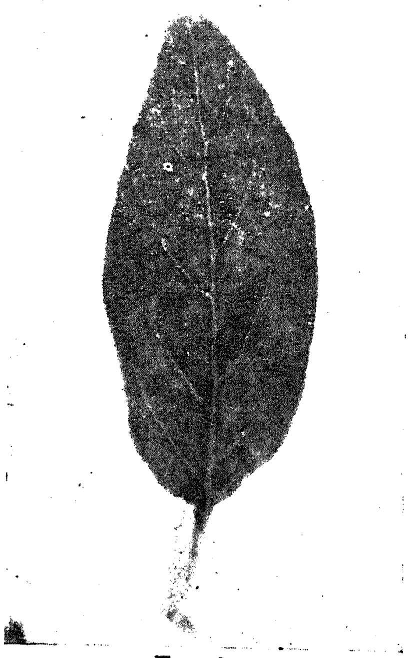

FIG. 2

days after inoculation but no necrosis developed. On *Solanum nodiflorum* characteristic yellowish veinal mosaic was produced whereas *Nicotiana glutinosa* developed chlorotic spots and vein clearing. Puckering and necrotic flecks were also observed on the leaves. On *Petunia hybrida* distinct pale blotchy mottle on the leaves and sepals with vein clearing developed.

The reactions on different hosts indicate that the tomato plant showing necrosis was infected both with *Solanum viruses* 1 and 2. Further tests with *Solanum virus* 1 filtered through *Datura stramonium* failed to ı duce the typical symptoms of the dise It was not possible to eliminate *Solaı Virus* 1 by making inoculations of the n ture to *Petunia* as the variety of *Petı* plants under test was found susceptibl it, and in order to separate *Solanum Vir* from the mixture tomato shoots showing disease were grafted to U.S.D.A. po seedling 41956 which is known to be re tant to *Solanum Virus* 1. The potato pl exhibited veinal necrosis and leafc streak. Scions from the potato plants w grafted back to healthy tomato plants no necrosis was produced on tomato pl even after one month.

Smith[5] has described necrosis in ton caused by the interaction of *Nicoti Virus* 1 and *Solanum Virus* 1 in which gross lesions develop longitudinally in stem and necrotic spots on the lea The young tomato plants are usually ki by the disease whereas in the case of disease under report the affected pl neither produce lesions on the stem the plants are killed.

Samson[4] observed necrosis in tom induced by a strain of *Nicotiana Viru* Also Linn and Anderson[3] reported a sim disease. Doolittle and Beecher[1] descri a mosaic disease due to a strain of tob mosaic virus on tomato causing necr and shrivelling of the foliage.

Dykstra[2] has, however, observed necr of tomato leaves as a result of inocula with the extract of potato plants infe with rugose mosaic.

Tests conducted here rule out the ı sence of *Nicotiana Virus* 1 and show either of the components of the virus tr missible to *Datura stramonium* or U.S.D.A. pototo seedling 41956 is not to produce the disease on tomato indep dently so that the necrosis observed tomato has been brought about jointly *Solanum Viruses* 1 and 2.

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:IODIC RESPONSE IN SOME \Y MUTANT WHEATS

photoperiodism of wheat under tions have been carried out by ty,[1] Kar,[2] Chinoy and Nanda.[3] investigation is directed to- y of the stage of optimum res- toperiods in two new strains of (Sarojini) and R-9 (Vijaya), the best (Pugh[4]) of the eleven lved by Prof. Ranjan.[5] These y widely in their morpho- physiological characteristics sent study has been designed heir photoperiodic response general trend of other Indian

vere sown in earthenware pots ontaining well-mixed garden ıure. As long-day treatment, ıotoperiod was used. This by supplementing the natural th artificial illumination from)sram' bulb kept at a distance ughout the night. The long- ıt was continued till ear- ıs complete in the individual

FIG. 1

treatment, an 8-hour photo- sed. This was obtained by ots in daylight daily from ı. and then removing them tilated light-proof room for the rest of the time. The exposure to short photoperiod in each individual set commenced at different stages of the vegetative phase (Table I) and was continued in each case for 30 days only after which they were kept outside under natural conditions for the rest of their period of development.

The results are presented in Table I and the condition of the plants under different treatments is shown in Fig. 1.

TABLE I

The effect of long-day and short-day treatments (at different ages of the seedlings) on ear-emergence

Sowing date, 27th December 1948. Average of 24 plants. + indicates earliness; − indicates delaying effect.

Variety of wheat	Age rom sowing in days, at which the treatment was commenced	Number of days from sowing to ear-emergence		Difference from control in days	
		Long-day	short-day	Long-day	short-day
R-1	14	38·4	71·2	+23·9	−8·9
	21	42·9	69·4	+19·4	−7·1
	28	49·6	65·7	+12·7	−3·4
	35	51·6	64·0	+10·7	−1·7
	Control	62·3	62·3		
R-9	14	38·0	65·1	+21·6	−5·5
	21	42·3	62·1	+17·3	−2·5
	28	47·8	61·2	+11·8	−1·6
	35	50·6	59·8	+ 9·0	−0·2
	Control	59·6	59·6		

Table I shows that long-day conditions during the vegetative phase bring about significant earlier ear-emergence in both the mutants and that the effect is more pronounced if the long days are applied at the early seedling stage. As the seedlings become older, the long photoperiods produce less and less effect in inducing earliness. It was found that short-day treatment always retards flowering, the effect gradually diminishing as the treatment is applied later and later in the advancing age of the plant.

The present study clearly shows that the mutants under investigation resemble the other Indian varieties in the general trend of their photoperiodic response, and that long-day treatment during their vegetative phase accelerates their normal life-cycle, although as such they tolerate the available short days of India and set good grains.