

During the course of investigations on the developmental studies in *Drosophila nasuta*, some peculiarities were observed pertaining to the rate of development of the eggs laid soon after starvation. The developmental obstinacy of these eggs during development are here reported. Following the procedure of DELCOUR<sup>4</sup>, 2 batches of eggs were obtained: 1. The eggs laid during the first 12 h after starvation ( $\pm 6$  h) and 2. of the eggs laid later ( $\pm 6$  h). From each batch of eggs collected, half of them were incubated at a constant temperature of 21°C ( $T^0$ ) and the other half at an ambient fluctuating room temperature of 23°C to 28°C ( $T'$ ). In order to maintain uniform pre-adult density, 100 eggs were transferred to vials (1"  $\times$  3") containing equal amount of food (normal wheat cream agar media) seeded with yeast. The first batch has 10 vials each at  $T^0$  and  $T'$  and second has 29 vials at  $T^0$  and 26 vials at  $T'$ .

Figures 1 and 2 illustrate the pattern of emergence of the adults at  $T^0$  and  $T'$ , respectively in the two batches of eggs. Table I gives the mean developmental time with the standard error of each batch. Table II incorporates the summary of the Student *t*-test computed to compare the mean values. The first batch of eggs exhibited significant retardation over the second batch of eggs at both  $T^0$  and  $T'$  temperatures. Eggs laid soon after starvation, experi-

ence a slower developmental rate than the eggs laid afterwards. The tables also reveal that at room temperature the eggs undergo a faster rate of development than at the constant temperature.

During starvation the eggs have remained in the reproductive system and are otherwise laid if there is a suitable surface. These detained eggs can be expected to have initiated their early embryonic development before they were laid. This being so, these first batch of eggs should manifest comparatively a faster rate of adult emergence than the eggs of the later batches.

In spite of this, why should the first batch of eggs collected soon after starvation manifest a delayed rate of development? Though it is difficult to assign any definite reasons for this, some suggestions could be made. The disparity in the rate of eclosion of adult flies may be due to the following reasons. If the sojourn of the oocytes exceed the prescribed optimum period within the reproductive system, it may affect their future development; retention may end up in the prodigality of the eggs of different stages in the system, which may affect the egg physiology resulting in the retardation of development, and/or it may be due to the biological homeostatic obstinacy of the population during the period of starvation in nature to prolong their developmental period to get over the inimical conditions of nature.

Further work is in progress to decipher this event. It is felt that in employing the Delcour's procedure care has to be taken to eliminate the first batch of eggs (first 12 h) collected after starvation.

**Zusammenfassung.** Weibchen von *Drosophila nasuta* wurden während 5 h gehungert. Nachkommen aus den in den nächsten 12 h abgelegten Eiern entwickelten sich bedeutend langsamer als jene aus den später abgelegten Eiern.

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Table I. Mean developmental time in days for the 2 batches of eggs

	Batch I	Batch II
$T^0$	20.11 $\pm$ 0.095	14.84 $\pm$ 0.049
$T'$	13.74 $\pm$ 0.089	10.14 $\pm$ 0.045

Table II. Summary of the Student *t*-test computed to compare the mean values within and between batches of eggs at  $T^0$  and  $T'$

	I and II of $T^0$	I and II of $T'$	I of $T^0$ and I of $T'$	II of $T^0$ and II of $T'$
<i>t</i> value	52.70	40.00	49.00	78.33
<i>p</i> value	<0.001	<0.001	<0.001	<0.001

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### Induced Interchanges in Finger Millet (*Eleusine coracana* Gaert)

Chromosomal interchanges constitute one of the most important type of structural change resulting in alteration of chromosome morphology and number. They are used not only to gain basic cytogenetic information but also as aids in breeding (BURNHAM<sup>2</sup>). Induced translocations were first reported by Stadler in maize in 1930. Since then, interchanges have been induced in many crop plants. SJODIN<sup>6</sup> made extensive studies on induced translocations in *Vicia faba*. However, such studies have not been reported in finger millet, *Eleusine coracana* which is one of the important millet crops of South India. The present paper deals with certain cytogenetic aspects of induced translocations in this crop.

During the course of our detailed cytological studies in the gamma irradiated material, plants showing interchanges were observed in the progenies of seeds treated

with doses of 20, 30 and 40 Kr gamma rays in the variety CO-1. For the isolation of interchange heterozygotes, plants showing 50% or more sterility were selected and the meiosis was studied in the flower buds fixed in 1:3 acetic alcohol. Anther smear preparations were made using 1% acetocarmine. Well spread meiotic plates were analysed for the frequency and types of quadrivalents, and the data are presented in the Table. Out of the 50 plants studied, 19 plants were found to show interchanges. The study of frequency of cells with translocations revealed considerable differences in different plants. Percentage of cells with quadrivalents ranged from 5.0% to 71.4% in different plants. The frequency of types of quadrivalents observed in different translocation heterozygotes is also given in the Table. It is clear from the Table that the frequency of ring and chain quadrivalents also varied in

Frequency and types and quadrivalents in different translocation heterozygotes of finger millet

Culture No.	Cells with quadrivalents (%)	Types of quadrivalents (%)	
		Rings	Chains
84-1	40.0	91.6	8.4
84-2	71.4	88.0	12.0
84-3	12.9	49.7	50.3
88-1	5.0	33.3	66.7
88-2	30.4	70.0	30.0
88-3	32.3	10.0	90.0
89-1	58.1	77.7	22.3
89-2	25.0	16.6	83.4
89-4	50.0	80.0	20.0
89-5	6.7	—	100.0
90-2	62.5	44.0	56.0
90-3	30.3	10.0	90.0
90-4	10.3	60.0	40.0
91-1	50.3	57.1	42.9
91-2	71.4	66.7	33.3
91-3	61.8	58.6	41.4
92-1	51.2	40.8	59.2
92-2	71.0	31.8	68.2
92-3	61.6	6.2	93.8

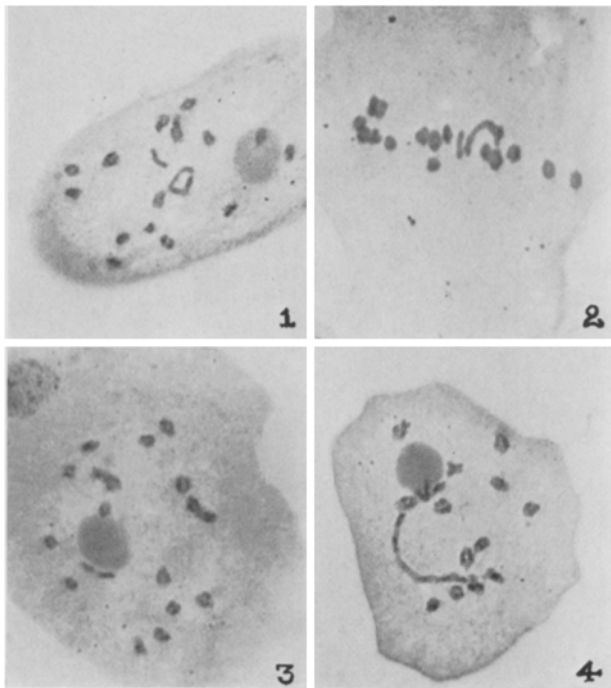


Fig. 1. Diakinesis with 16 bivalents and 1 quadrivalent.  
Fig. 2. Metaphase I with 16 bivalents and 1 quadrivalent.  
Fig. 3. Diakinesis with 14 bivalents and 1 quadrivalent.  
Fig. 4. Diakinesis with 15 bivalents and 1 hexavalent.

in different plants. The percentage of ring quadrivalents ranged from 2.6% in plant No. 92-3 to 91.6% in plant No. 84-1. In one plant (86-5) only chain quadrivalents were observed exclusively. On an average, frequency of chain quadrivalents was slightly higher than the ring quadrivalents.

The association of types of 4 chromosomes in translocation heterozygotes was either in the form of a ring or chain (Figures 1 and 2). In 2 plants, cells with 2 rings of 4 chromosomes and a chain of 6 chromosomes were observed occasionally (Figures 3 and 4).

Studies on induced interchanges have been reported in many crop plants by several workers (BURNHAM<sup>1</sup>; CALDECOTT and SMITH<sup>2</sup>; GOTTSCHALK<sup>4</sup>; SJODIN<sup>6</sup>; KALLO and DAS<sup>5</sup>). In the present study interchange heterozygotes were isolated from the plants raised from the gamma irradiated seeds. Both ring and chain quadrivalents were observed during meiosis. The formation of ring or chain quadrivalents depends upon two factors. Firstly on the occurrence of chiasma in the interchanged segments, and secondly on the length of interchanged segment itself (BURNHAM<sup>3</sup>). High frequency of rings observed at least in some plants in the present study indicates that the length of exchanged segment between non-homologous chromosomes are sufficiently long for the chromosomes to pair and recombine. On the other hand, the prevalence of only chain quadrivalents observed in one of the plants (89-5) in the present case indicates that the exchange has possibly taken place between a long and a short segment<sup>7</sup>.

**Zusammenfassung.** In heterozygoten Nachkommen aus mit Gammastrahlen behandelten Samen der Hirse *Eleusine coracana* treten Quadrivalente in Form von Ketten oder Ringen je nach der Länge des ausgetauschten Segments und der Chiasmahäufigkeit auf.

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## Die spektrale Transmission und die optische Aktivität des dioptrischen Apparates der Honigbiene (*Apis mellifica* L.)

Da uns bislang Untersuchungen der spektralen Transmission des Kristallkegels<sup>1,2</sup> der Honigbiene sowie Untersuchungen der optischen Aktivität<sup>3</sup> im kurzwelligen Bereich nicht bekannt sind, erschien es uns im Hinblick auf frühere Arbeiten<sup>4,5</sup> und im Hinblick auf Unter-

suchungen des Farbensehens der Honigbiene<sup>6</sup> wünschenswert, die vorliegenden Messungen durchzuführen.

1. Messungen der spektralen Transmission von Cornea und Kristallkegel der Honigbiene bei 300-600 nm<sup>7</sup>. Die Messungen der spektralen Transmission im Bereich von