Chromosome Number and Sex Chromosome Mechanism in Some More Species of the Indian Mantids

A preliminary cytological account regarding the chromosome number and sex chromosome mechanism in 15 species of the Indian preying mantids has already been given in the earlier publication[1]. Recently WHITE[2] added cytological data on 20 more species of mantids from Africa and Australia, bringing the total of hitherto cytologically known species to 88.

The present report on the chromosome number and sex chromosome mechanism in some more species of the Indian mantids has been possible due to the most generous collaboration of Prof. Dr. MAX BEIER, Director of Zoologische Abteilung, Naturhistorisches Museum, Vienna, who very kindly identified all the species. The present observations about the various species have been made on the male germ cells and are presented in the Table, in which the species have been arranged systematically after GIGLIO-TOS[3].

This report, therefore, brings the total of hitherto cytologically known species to 96. It also provides preliminary cytological information for one more subfamily of mantids, *Eufischeriellinae*, which has so far remained completely unknown in this respect.

There has been a great deal of confusion with regard to the systematics of the genus *Humbertiella*[4]. HUGHES-SCHRADER[5] and OGUMA[6] reported $2n♂ = 39$ in a species of *Humbertiella* from India, which they labelled as *Humbertiella indica* Sauss. But they gave no information as to who had identified their specimens. DUTT[7] described $2n♂ = 31$ in an obviously different species of *Humbertiella* from Delhi (India), which was, however, again identified as *Humbertiella indica* Sauss. by the late Dr. JAMES A. G. REHN of the Academy of Natural Sciences of Philadelphia. An adult male of a species of *Humbertiella* from Chandigarh, carrying $2n♂ = 31$, was also sent by me to Dr. REHN who identified it as *Humbertiella* sp. (not *H. indica* or *H. septentrionum*)[1]. This very species has now been identified by Dr. MAX BEIER as *Humbertiella similis* GIGLIO-TOS. Thus Dr. REHN's earlier identification of DUTT's material, which is most probably the same as mine of *H. similis*, Delhi being only 150 miles away from Chandigarh without any difficult barrier in between, seems to be incorrect. Similarly, the identification of HUGHES-SCHRADER's and OGUMA's material appears unauthentic.

Dr. BEIER has clearly shown the 4 species of *Humbertiella* (present paper) as different from one another, without the knowledge of their different chromosome number. In the absence of well-marked differentiating morphological characters, the cytotaxonomy seems to be a useful tool in establishing the systematics of the genus *Humbertiella* on firm grounds.

The present report of the diploid number of *Didymocorypha lanceolata* also stands in contrast to that of

[1] M. L. GUPTA, Curr. Sci. *33*, 369 (1964).
[2] M. J. D. WHITE, Chromosoma *16*, 521 (1965).
[3] E. GIGLIO-TOS, *Mantidae*. Tierreich *50*, 1 (1927).
[4] F. WERNER, Proc. zool. Soc. Lond. *1933*, 897.
[5] S. HUGHES-SCHRADER, Chromosoma *3*, 257 (1948).
[6] K. OGUMA, Kromosomo *1*, 1 (1946).
[7] M. K. DUTT, Caryologia *6*, 117 (1954).

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Species	Locality	Diploid number of chromosomes in ♂	Sex chromosome mechanism in ♂
Subfamily *Eremiaphilinae*			
1. *Humbertiella indica* Sauss.[a]	Doon Valley	23	*XO*
2. *Humbertiella similis* Giglio-Tos[b]	Chandigarh	31	*XO*
3. *Humbertiella* novo species	Bikaner	39	*XO*
4. *Humbertiella* sp.	Rameshwaram Island	21	*XO*
5. *Didymocorypha lanceolata* (F.)[b]	Chandigarh	17	*XO*
Subfamily *Amelinae* – Group *Gonypetae*			
6. Novo genus vic. *Cimantis-Eumantis*	Rameshwaram Island	25	*XO*
Subfamily *Thespinae*			
7. *Parathespis humbertiana* Sauss.	Rameshwaram Island	31	*XO*
Subfamily *Mantinae*			
8. *Hierodula coarctata* Sauss.	Chandigarh	27	X_1X_2Y
Subfamily *Eufischeriellinae*			
9. *Deiphobe brunneri* (Sauss.)	Chandigarh	19	*XO*
10. *Deiphobe indica* Giglio-Tos	Doon Valley	27	X_1X_2Y
Subfamily *Hymenopodinae*			
11. *Creobroter gemmatus* (Stoll)	Chandigarh	27	*XO*
Subfamily *Vatinae*			
12. *Cheddikulama straminea* Henry[b]	Doon Valley	27	X_1X_2Y
Subfamily *Empusinae*			
13. *Empusa pauperata* (F.)	Chandigarh	27	*XO*

[a] Described as *H. ceylonica* in previous paper[1]. [b] Described without specific names in previous paper[1].

OGUMA[6], who showed $2n♂ = 15$. In this connection, I may report that I have invariably found $2n♂ = 17$ in a large number of available mitotic and meiotic cells from as many as ten individuals studied.

Although no meiotic divisions are represented in my nymphal material of the 2 species of *Deiphobe*, the sex chromosome mechanism in them has been carefully established from their spermatogonial stages. In *Deiphobe indica* three large unpaired chromosomes are readily identifiable, lying on the periphery of the spermatogonial metaphase. Two of them are characterized by a negative heterochromacy of the distal region of the longer arm and obviously represent X_1 and X_2. Further, the lagging of these three chromosomes during the later half of the spermatogonial anaphase confirms their identification as the sex chromosomes and definitely establishes X_1X_2Y system in the male of this species. In *Deiphobe brunneri* with $2n♂ = 19$, on the other hand, the possibility of X_1X_2Y mechanism is excluded because none of its above characteristics exists here. One of the 5 larger metacentric chromosomes in the spermatogonial metaphase of this species seems to represent the sex chromosome as is indicated by its presence as a single positively heteropycnotic, bipartite, straight or conflexed structure in all the spermatogonial interphases. The presence of two types of spermatids, one with a single positively heteropycnotic body representing obviously the sex chromosome and the other without it, in the adult males which are otherwise mature, is also suggestive of an XO system in this species.

The discovery of XO and X_1X_2Y systems within the same genus *Deiphobe* is indeed of great evolutionary importance and urgently warrants further exhaustive cytological sampling of this genus.

A detailed account of mitosis and meiosis in the various species of the Indian mantids will be published in the near future. Novo genus vic. *Cimantis-Eumantis* of the group Gonypetae and *Humbertiella* novo species (present paper) will be described elsewhere.

Zusammenfassung. Über Chromosomenzahl und Mechanismus der Geschlechtschromosomen von 13 Arten (8 Unterfamilien) indischer Mantiden wird berichtet. Die Gattungen *Humbertiella, Didymocorypha*, Novo Genus der Gruppe Gonypetae vic. *Cimantis-Eumantis, Parathespis, Creobroter, Empusa* und die Art *Deiphobe brunneri* zeigen im ♂ Geschlecht das *XO*-System. *Hierodula coarctata, Cheddikulama straminea* und *Deiphobe indica* zeigen $2n♂ = 27$ und X_1X_2Y.

M. L. GUPTA[8]

Department of Zoology, Panjab University, Chandigarh (Punjab, India), February 25, 1966.

[8] I am deeply grateful to Prof. G. P. SHARMA for his able guidance, laboratory facilities and kind permission to accompany the zoological trip of the department to Rameshwaram Island, for the collection of mantids.

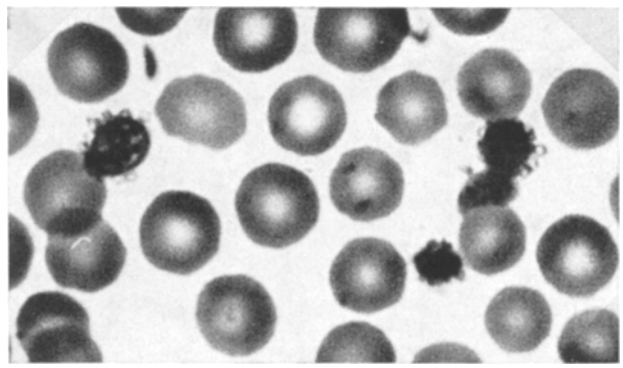
A Microorganism Affecting Bovine Platelets

In the course of studies of bovine tick-borne fever, Giemsa-stained blood smears of a splenectomized calf aged $1^1/_2$ years revealed the presence of delicate particles apparently attached to the surface of the platelets. These particles appear to represent a hitherto undescribed microorganism which seems to have a specific affinity to platelets, judging by the observations made so far.

The calf had been splenectomized more than one year previously and had subsequently been subjected to repeated inoculations of bovine and ovine blood. It had on several occasions suffered attacks of tick-borne fever, as well as piroplasmosis and eperythrozoonosis. The tests in progress at the time when the presumed new agent was discovered were intended for check on immunity to tick-borne fever.

When the first observation of particles attached to the platelets was made, 10 days had passed since the calf had last received an inoculum of bovine blood carrying tick-borne fever. In a blood smear made 6 days after the said inoculation no particles were yet positively seen. Starting on the day following discovery of the particles, the calf experienced a fever reaction, which lasted for 2 days. No other symptoms were recorded. During the fever reaction the number of particles was at its peak. It has since subsided at a uniform rate, but at present (1 month after the height of the reaction) particles are still found on occasional platelets. Subinoculation of another splenectomized calf resulted in the appearance of the same particles. Two normal calves have not reacted to such inoculation, nor has a splenectomized sheep.

The Figure shows the appearance of the particles in a Giemsa-stained blood smear. Fairly close resemblance to eperythrozoon organisms can be noted. The most prevalent form seems to be a delicate, weakly grey-staining ring, which is approximately 0.7 μ in diameter in most instances, but more deeply staining coccoid or rod shapes may also occur. At the height of the reaction one or several particles were found on practically every platelet. The irregular form and small size of many platelets suggest that they have suffered from the association. The particles show no tendency of attachment to any other



Giemsa-stained blood smear. Several ring forms of the agent are attached to platelets. Magnification × 2100.