HAPTOGLOBINS IN SOUTH INDIAN FISH

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HAPTOGLOBIN is a α_2-glycoprotein found in serum and has the capacity to combine with haemoglobin in a one-to-one ratio yielding a relatively high molecular weight complex. Apart from its peroxidase activity, the function of haptoglobin is probably to prevent excretion of plasma haemoglobin[1]. Comparative studies of haptoglobin distribution and structure should contribute substantially not only to our understanding of haptoglobin function but also to theories of protein evolution. Its known distribution is limited to vertebrates[2,3]. The present study examines the distribution of haptoglobin in a few species of South Indian fishes.

The fish were collected from ponds and reservoirs in South India for the present experiment. By using hypodermic needle, blood was collected and from pooled blood erythrocytes were removed by centrifugation to separate sera. Smithies' horizontal and vertical electro-phoretic techniques[4] were followed with minor technical modifications. Later the starch gel plate was split horizontally into two halves, one of which was stained with benzidine and the other with Amido Black 10 B[5].

The results have been given in table 1. The fish of family Gobiidae, Ophiocephalidae, Siluridae, Cyprinidae and Clupeidae show the presence of 2-1 type of haptoglobin in the serum. As in monkeys[6], here also no polymorphism of haptoglobin was noted. So also there is no relationship between the presence of haptoglobin type and blood groups[7] of these fish which agrees with other authors[8,9]. The study of structures and type of these haemoglobin binding proteins (haptoglobin) in the serum of fish need further

TABLE 1

Result of the presence of haptoglobin types in the serum of fish after zone electrophoresis using starch gel as a medium.

Name of the specimen	Total number of fishes tested	Haptoglobin types		
		H_p 1-1	H_p 2-1	H_p 2-2
Order : Acanthopterygii Family : Gobiidae				
Boleophthalmus sculptus	50	—	50	—
Gobius viridupunctatus	50	—	50	—
Order : Acanthopterygii Family : Ophiocephalidae				
Ophiocephalus punctatus	40	—	40	—
Ophiocephalus striatus	50	—	50	—
Order : Physostomi Family : Siluridae				
Saccobranchus fossilis	50	—	50	—
Glyptosternum madraspatanum	50	—	50	—
Order : Physostomi Family : Cyprinidae				
Labeo calbasu	50	—	50	—
Labeo ariza	50	—	50	—
Order : Physostomi Family : Clupeidae				
Spratelloides malabaricus	50	—	50	—
Engraulis malabaricus	40	—	40	—

investigations.

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MATING, OVIPOSITION AND EMERGENCE OF *DIADEGMA TRICHOPTILUS* (CAMERON) (HYMENOPTERA:ICHNEUMONIDAE), A LARVAL PARASITOID OF *EXELASTIS ATOMOSA* FAB.

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THE behavioural changes of hymenopterous parasitoids during some of the life processes such as mating, oviposition and emergence of adults in the field and effects of long term laboratory rearing on the physiology and behaviour of these insects are of concern to many researchers. Considering the importance of behavioural studies in biological control programme, the mating, oviposition and adult emergence of *Diadegma trichoptilus* were carried out. In the past several workers[1,4] attempted such studies.

Cultures of host and parasitoid were maintained at the laboratory conditions (22 ± 1°C, 55%—60%, R. H.). Newly emerged males and females were kept in special rectangular containers in 20 pairs for observations of mating behaviour. Simultaneously the food preference activity of both the sexes before and after mating was also noted. Oviposition behaviour was studied by providing 30 host larvae of known age (2-3 days) to freshly mated females in an oviposition unit and parasitized hosts were kept in petridishes to study the phenomenon of emergence of adults from their cocoons.

Adults started mating soon after their emergence. There is no precopulation period. The male, when excited by the presence of female, walked towards her tanning the wings, when the female was at a distance of 2.5 to 5 cm and the male raised its antennae, vibrated speedily in the air and spread the wings for a moment. With the help of legs, the male grasped the female and suddenly vibration of wings stopped after insertion of the aedeagus into bursa copulatrix. The female ramained stationary and indicated her receptivity. Both remained in copula for 2 to 3.3 min. The male can copulate twice a day but the female did not respond during the second time. Both sexes were attracted towards food after copulation. Almost immediately after thrusting the ovipositor, the female actively searched the suitable host larvae by taping its antennae to determine the suitability. If the female came across an unsuitable host, searching for a suitable one was continued. Oviposition lasted for 2 sec. Parasitized hosts were not accepted by females for oviposition. Shortly after copulation females begin to oviposit.

The adult parasitoid came out from the cocoon by cutting its anterior inner side with the help of its mandibles. During this phenomenon, the adult slowly ruputured the inner side of the cocoon till sufficient way was made for the emergence. This process was completed in 20-25 min. The parasitoid dragged the head first from the cocoon, freed the wings and antennae from body after emergence and later started short flights.

In *Bathyplectes curculionis* (Thom.) preoviposition period lasted for 30–40 min. contact during this period did not result in mating and later only the male exhibited courtship behaviour in the form of mating dance[1]. Qudenau and Guevrement noted a precopulation period of 45 hr in *Priopoda nigricollis* (Thom.) and copulation was observed in female ranging in age from 1 to 4 days. Parasitoid studied in the present communication had 2 to 2.3 minutes copulation period. In *Campoletis sonorensis* (Cameron), four successive phages *viz.*, antennal examination of larvae, ovipositor thrusting, ovipositor insertion and actual oviposition were completed in 1-8 seconds[3]. Simillar behaviour was found in *D. trichoptilus* but required only 2 seconds. In *Neodiprion sertifer* (Geoff) mating occurred between 9 a.m. to 8 p.m. and it was most intense between 12 noon to 5 p.m. with copulation period 9.2 ± 0.20 minutes[4] Similar behaviour was not noted in *D. trichoptilus* but the mating was observed during day time.