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# Description of endocrine system of common Indian water scorpion, *Laccotrephes maculatus* fabr. (Hemiptera, Heteroptera: Nepidae)

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**Abstract**
*Laccotrephes* is a genus of water scorpion belonging to the family Nepidae. *Laccotrephes maculatus* Fabr. belongs to the class Insecta, Order Hemiptera and Suborder Heteroptera. Laccotrephes species are found in shallow stagnant or slow-moving waters. *Laccotrephes maculatus* Fabr. is a carnivorous insect commonly called water scorpion, hunt near the surface of the water. The present contribution provides the description of endocrine system of common Indian water scorpion, *Laccotrephes maculatus* Fabr. which includes a pair of corpora cardiac and a pair of corpora allata located on either side of aorta.

**Keywords:** *Laccotrephes maculatus* fabr, endocrine glands, corpora cardiaca, corpora allata

## Introduction
The endocrine system of Heteroptera had mainly been studied by various researchers (Awasthi, 1972; Cazal, 1948; Junque, 1956; Kaushik, 1970; Nabert, 1913; Nayar, 1955; Parsons, 1972) [1, 3, 5, 6, 7, 8, 9]. As evident from review of literature that though several attempts have been made to study the endocrine system of various Heteroptera insects. The endocrine system of water scorpion, *Laccotrephes maculatus* Fabr. Has not been studied. The present contribution provides the description of endocrine gland of common Indian water scorpion, *Laccotrephes maculatus* Fabr.

## Material and Methods
Large number of water scorpion, *Laccotrephes maculatus* Fabr. Were collected from ditches, ponds etc and kept in the laboratory. Freshly killed water scorpions were dissected out and endocrine gland were fixed in Bouin's fluid. Staining with Ehrlich's hematoxylin and 2% alcoholic eosin proved to be fairly satisfactory. The diagrams have been drawn to the help of camera Lucida.

## Observation and Discussion
### Endocrine glands (Pl. I, Figs. 1-3)
The endocrine glands of the water scorpion, *Laccotrephes maculatus* Fabr. Consists of a pair of corpora cardiaca and corpora allata located on either side of the aorta, above the accessory pump of the pharynx.
The corpora cardiaca (CC) is situated on either side of the gut and aorta (AO). It was considered as simple ganglia and named as post cerebral or pharyngeal ganglia for a long time. These glands are larger than the corpora allata (CA) and somewhat oval in shape. It bifurcates into paired lobe like structures in the anterior region, each terminating into a fine nerve ($CCN_1$-$CCN_2$). The posterior portion of the corpora cardiaca (CC) of each side is continuous with a flat band of tissues, which are closely associated with the wall of the aorta (AO). These tissues run dorsal to the aorta, forming a connective which unites two corpora cardiaca (CC) and the paired corpora allata (CA). The boundary between the corpora cardiaca (CC) and corpora allata (CA) is not very distinct because both of these structures have somewhat merged with each other. The corpora cardiaca are filled with rounded secretory globules which are more abundantly found in the posterior region.
The first nerve of the corpus cardiacum ($CCN_1$) originates from the anterior part of the gland and enters the brain. The nerve represents the nervous corporis cardiaci I of Johansson, 1956 [4] the internal pericardial nerve of Cazal, 1948 [3] and Benwitz, 1957 [2], the cardiac nerve of Nayar, 1955 [8] and nervous corporis recundus of Parsons, 1972. This nerve has no connection with stomodeal nerves.
The corpora allata (CA) is situated laterally behind the brain on either side of aorta (AO) near the corpora cardiaca (CC). Each corpora allatum (CA) consists of three lobes, the first two of which are larger than the third. Both the corpora allata (CA) are connected together by fibrous connective tissues giving the appearance of a single mass. The corpora allata (CA) is innervated by the fibres from the protocerebrum which first pass through the corpora cardiaca (CC).
The endocrine glands have arise from the ectoderm and their secretion coordinate the important biological functions such as growth, post-embryonic development, metamorphosis, certain aspects of reproduction, water balance and excretion etc.

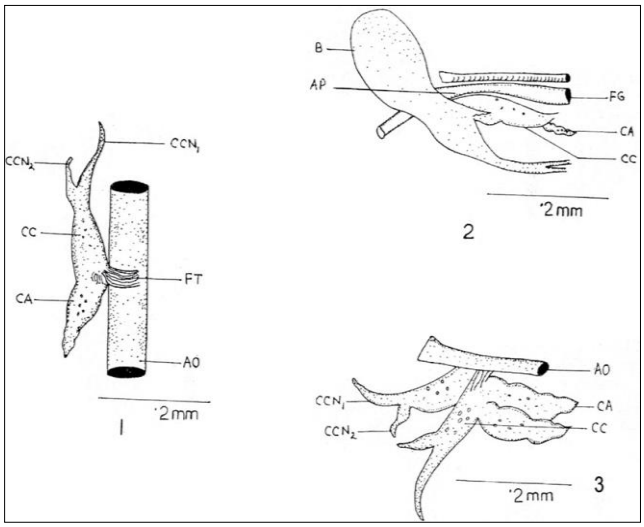


**Fig 1:** Pl. I, corpora cardiacum ($CCN_1$); corpora cardiac (CC); corpora allata (CA); aorta (AO)

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