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RESEARCH ARTICLE

CHAETOTAXY MAPPING OF ARGENTOPHILIC PAPILLAE IN *MIZELLEUS INDICUS* (JAIN, 1957), PANDEY *ET AL.* 2003 AND ITS RELEVANCE TO SPECIES CHARACTERISATION

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ABSTRACT

Chaetotaxy maps a well established tool for taxonomic relevance mainly in ticks and mites. Silver staining based tools have been employed in monogenean studies as well. Present communication deal with the application of silver staining technique for establishing argentophilic map of a Monogenean *Mizelleus indicus* (Jain, 1957), Pandey *et al.* 2003. Possibility of employing this tools in species validation is discussed in detail.

Key Words: Monogenea, Argentophilic papillae, Mizelleus indicus.

INTRODUCTION

Silver nitrate staining technique of Lynch (1933) is an effective way of visualizing cells on the surface of parasites and their larvae. Monogeneans are covered by a sysncitial tegument, which is not normally argentophilic. However, cellular structures breach the tegument, the inter cellular material between the tegumental lining and the cell membranes of the intruding structures appear to have strong affinities for silver, including cellular structures ciliated or nonciliated nerve endings, which are presumed to be sensilary, termination of gland ducts openings of the excretory systems, reproductive systems and gut. Most of the previous studies have demonstrated the distribution of sensilla in onchomiracidia larva of monogenean (Combes and Lambert, 1972; Lambart, 1977a, 1977b, 1978a, 1978b and Tinsley, 1978). Studies on the distribution patterns of surface sensilla in adult monogenea are very few (Lambert, 1979; El-Nagger *et al.,* 1993; Khidr and El-Nagger, 1996; Shinn *et al.,* 1997, 1998a, 1998b and El-Nagger *et al.,* 2001). Chaetotaxy maps has been used by some workers as taxonomic tools for discriminating different genera and species of monogenea (Maeder, 1973; Shinn *et al.,* 1997, 1998, 1998 and El- Nagger *et al.,* 2001). These workers were of opinion that chaetotaxy maps prove to be a good tool for taxonomic identification. During the course of study an attempt has been made to work out argentophilic element on dorsal and ventral surfaces of *M. indicus* (Jain, 1957) Pandey *et al.,* 2003 extensively.

MATERIALS AND METHODS

Collection and Identification of the Piscine Hosts

The fish *Wallago attu* (Bl. and Schn.), for the present study were obtained from the suppliers in local fish markets of Meerut. Identification of host was carried out with the help of classical work of Srivastava (1968) and Day (1994). The fishes were immediately examined at Laboratory, Department of Zoology, Ch. Charan Singh University Meerut.

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Collection of the Parasitic Monogeneans

For the collection of parasites standard lab protocols were applied. Argentophilic Papillae: Study of argentophilic papillae and associated glands was made as per method suggested by Lynch (1933) with minor modifications. Parasite were directly placed in 0.5% Silver nitrate solution at room temperature (25-30^0 C) in dark for about 5 minutes and then washed in distilled water with 5- 8 changes. The parasites were then kept in distilled water and exposed to sunlight for about 5 minutes with regular shaking. The parasites were washed in distilled water with several changes. Subsequently, they were kept in mixture of Alcohol and Glycerin (90% and 10%). The Alcohol was allowed to evaporate and the parasites were left in Glycerin. The parasites were then picked up with the help of needle or fine glass droppers and mounted (excess of Glycerin helps in various ways like- to avoid flattening of parasite, it provides chance to study the papillae from different sides of the body by rolling the parasite etc.). Chaetotaxy maps were prepared using Camera Lucida attached to Olympus CH-130 microscope. Specimens were stored at 4^{0}C for ready reference. The techniques involved in producing sensillary maps were outlined in Shinn *et al.* (1997). The system of sensillary nomenclature used in this study was followed from Shinn *et al.* (1997).

RESULTS

It was found that ventral surface was provided with lesser number of argentophilic papillae in comparison to dorsal. In Anterior dorsal region 12 papillae were present at the dorsal surface whereas, in ventral region 13 papillae were found. The posterior part of the body is provided with 12 papillae at dorsal

surface and 10 at ventral surface. During the course of study a sensilla on various parts of the body of present worm, was observed and tabulated. *M. indicus* (Jain, 1957) Pandey *et al.,* 2003, is provided with 24 and 23 sensilla on their dorsal and ventral surfaces respectively. Terminology for the body surface sensilla was as followed by Whittington *et al.* (2000), as far as regional distribution of sensilla are concerned they are shown in Table-1 and 2.

Table 1. Distribution of Argentophilic papillae in various zones on ventral surface of *M. indicus* (Jain, 1957) Pandey *et al.,* 2003

Surface	Peri-buccal (Pb)	Antero -lateral (al)	Antero -ventral (av)	Median (m)	Medio -lateral (ml)	Postero -lateral (pl)	Haptoral Ventral (hv)	Postero-terminal Ventral (ptv)	Total
Ventral	2	3	4	3	1	6	2	2	23

Table 2. Distribution of Argentophilic papillae in various zones on dentral surface of *M. indicus* (Jain, 1957) Pandey *et al.,* 2003.

Position	Antero -dorsal (ad)	Circumporal (Cp)	Antero-median (am)	Median dorsal (md)	Posterior dorsal (p)	Haptoral dorsal (Hd)	Postero-terminal dorsal (ptd)	Total
Dorsal	7	1	4	3	6	3	0	24

The motile cilia, found in dense fields, obscured most sensilla on the ventral surface and therefore ventral sensilla could not be examined any further. Furthermore, the presence of some sensilla was not consistent between all specimens. The number of sensilla lost varied across the worms but the paired row of mid-dorsal sensilla (DS) was absent in all specimens suitable for mapping. Individuals showed a range of losses outside the mid dorsal paired row and in some individual, only very few sensilla were present.

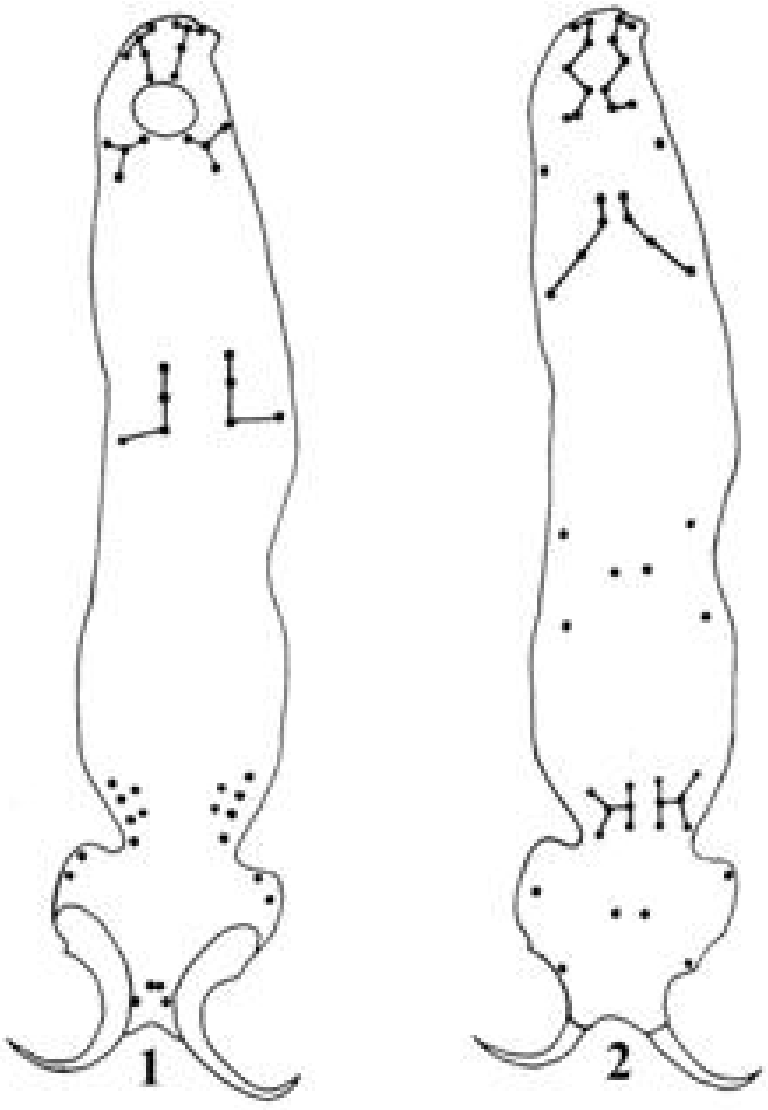

Fig. Argentophilicnpapillae mapping of *M. indicus* (Jain, 1957) Pandey *et al.,* 2003; 1. Dorsal view of argentophilic papillae; and 2. Ventral view of argentophilic papillae

This suggests that all dorsal sensilla may eventually be lost. In individuals where the DS are lost, remaining sensilla have a degraded basal region with loss of the tegumental collar. Due to the increase in body length and width and appearance of these new sensilla, it is not possible to reconcile the distribution of dorsal sensilla in the older worms. A dorsal row of putative multiciliated sensilla was found in specimens. Sensilla length is an uninformative character because the length of the single sensillum varies widely. Sensilla numbers continue to increase, with the maximum number found in adults.

DISCUSSION

Most of the previous studies have concentrated on the distribution of sensilla in oncomiracidia larva of monogeneans (Combes and Lambert, 1972, 1975; Euzet and Lambert,1974; Lambert, 1976, 1977a, 1977b, 1978a, 1978b and Tinsley, 1978). Studies regarding distribution pattern of surface sensilla in adult monogeneans are very few (Lambert, 1979; El-Naggar *et al.,*1993; Khidr and El-Naggar, 1996; Shinn *et al.,*1977, 1998a, 1998b and El-Naggar *et al.,* 2001). Use of chaetotaxy as taxonomic tool has also been successfully used by a few workers like Maeder (1973), Shinn *et al.* (1997, 1998a and 1998b). Chaetotaxy pattern (mapping of surface sensory structures using Silver nitrate) of the Ancyrocephalid monogenean *Mizelleus indicus* (Jain, 1957) Pandey *et al.,* 2003, have not been studied although some other monopisthocotyleans have been studied *viz., Gyrodactylus* by Lambert (1979), Maeder (1973), Shinn *et al.,* 1997, 1998a and 1998b; *Pseudodactylogyrus anguillae* by El-Naggar *et al.* (1993); *Cichlidogyrus arthracanthus* by Khidr and El-Naggar (1996) and *Macrogyrodactylus* sp. by El-Naggar *et al.* (2001).

The sensillar pattern exhibit bilateral symmetry both at ventral and dorsal surface. But these sensilla are not uniformly distributed over the body. This has also been observed by earlier workers. Number of sensilla on ventral surface is less as compared to dorsal surface. Harris (1983) also reported that dorsal surface of *Oogyrodactylus farlowellae* bears more sensilla than ventral. But, Shinn *et al.* (1998) found that ventral surface of *Gyrodactylus* sp. bears more sensilla than dorsal. In my opinion since the dorsal surface plays dominant role in sense reception. Thus it is provided with greater number of sensory papillae. The chaetotaxy pattern of surface sensilla of the worm exhibit some similarity with other members of the family, indicating close relationship amongst them as they belong to same family (Shinn *et al.,*1998 and El-Naggar *et al.,* 2001). However, a detailed comparison of different sensillar bands on ventral and dorsal surface shows significant differences that establishes that it can be used as taxonomic tool besides anatomical and morphological differences (El-Naggar and Serag, 1987 and El-Naggar *et al.,* 1999, 2001).

Variation in the number of sensilla on dorsal and ventral surfaces at different stages of life cycles has also been observed by earlier workers Cribb *et al.* (2003). They were of opinion that these tegumentous sensilla develop on the tegument according to the need with which author also agree. As regard differences in number of sensilla on dorsal and ventral surfaces are concerned, nothing can be said. However, some of the previous workers like Cribb *et al.* (2003) believes that sensilla present at the dorsal surface are related somehow to swimming behaviour and the sensilla present on the ventral surface are chiefly chemoreceptors or rheoreceptors. During the study, different degree of invagination of sensillar papillae have been observed at the different places of the body. The possible relationship between degree of invagination of dendrite tip and presence of dendrite vesicle could not be worked out. But it is felt that there may be some relation. Bendini *et al.* (1975) suggested that deeply invaginated sensilla may be secretory in nature. Wright (1992) proposed that deeply invaging papillae are more sensitive in comparison to superficially located papillae. He further postulated that dendrites if equipped with vesicles at their tip may serve to modulate the sensitivity of papillae. In conclusion the author feels that these sensilla although have enough physiological role to play but are of practically no use as far as taxonomy is concerned. The reason behind this conclusion is that the number of papillae used to vary and change their position in different specimens of the same species.

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