



A Comparative Description of Mouthparts in Praying Mantids from Sindh

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Received 12th April 2012 and Revised 17th September 2012

Abstract : A comparative description of mouthparts in seven species of praying mantids from Sindh are added to previously recorded seven species.

Keywords: Mouthparts, Praying Mantids, Sindh

1. INTRODUCTION

The anatomical studies of the mouthparts have been made by various workers. (Mangan, 1908), studied the mouthparts of some (Blattidae; Crampton 1916, 1921, 1923) studied the structure of the insectum head and mouthparts; (Yuasa 1920) made the classic survey of the head and mouthpart structure in Orthoptera; while Golden (1926) observed the mandibles and maxillae in the representative groups of Orthoptera; Snodgrass (1928, 1935, 1951), made a general survey of insects morphology including mouthparts; (Walker 1931), studied the clypeus and labium in selected insects; Walker (1933), also made a comparative study of the head and mouthparts of Grylloblatta with those of the Orthoptera; Cook (1944), studied the clypeus and labrum in selected insect groups; While (Ahmad 1950), studies the phylogeny of termite genera based on immago-worker mandibles; A survey on the functional morphology of the mouthparts of the cockroach, *Periplaneta americana* L. was done by Popham (1959, 1961; Gangwere 1965), described the structural adaptations of mouthparts in Orthoptera and Allies; (McKittrick 1965), worked on affinities of cockroaches and termite (mandibles); (Zhuzhikov 1987), studied biomechanics of damage of materials by insects, by the example of termites; (Chapman 1998), described the structure and function of the insects; (Zhuzhikov, 2007), made a detailed study on of the mouthparts (labrum, mandibles, maxillae, labium, and hypopharynx) characteristic of different suborders of Blattodea and some families of Blaberoidea. (Khokhar and Soomro 2009) have presented detailed morphological study of mouthparts in seven species of praying mantids. Most of the work is done on morphological adaptations of mouthparts of the nearest allies of praying mantids by various workers but no comparative account of mouthparts of praying mantids is available in literature.

However, the only information about the mouthparts of mantids is given by Gangwere (1965), Khokhar and Soomro (2009); which is inadequate. Presently, a comparative account of mouthparts in seven species of praying mantids are added to previously recorded seven species belonging to families Eremiaphilidae, Empusidae and Mantidae.

2. MATERIALS AND METHODS

Collection of Mantids

325 specimens were collected in 2005-2007 in May to October from selected districts of Sindh.

Killing and Preservation

Specimens were killed by means of standard methods. The specimens were then stored in standard entomological boxes with labels showing locality, date of collection and collector's name. The identification of specimens was done with the help of keys and description given by (Soomro *et al.*, 2002).

Dissection of Mouthparts

After 24 hours relaxing specimen, the head of praying mantids was first separated through the neck membrane with a scissors and taken with the forceps under Stereoscopic binocular microscope for dissection. First labium was removed with the help of fine tipped dissecting needles so as to make submentum free from its attachment, and then the two maxillae were pulled out after freeing each cardo from its attachment to the base of cranium. Next mandibles were separated and finally labrum was removed.

Feeding Habit

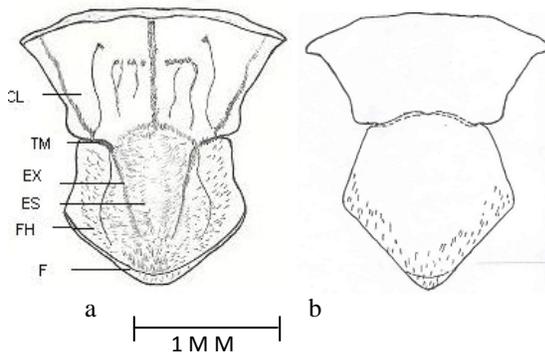
Feeding observations were carried out in green house and open fields. The figures are drawn with the help of the Ocular graph.

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3. RESULT AND DISCUSSION

Labrum

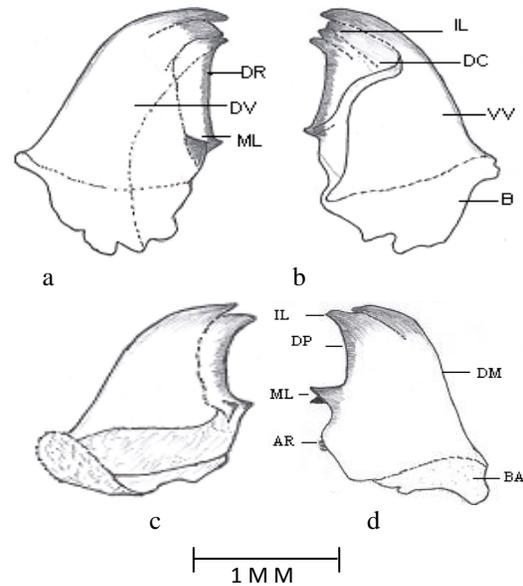
The labrum or upper lip (Fig.5. A-G) is unpaired and dorsal. It is a broad, flap-like lobe suspended from the clypeus (CL) in front of the mouth. A typical labrum of praying mantid illustrated in (Fig. 1a, b) is triangular, sub triangular and some what oval in outline having fine hair, both ventral and dorsal sides. The anterior margin of the labrum is slightly curved inwards. The Labrum in *Eremiaphilia laeviforons* Uvarov, *Eremiaphilia arabica* Sauss and *Microthespis dmitrievi* Werner Fig.5, A, B, C have convex sides continues smoothly into the interior margin. The level of the greatest width approximately in the middle, overview is slightly ovel and without noticeable angles, in *Microthespis sindhensis* Soomro et.al, *Tenodera aridifolia aridifolia* Stoll and *Mantisreligiosa religiosa* L. have semicircular with small protrusion while in *Statilia ocelleta* Uvarov has somewhat semi triangular labrum.



(Fig. 1a, b) A typical praying mantid labrum, ventral (a) and dorsal view (b)

Mandibles

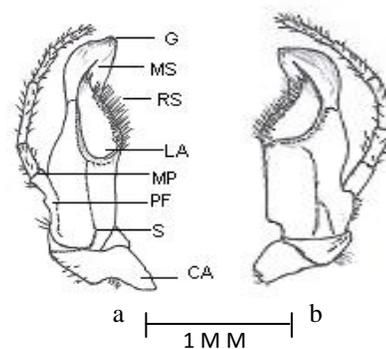
The mandibles or jaws (Fig.6. A-G) are paired, powerful and heavily sclerotized with a broad triangular base lying immediately behind the labrum. These articulated with the head capsule by means of their triangular bases at two points, the anterior and posterior. A typical praying mantid mandible is illustrated in (Fig. 2a, b, c, d); it is characterized by an outer, external margin or dorsal view (DV), and an internal, dental margin. Having a dental cavity (DC), a masticating or grinding, molar lobe (ML), and tearing or biting, incisor lobe (IL). Between molar and incisor lobes is sharp cutting edge or dental ridge (DR). The left mandible has 4 incisors and 2 molars, while right mandible has 2 incisors and 2 molars. The both left and right mandibles are not symmetrical and their lobes are also unequal in size. Mandibles showed minor variations in size, distance between molar and incisor lobes, shape and size of dentes.



(Fig. 2a, b, c, d), Left mandible, dorsal (a) and ventral view (b), Right mandible, ventral (c) and dorsal view (d).

Maxillae

The maxillae (Fig.7. A-G) lying immediately behind the mandibles, are also paired structures. Each maxilla is attached by its entire inner surface on the pleural region of the head. A single condyle is present on the dorsal extremity of the maxilla by means of which it articulates with the lower lateral margin of the post gena of cranium. In typical praying mantid maxilla (Fig. 3a, b) the lacinial maxadentes (MS) are sharp, elongated, and of unequal size. The lacinastra (RS) occurs in the form of a thick patch of setae. The lacinia and stipes are broad. The cardo is small usually triangular in shape.

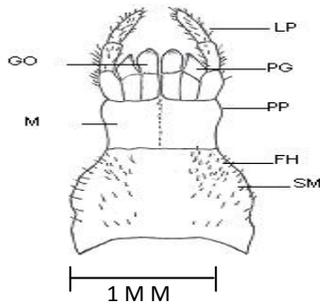


(Fig.3a, b), Right (a) and Left maxillae (b) ventral view.

Labium

The labium or the lower lip (Fig.8. A-G) forms the floor of the pre-oral cavity. It is single (unpaired) structure (through it probably evolved from the two

maxillae-like structures fusing along the mid-line) lying ventral to the maxillae. It comprises of two main parts, a proximal post-labium or submentum (**Fig. 4**) is immovable and a movable distal part the pre-labium or ligula (**Fig. 9. A-G**) both these parts are separated by a distinct labial suture. These both regions show much variation in the structure as in the ligula, glossae and paraglossae varies considerably in size, where as submentum is broad and mentum is narrow and small or absent. This part showed maximum variations as shown and compared in (**Figs: 4, 5,6,7,8,9**).



(Fig. 4), Labium, dorsal view.

Explanation Of Abbreviations Used In Figures

BA, base; BR, brustia; CA, cardo; CL, clypeus; CU, curved inward; DC, dental cavity; DM, Dorsal margin; DP, dental plate; DR, dental ridge; DV, dorsal view; ES, epipharyngeal suture; EX, epipharynx; FH, fine hairs; G, galea; GL, glossa; IL, incisor lobe; LA, lacinia; LE, labral emargination; LG, ligula; LH, light hairs; LP, labial palps; M, mentum; ML, midline; ML, molar lobe; MP, maxillary palpus; MR, mesarima; MS, maxadentes; MU, muscles; PF, palpifer ; PG, paraglossa; PP, palpiger; RS, lacinastra; S, stipes; SD, small dente; SM, Submentum; TM, torma.

Name Of Species A - G

A. *Eremiphilia laevifrons* Uvarov., **B.** *Eremiphilia arabica* Sauss., **C.** *Microthespis dmitrievi* Werner., **D.** *Microthespis sindhensis* Soomro et al., **E.** *Tenodera aridifolia aridifolia* (Stoll), **F.** *Mantis religiosa religiosa* L., **G.** *Statilia ocellata* Uvarov.

FIGURES

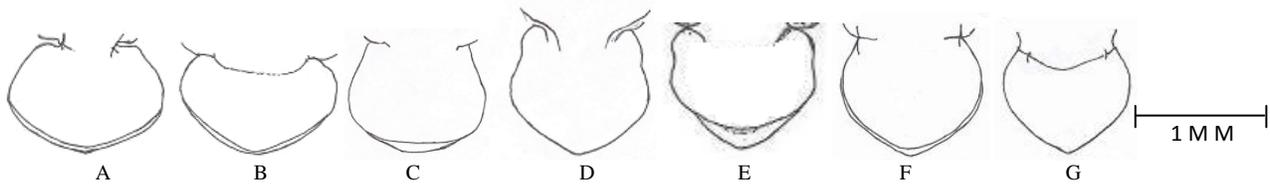


Fig. 5. (A-G) Outline of labrum.

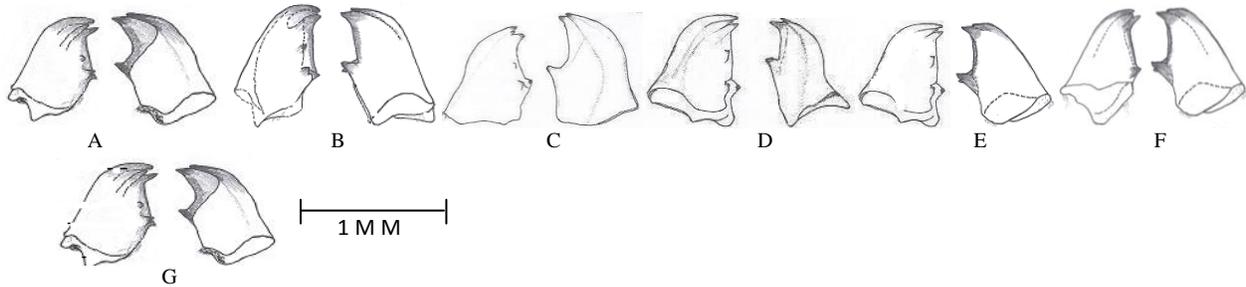


Fig. 6. (A-G) left and right mandibles.

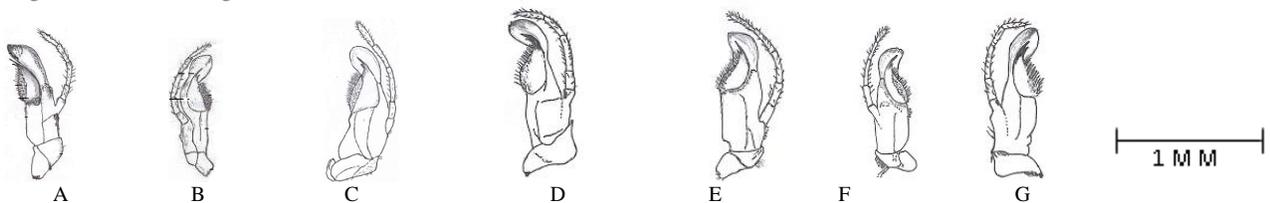


Fig. 7. (A-G) left and right Maxillae.

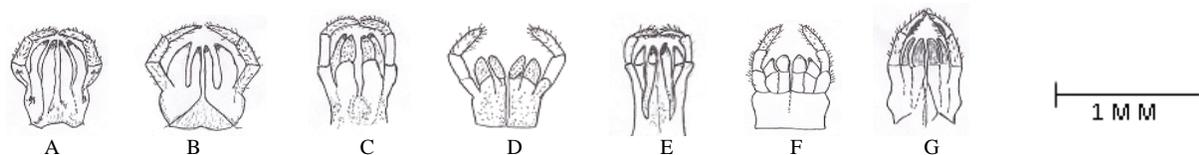


Fig: 8. (A-G) Ligula.

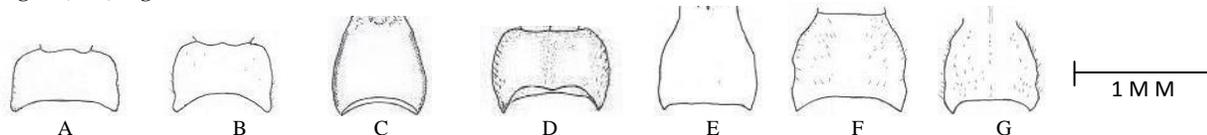


Fig: 9. (A-G) Submentum of labium.

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