

Head Capsule of the Hemipteran, *Triatoma sanguisuga* (LeConte)

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The problem is difficult of selecting a generalized head typical for the suborder Heteroptera. Spooner (1938) used two principal characters as a basis for working out the phylogenetic affinities of hemipterous head capsules; subsequently, he had to use other characteristics to further subdivide the group.

He selected the absence of the paraclypeal areas to designate a primitive condition; the second character he employed was the form of the labrum. He selected two species that exhibited the most generalized conditions; a cimicid, *Cimex lectularius*, and an anthocorid, *Triphelps insidiosa*. Both of these species show the small paraclypeal areas and the broad, flap-like labrum.

Beyond these generalized forms, variation within the suborder is pronounced; and in many cases no phylogenetic significance can be found due to a lack of sutures and the presence of specialized modifications.

Modifications due to specialization makes the head capsule of *Triatoma sanguisuga* difficult to interpret. Embryological evidence is needed before phylogenetic inferences can be proposed. A comparative study of the head capsules of the entire superfamily Reduivoidea should also be made before the bug can be placed in the proper sequence.

The scope of this paper is merely to indicate the various areas of the *T. sanguisuga* head capsule, and to consider its variance from other members of the Heteroptera.

The Vertex

In a primitive condition, e.g. *Triphelps insidiosa*, the vertex occupies a well defined area. In nymphs of this species the epicranial arms are prominent, converging to form a relatively long epicranial stem.

The shape of the head controls this character, and often it varies among the members of a single family. The family Reduviidae is a good example of this variation. In *Sinea*

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diadema of the Harpactorinae, the epicranial stem is long, with the arms branching to the posterior margins of the compound eyes. The epicranial arms are similar in *Melanolestes picipes* of the Piratinae, but the epicranial stem is more abbreviated with the ocelli more caudad toward the occiput. In *Emesaya brevipennis* of the Emesinae, the epicranial arms branch to a long stem in the anterior region of the compound eyes.

The epicranial arms of *Triatoma sanguisuga* of the Triatominae branch from the posterior region of the compound eyes, and converge to form a short stem between the ocellar elevations, thus limiting the vertex to a small area.

The Frons

A small vertex usually necessitates a long frons, but the area also varies with the position of the postclypeus. The frontoclypeal suture is never present in the Heteroptera.

Weber (1930), as also Muir & Kershaw (1911), gives the figure of a longitudinal section of *Reduvius personatus* in which the pharyngeal muscles attach to the head capsule caudad of the anteclypeus; moreover, he indicates the definite presence of an anteclypeus and a postclypeus.

Externally, Spooner (1938) does not recognize the cephalic margin of the frons.

Due to the reasons discussed under "Clypeus" (*q.v.*), the frons of *Triatoma sanguisuga* has been interpreted here as a small posterior area just anterior to the vertex because of a large portion of the head that I interpret as the postclypeus.

The Clypeus

Four areas are here recognized as constituting the clypeus: the anteclypeus (tylus of systematists), the postclypeus, and the two paraclypei or juga.

In most recent forms the anteclypeus is flanked on either side by the paraclypei, whereas *T. sanguisuga* is an exception by having the anteclypeus flanked on either side by the genae. The paraclypei are retained as relatively small lobes between the bases of the genae and the base of the anteclypeus.

A posterior anteclypeal depression is here assumed to be the dividing line between the anteclypeus and the postclypeus, since the pharyngeal muscles attach to the postclypeus at this area; moreover, the antafossae are located in a position immediately posterior to this depression.

Morphologists use the antafossae as landmarks for this dividing line; but in this case (as in many others) the anterior limit of the frons is difficult to determine since with the pushing back of the postclypeus the frontoclypeal line also curves back.

With many of the Heteroptera the postclypeus is a vague area, as the caudal and anterior boundary lines are usually absent. Snodgrass (1935) and MacGillivray (1923) state that the clypeus is composed of one piece; Muir and Kershaw (1911), however, describe the early fusion of the frons with the clypeus in the embryo of the reduviid *Pristhesancus papuensis*. No trace of a suture remains in the adult. Muir and Kershaw refer to the anteclypeus as the labrum and to the labrum as the epipharynx. Spooner (1938) states that this indicates that the clypeus consists of two parts in the embryo and that the postclypeus fuses with the frons.

The anteclypeus occupies a well defined area in *Triatoma sanguisuga*. It is deeply invaginated on either side and the invaginations fuse ventrally forming a tube through which the madibular and maxillary stylets pass.

The postclypeus of *T. sanguisuga* proves an exception to the general condition found in the Heteroptera. In this species the general region is well defined. Two paraclypeal lines that are free from pits and setae extend from the region of the antennal tubercle bases dorso-laterally back to an abbreviated frons immediately posterior to the short epicranial stem. These lines delimit the area where the well developed pharyngeal muscles attach to the head capsule. The presence of these muscles is also indicated by an arching of the postclypeal region.

The Maxillary Plates

The maxillary plates are fused to the genae and postgenae without a trace of sutures. They are separated from the anteclypeus by the anteclypeal sutures and from the paraclypei by the paraclypeal sutures.

The Bucculae

MacGillivray (1923) states that these lines are modifications of the maxillary plates. Apparently they support the labium when in use and serve as a protection when it is at rest. Heymons (Bugnion & Popoff, 1911) considers them to represent the rudiments of the maxillary palps. In view of

their extensive development MacGillivray's explanation seems more logical.

The Labrum

The Heteroptera possess three types of labra: a broad flap-like type, a long slender triangular type, and a broad flap-like sclerite with a long pointed outgrowth from the epipharyngeal area (which projects beyond the distal margin of the labrum.)

The first type is the most primitive, and is found in the Cimicidae and Anthocoridae. There are many intergrading forms. *Sinea diadema* and *Melanolestes picipes* express intermediate development between the two first mentioned types. In these species the labra are broad, but the breadth is less than the length. Due to a superficial transverse depression, *Triatoma sanguisuga* simulates the third type in having a long, flexible distal flap; this flap, however, does not arise from the epipharyngeal area, but from the midportion of the labrum itself.

Caudal and Ventral Aspects

The outstanding difference between the suborders Homoptera and Heteroptera is a gular area (genaponta of MacGillivray). This is not a true gula, but a heavy sclerotized area where the mandibular plates unite. In *Triatoma sanguisuga* the gula is narrow anteriorly, occupying a space between the bucculae, but it widens appreciably in its posterior position, both antecularly and postocularly.

The Labium

A striking characteristic of the Reduviidae is a 3-segmented labium. Recent studies indicate that all Heteroptera possess a 4-segmented labium. All or part of the basal segment may become attached to the head capsule, according to Muir & Kershaw (1911). Their conclusion is based on embryological evidence. Spooner (1938) says that the number of the segments is of no phylogenetic importance. No morphological evidence of a fourth segment of the labium can be found in either nymphal or adult individuals of *Triatoma sanguisuga*.

In *T. sanguisuga* the direction of the labial opening is relatively cephalad, but this opening varies within the superfamily Reduvidae. In *Emesaya brevipennis* of the

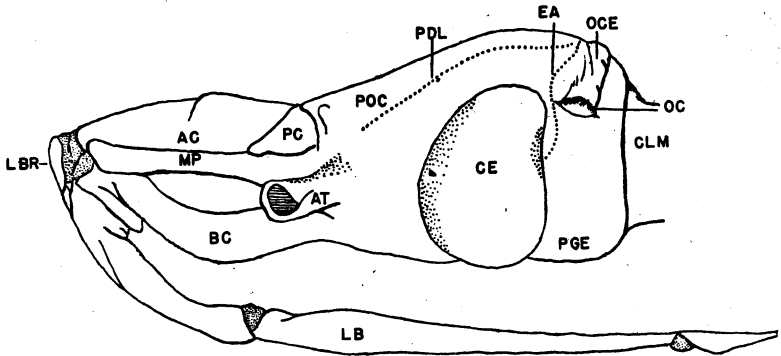


FIG. 1. Head of *Triatoma sanguisuga* (LeConte), lateral view. ($\times 22.5$) AC (anteclypeus), AT (antenniferous tubercle), BC (buccula), CE (compound eye), CLM (collum), EA (epicranial arm), LB (labium), LBR (labrum), MP (mandibular plate), OC (ocellus), OCE (ocellar elevation), PC (paraclypeus), PDL (post-clypeal depression line), PGE (postgena), POC (postclypeus).

Reduviidae, *Nabis ferus* of the Nabidae, and *Sinea diadema* of the Reduviidae, it is ventral. In *Melanonestes picipes* of the Reduviidae and *Systelloderes biceps* of the Enicocephalidae, it is cephalad. In *Phymata fasciata* of the Phymatidae, it is intermediate.

Tentorium

No tentorium exists in the Hemiptera. The caudal two-thirds of the metatentoria (MacGillivray, 1923) have subsequently been proved¹ to be the hypopharyngeal arms for muscular attachment (Spooner, 1938).

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