HOMOLOGY OF CEPHALIC SUTURES IN CHILOPODA: THE ANTENNOCELLAR SUTURES OF SCUTIGEROMORPHA


The cephalic sutures of the centipede orders Lithobiomorpha and Craterostigmomorpha share a common 3-part structure: a transverse suture splits distally into anterior and posterior branches that have the same relationships to the antennal socket and eyes, respectively. Each of these components of the antennocellar sutures is present in the family Scutigerinidae, a group resolved basally in the order Scutigeromorpha based on other morphological characters. The transverse and antennocellar sutures are reinterpreted as general characters for Chilopoda rather than a putative synapomorphy of Lithobiomorpha and Craterostigmomorpha.

Correspondence: Gregory D. Edgecombe, Australian Museum, 6 College Street, Sydney, NSW 2010, Australia; e-mail: greged@austmus.gov.au

Keywords. – Chilopoda; Scutigeromorpha; Scutigerinidae; cephalic sutures

The striking difference in head morphology between Notostigmophora (order Scutigeromorpha) and other centipedes complicates some homology statements. The scutigeromorph head is domed, with the antennae inserting laterally, in contrast to the flatened head with antennae originating frontally in all other centipedes, the Pleurostigmophora. The eyes and antennae provide essential landmarks for determining homologies of the sutures on the dorsal side of the centipede head capsule or head plate. These homologies have as yet been imprecisely determined across the Chilopoda, principally due to ambiguity caused by the unique morphology of scutigeromorphs.

The cephalic sutures of Scutigeromorpha originate at the posterolateral margin of the head capsule, run along the inner margin of the compound eye, and then extend anteromedially. In most scutigeromorphs they terminate in a pair of slender anteriorly directed projections on each side of a longitudinal median depression (figs. 1, 3). The projection is exceptionally (e.g., in Therienometa) short and triangular (fig. 2). The posterior part of the two projections is connected by a transverse suture.

Lithobiomorpha is generally regarded as sister to all remaining Pleurostigmophora (Edgecombe & Giribet 2004 and many earlier morphological studies), the latter grouping being named Phylactometria. In lithobiomorphs, a transverse suture spans most of the width of the head plate at about one-third of its length from the front. The transverse suture bifurcates distally into an anterior branch that runs to the antennal socket, terminating near to the dorsal articu lar processes, and a posterior branch that runs to the cephalic margin at the rear edge of the ocellus or ocelli (fig. 7). These anterior and posterior branches were called the antennocellar suture by Crabill (1960). A clearly homologous pattern of cephalic sutures is observed in Craterostigmus, the sole member of the order Craterostigmomorpha. As noted by Dohle (1990), the transverse suture across the anterior part of the head plate of Craterostigmus is shared with lithobiomorphs. The similarity extends to its distal splitting into anterior and posterior branches with the same relationships to the antennal base and ocellus (fig. 7), respectively, as seen in Lithobiomorpha.

The antennocellar sutures are lacking in the phylactometrian orders Scolopendromorpha and Geophilomorpha, which are generally regarded as sister taxa in the clade Epimorpha. Some geophilomorphs have a transverse suture, called a frontal line or frontal sulcus, which is reasonably homologised with the transverse suture in Lithobiomorpha and Craterostigmomorpha. The positional correspondence of these sutures on the head plate is matched by a similar functional role of the sutures as ec dysial lines. In the
geophilomorph *Strigamia maritima*, the ecdysial split follows the transverse suture (Lewis 1961). This is likewise the case for ecdysial rupture in the lithobiomorph *Lithobius forficatus*, with the split following the transverse suture and ocellar branch of the antennocellar suture (Demange 1944) or also extending along the antennal branch of the antennocellar suture (Lewis 1981: fig. 55). Ecdysial rupture has likewise been observed along the frontal suture in scutigeromorphs (Demange 1948).

The configuration of head sutures described above for Scutigeromorpha is applicable to the families Scutigeridae and Pselliodidae, but a significant difference is observed in members of the southern African-Malagasy family Scutigerinidae. This group consists of three species belonging to the genera *Scutigerina*

Figs. 1-6. Scanning electron micrographs of cephalic sutures in Scutigeromorpha. – 1-3, Scutigeridae; 4-6, Scutigerinidae. – 1, *Ballonema gracilipes* Verhoeff, 1904; 2, *Thereuonema tuberculata* (Wood, 1862); 3, *Allothereua maculata* (Newport, 1844). Detail of anterior projection; 4-6, *Scutigerina* sp. [Madagascar]. Scales 100 μm except 2, 200 μm, 3, 30 μm. Abbreviations: a, antennal branch of antennocellar suture; ap, anterior projection; lmd, longitudinal median depression; o, ocellar branch of antennocellar suture; t, transverse suture.