

The importance of functional morphology for the reconstruction of phylogenetic relationship

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Various approaches based on functional morphology are exemplified. The transformation of the chelicerae within the Lipoctena (Uropygi + Amblypygi + Araneae) forms a good example to demonstrate more general aspects. Functional economisation directly provides information on the direction of evolutionary change ("Leserichtungs-Kriterien"). Different positions of the chelicerae within the Araneae (i.e. plagiognathy, orthognathy, labidognathy) can be correlated with different functional needs. There are strong arguments to believe that lateral eyes grouped in triads are plesiomorphic in the Lipoctena, spiders included, but the question remains open why all eyes were concentrated on a tuber oculorum in the Mesothelae, and, independently, also in most representatives of the Mygalomorpha. The insight that three-partite bulbs in males (with tegulum, subtegulum, embolus + conductor) are primitive whereas piriform bulbs proved to be highly derived also provides evidence for the recognition of evolutionary novelties, this can be used within the framework of phylogenetic reconstruction. The same is true with regard to patterns of female genitalia, apparently, 2 + 2 receptacula are plesiomorphic, whereas the entelegyne condition represents the most advanced type of construction. For functional reasons, haplogyne female genitalia may also have originated secondarily.

Considerations of this kind are not used as decisive arguments by those who adhere to the method of "transformed cladistics". This approach is deemed to be 'objective' as cladograms obtained are regarded to represent testable hypotheses. In order to exclude what is regarded to depend from subjective judgement, pattern cladists ignore evolution, and no a priori weighing of character states is admitted. Organisms are "simply arranged into nested pairs on their existing characters as parsimoniously as possible" (Charig, 1992). Cladograms are produced by using special computer programs (e.g. Hennig, 1986).

Obvious shortcomings of this approach are presented and discussed.