

Editorial

Hemiptera Morphology and Phylogeny

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Accepted 16 December, 2021

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The *Hemiptera* are called 'true' bugs because everyone entomologists included tend to call all insects 'bugs'. That's a broad phrase, but genuine bugs are only those belonging to the insect order *Hemiptera*. With over 75,000 species worldwide, this category of insects is extraordinarily diverse. In the British Isles, there are approximately 1,700 of these. Many of them are dissimilar to one another, but they all have piercing mouthparts that allow them to suck the juices from plants or animals primarily plants. When not in use, their mouthparts are housed in a beak (or rostrum), which is normally carried beneath the body.

Some bugs, such as aphids, are important agricultural pests as plant feeders, not only because they destroy crops but also because they can spread viral illnesses. Most bugs, on the other hand, are not pests. Long antennae separated into a small number of segments are common in genuine bugs, and the front wings can be relatively toughened. Some bugs resemble beetles, however unlike the bugs, beetles have wing covers that do not overlap. Due of recent developments, the orders *Homoptera* and *Hemiptera* have been combined into one order known as *Hemiptera*. Most entomologists have recognised two closely related orders, *Hemiptera* and *Homoptera*, for over a century. It was discovered that they all belonged to the same major group, and *Homoptera* is divided into three smaller groups. "*Hemiptera* (true bugs)" is what modern sources name "*Heteroptera* (true bugs)" if you have an older book that recognises two orders (*Hemiptera* and *Homoptera*). In ancient literature, "*Homoptera*" is divided into three groups: Sternorrhyncha (aphids, whiteflies, scales), Auchenorrhyncha (cicadas, hoppers), and Coleorrhyncha (cicadas, hoppers). In technical literature, the name *Homoptera* is no longer used. Historically, the *Hemiptera* Order was divided into two suborders: *Heteroptera* (meaning "various wings") and *Homoptera* (meaning "uniform wings"). The structure of the wings was used to make this differentiation.

Any member of the insect order *Heteroptera*, which includes the so-called true bugs, is referred to as a heteropteran. An X-shaped design on the back, produced by the wings at rest, distinguishes this huge group of insects, which includes over 40,000 species. The heteropterans are distinguished from all other insect orders by a combination of characteristics, including sucking mouthparts specialised to puncture plant or animal tissues and a hardened gula. The majority of *Heteroptera* species are terrestrial, however a few are aquatic. Some species that feed on plant liquids can be harmful to cultivated crops. Other predatory creatures aid people by eliminating certain pests. Heteropterans can also operate as disease carriers.

Hemiptera include species that are clearly insects, such as assassin bugs, as well as organisms that are so reduced that it is impossible to identify they are animals, such as scale insects. The arrangement of the mouthparts into an extended beak is the only common feature. Two stylets (maxillae) at the centre of the beak have two groves on their inner surface, thus when both stylets are positioned together, two channels are formed. The one channel is used to suck food into the body, while the other is utilised to expel saliva or venom. The mandibles are two additional stylets on either side of the maxillae. To aid penetrate the food item, they can glide back and forth along the beak independently of the inner maxillae. A thin sheath made of labium surrounds each of the four stylets. The following is an example of a generalised feeding event: The mandibular stylets emerge at the tip of the beak and cut into the food item; then, as the mandibular stylets continue to cut into the food item and the beak is inserted further, the inner most maxillary stylets begin ejecting saliva (or venom) through the salivary channel; finally, fluid is sucked up through the food channel of the maxilla. Many hemipterans are major disease vectors due to the presence of the salivary channel and saliva injection.

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