setae equipped with projections pointed backward (to the base, or away from the point) that cause them to remain imbedded once contact with them is made. Presumably they function in defense, especially against vertebrate predators. Structures bearing such projections are said to be barbed, and the occurrence of numerous setae is sometimes described as barbate. A small barb is called a barbule.

Barber, Herbert Spencer

Herbert Barber was born in South Dakota on April 12, 1882. His father, an engineer, encouraged his son’s interest in natural history. At the age of 16 he was given employment as an insect preparator at the U.S. National Museum. He worked at such tasks as arranging the Hubbard and Schwarz collection of Coleoptera, but including a collecting trip with Schwarz to Arizona and New Mexico. Although he was employed continuously at the museum until retirement, his pay was, after some years, and until his retirement, provided by the U.S. Department of Agriculture. In time, by association with entomologists and through experience, he began to publish results of his own studies. His publications eventually amounted to some 90 papers. One of the most intriguing was on his discovery of the strange life history of *Micromalthus* (Coleoptera: Micromalthidae) in which there are several forms of larvae, and that some larvae may produce eggs and larvae. He died in Washington, DC, on June 1, 1950.

Reference


Barberry Whitefly, *Parabemisia myricae* (Kuwana)

A whitefly (Hemiptera: Aleyrodidae) pest of citrus.

Barberry Whitefly, *Parabemisia myricae* (Kuwana)

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Bark Beetles

Some members of the subfamily Scolytinae (order Coleoptera, family Curculionidae).

Bark Beetles

The genus *Dendroctonus* (Coleoptera: Curculionidae, Scolytinae), originally described by Erichson in 1836, currently includes 19 species that are widely distributed. Seventeen species occur between Arctic North America and northwestern Nicaragua, and an additional two species are in northern Europe and Asia. *Dendroctonus* species attack and infest conifer hosts (Pinaceae) in the genera *Larix*, *Picea*, *Pinus*, and *Pseudotsuga*. Species within the genus can be identified by the host species they attack, egg gallery patterns, population behavior, and morphological distinctions. The smallest species is *D. frontalis* (male length 2.0–3.2 mm) and the largest is *D. valens* (male length 5.3–8.3 mm). Members of the *Dendroctonus* genus, which means “tree killers,” are noted as the most economically and ecologically significant species affecting forest ecosystems in western North America. Tree mortality resulting from *Dendroctonus* outbreaks can adversely affect timber management, forest planning, and recreational opportunities. In contrast, disturbance events caused by native bark beetle species are important drivers of forest succession, foster heterogeneity and biodiversity, promote biomass recycling, and play a critical role in the fire ecology and overall health of many ecosystems.

*Dendroctonus* beetles are monogamous, and spend the majority of their lifecycle in a cryptic habitat beneath the bark of host trees where larvae feed within the inner bark or phloem. Relative to the length of their life cycle, only a short time is
spent as an adult moving from tree to tree. The majority of the species in this genus is capable of killing the host tree in one generation. In fact, death of the host is often a requirement for successful brood production. Although most of the species are capable of attacking and killing standing, vigorous trees, recently fallen trees are favored by some species. The female is the colonizing sex in the majority of *Dendroctonus* species. After attack of a new host, mating typically occurs in a nuptial chamber beneath the bark and an egg gallery is initiated. Adults of a few species, however, mate before emerging from the brood host. Eggs are laid either singly along the sides of the gallery, or in clumps. Egg galleries may be either vertical or sinuous, and larvae mine and feed horizontally in the phloem, either singly or en mass, depending on the species. Pupation takes place in individual niches within the phloem or in the outer bark of the host tree. Upon adult emergence, which is usually temperature dependent, beetle dispersal to a new host occurs and the process begins again.

Aggregation, which facilitates host selection and mating, is an important life history strategy of most, although not all, *Dendroctonus* species. Aggregation is often a response to chemicals produced by the host tree, adults from the same or a different species attacking the host tree, microbes, or a combination of these factors. Aggregation on a single host tree allows for a mass attack by conspecific beetles, thereby overcoming the resin defensives of the conifer hosts. To overcome the defenses of healthy, vigorous hosts, many beetles must attack within a short time (1–3 days). Conversely, trees of poor health may be overcome by fewer beetles (e.g., endemic population levels). Because a single tree is a limited resource, some *Dendroctonus* species have evolved a response to a series of chemicals that interrupt aggregation. These chemicals act to space beetle attacks along a single tree and signal incoming beetles to begin attack on another, nearby tree. Synthetic forms of both attractive and interruptive aggregation chemicals have been developed for many *Dendroctonus* species. The attractive aggregant chemical(s) are commonly used, often with traps, for monitoring and control of many economically important species in the genus. The complexity of the signal for interruption of aggregation has made it difficult to identify the chemical makeup of compounds, as well as, the specific biological action of the compounds within the population ecology of many *Dendroctonus* species. Consequently, the current use of synthetic interruptive aggregation chemicals is limited.

As with most poikilothermic organisms, temperature is a strong driving force of *Dendroctonus* population dynamics and an important controller of seasonality. Diapause, which is often temperature related, is typically considered the universal adaptation of insects for maintaining seasonality. However, with the exception of an adult reproductive diapause in *D. rufipennis* and *D. pseudotsugae*, and a prepupal diapause in *D. rufipennis*, this physiological timing mechanism appears to be absent in the *Dendroctonus* genus. Instead, *Dendroctonus* seasonality appears to be under direct temperature control. Life cycle duration in the genus is variable depending on the species, latitude, elevation, and microclimate of the population. Species in the south can have as many as seven generations per year, whereas in the north, or at high elevation some species require up to 3 years to complete a single generation. Intraspecific latitudinal differences in many temperature-associated life history traits exist as well. Global climate warming will undoubtedly have significant impacts on the distribution and seasonality of the *Dendroctonus* species.

Many *Dendroctonus* species carry spores of symbiotic fungi either passively on the exoskeleton or in specialized structures of the integument called mycangia. The fungi are disseminated among host trees via adult *Dendroctonus* beetles. Although little research has been conducted on fungal associations of the majority of *Dendroctonus* species, the work that has been done shows both a benefit and a detriment to the beetle, depending on the particular fungal associate. Benefits gained include protecting the beetle brood...
Bark-Lice, Book-Lice or Psocids (Psocoptera)

References


Bark-Gnawing Beetles

Members of the family Togossitidae (order Coleoptera).

- Beetles

Bark-Lice, Book-Lice or Psocids (Psocoptera)

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The insects of the order Psocoptera (=Copeognatha, Corrodentia) are commonly called psocids, although outdoor species living on tree trunks and branches have been called bark-lice, whereas indoor species, sometimes found in old books, have been called book-lice. The Psocoptera are a small order of paraneopteran insects (near 4,000 species have been described around the world) which are found in a wide range of terrestrial ecosystems throughout the world. Most psocids inhabit trees and shrubs, some others occur in ground litter, others are found on rocks and in the nests of birds and mammals. Some live on herbs and grasses, and a few in moss, whereas others are found in caves. Lastly, several species are found in domestic habitats. The Psocoptera share certain morphological features with the lice (orders Mallophaga and Siphunculata; Phthiraptera of some authors), and these taxa are grouped together in the superorder Psocodea by some authors. Fossil insects identified as psocids have been reported.