

The Great Lakes Entomologist

Volume 14
Number 4 - Winter 1981 *Number 4 - Winter*
1981

Article 3

December 1981

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Recommended Citation

Gosling, D. C. L. 1981. "Correct Identity of the Oak Twig Pruner (Coleoptera: Cerambycidae)," *The Great Lakes Entomologist*, vol 14 (4)

Available at: <https://scholar.valpo.edu/tgle/vol14/iss4/3>

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CORRECT IDENTITY OF THE OAK TWIG PRUNER (COLEOPTERA: CERAMBYCIDAE)

D. C. L. Gosling¹

The oak twig pruner is a cerambycid of minor economic importance which is generally common through most of eastern North America. The adult beetles oviposit on living twigs of oak and other hardwoods, and the larvae bore within the twig, subsequently pruning it from the tree. Haldeman (1847) identified this borer as *Elaphidion villosus* (Fabricius), a species later placed in the genus *Elaphidionoides* by Linsley (1963). This identification has been accepted and followed by Baker (1972), Craighead (1923, 1950), Duffy (1960), Knull (1946), Linsley (1963), and many other authors.

A sibling species, *Elaphidionoides parallelus* (Newman), has frequently been confused with *villosus*, and was for a time regarded as the same species. The difficulty in distinguishing adults of the two species created a likely situation for error in observations of their biology, but this possibility seems to have received little consideration. The habits of *parallelus* have simply been described as similar to those of *villosus* (Knull 1946, Linsley 1963), and *parallelus* has been widely ignored by authors dealing with forest insect pests.

Craighead (1923, p. 70) had a clue to the possible confusion when he observed that the beetle he considered to be *villosus* "is sometimes reared from branches which are dead, and in this case does not girdle them. This may be a different species, as some of the larvae show variations from the form described." He did not distinguish the habits or larva of *parallelus*, although what he did describe now seems to refer to that species.

My recent ecological study of Cerambycidae in southwestern Michigan (Gosling 1981) provided an opportunity to observe both species over a period of six years. I have previously described the habits of *parallelus* and characters useful in identifying the adults (Gosling 1978), but at that time I had not yet observed the larval activities of *villosus*. Subsequent success in rearing *villosus* from several hostplants has helped to clarify the identity of the twig pruner and relationships between the species.

The study was conducted from 1976 to 1981 in an 80-ha woodland near Tamarack Lake in St. Joseph County, Michigan. As part of a rearing program, host materials were gathered in the study area and enclosed in screened cages. Twigs infested by the twig pruner can be easily identified and 638 were collected in this manner, plus 55 twigs from another woodland nearby. All of the 280 adult beetles subsequently reared from these twigs were found to be *parallelus*.

Thirty-seven adults of *villosus* were reared from other host materials. These included branches of *Tilia americana* L., *Acer rubrum* L., and *Cercis canadensis* L.; a stem of *Toxicodendron radicans* (L.) Kuntze; and bolts of *Carya glabra* (Miller) Sweet. All of these hostplants were dead at the time of oviposition. The branches were 1-3 cm d and the *Carya* bolts were 7 cm d and larger. Adult beetles were also beaten from dead branches of *Quercus velutina* Lamarck and *Tilia americana*, and collected from a bolt of *Carpinus caroliniana* Walter. In all cases the adult was reared from or associated with host material which was recently dead, and generally much larger than the twigs from which *parallelus* adults were obtained.

These observations show that *parallelus*, not *villosus*, is the borer which regularly attacks small, living twigs of oak and other hardwoods in southwestern Michigan. *E. villosus* adults oviposit in branches which are recently dead and usually larger in diameter. There is no reason to believe the host selection behavior of these species in the study area is different from that elsewhere in their ranges. The identification of *villosus* as a twig pruner, then, is not correct.

Other differences in the behavior of these species have been noted. *E. parallelus* adults

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show an overwhelming preference for *Quercus velutina* and *Q. rubra* L. as hostplants, and only rarely attack other species of *Quercus* and *Carya*. *E. villosus* seems much more cosmopolitan in its host selection, and most of the adults were reared from *Tilia* and *Carya*. There is also a difference in their adult activity periods. Adults of *parallelus* in southwestern Michigan emerge in late May and early June, while *villosus* adults emerge later, from mid- through late June. Flight activity of *parallelus* extends from late May through early July, and that of *villosus* from mid-June through July. A similar pattern in activity periods of these species has been observed in material collected in Connecticut by M. E. Montgomery (pers. comm).²

The published accounts of twig pruner activity cited above refer to *parallelus* and the larval behavior of *villosus* has not been described. A typical *villosus* larva feeds beneath the bark of the branch, excavating a broad, irregularly shaped chamber with an overall length of 100–150 mm and 5–20 mm wide. Its boring removes the inner bark and cuts 2–3 mm into the sapwood, leaving a paper-thin layer of outer bark covering the chamber. If the larva is boring in a small branch it will usually pupate between plugs of shredded wood in a narrow extension of the chamber. In a larger branch the larva extends a narrow, oval gallery to the center of the branch and continues down the center for as much as 120 mm. Pupation then takes place between shredded-wood plugs near the end of this gallery. In either case the emerging adult exits through a hole in the bark cut previously and used for expelling frass. The life-cycle requires two years to complete in southwestern Michigan, and adults are usually present only in odd-number years.

The larval behavior of *villosus* is similar to that of *parallelus* in several respects. *E. parallelus* larvae often excavate a smaller version of the feeding chamber before starting their principal gallery in the main stem of twig. Both species expel frass during larval feeding, and both exit as adults through pre-existing holes. If the size of the host material permits, both borers excavate a similar gallery down the center of the twig or branch and pupate at the end of it between plugs of shredded wood. The principal differences are that *parallelus* larvae begin feeding in a living twig, feed mostly by narrow galleries extended in the sapwood, and make their characteristic pruning cut which often severs the twig from the host tree. *E. villosus* larvae feed in recently dead hostplants, in a broad chamber beneath the bark, and do not make a pruning cut.

These differences in larval feeding behavior seem to be adaptations to the differences in size of host material utilized and probably in its condition as well. The mating behavior of these beetles has only been observed in cages, where adults copulate shortly after emergence. It is not known if differences in host selection serve to isolate adults while mating, but their difference in emergence period undoubtedly provides effective temporal isolation between these sympatric and presumably closely related species.

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