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SEASONAL PATTERNS OF FLIGHT AND ATTACK OF MAPLE SAPLINGS BY
THE AMBROSIA BEETLE *CORTHYLUS PUNCTATISSIMUS* (COLEOPTERA:
SCOLYTIDAE) IN CENTRAL MICHIGAN

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ABSTRACT

Window traps with ethanol were used to observe seasonal flight patterns of *Corthylus punctatissimus* in central Michigan. Flights peaked in early July with a second peak seven weeks later in late August. Similarly, wilting of attacked maple (*Acer*) saplings began to appear a week after initial *Corthylus* flights, and showed two peaks, one in mid-July and again with another peak, seven weeks later, in early September. The second peak of activity is presumably from reemerged adults, and not a second generation.

The pitted ambrosia beetle, *Corthylus punctatissimus* (Zimmermann), infests and kills a variety of woody, deciduous saplings and shrubs within its range of eastern North America (Finnegan 1967, Roeper et al. 1987a). Life history, seasonal history and habits have been described (Finnegan 1967, Roeper et al. 1987b). The beetles infest their hosts as a monogamous pair with the male initiating a gallery system in the stem at or just slightly below ground level. The male is joined later by a female. The beetles infest live maple (*Acer*) saplings between the ages of 3-12 years with basal diameters of 4-14 mm. The beetles construct a spiral gallery system that cuts off the xylem water conducting system so that host sapling leaves lose turgidity and wilt. Wilting occurs so quickly leaf abscission does not occur (Roeper et al. 1987b). Attacked *Corthylus* saplings are easily recognized by the wilted appearance of their leaves. The purpose of this study was to determine the seasonal activity patterns of this beetle.

MATERIALS AND METHODS

This study was conducted at three woodlots in Gratiot County, Michigan: Pine River Park in Alma (Arcada Township, T1N, R3W, Sec. 4) with a predominant sugar maple (*Acer saccharum*) understory; near Sumner (Sumner Township, T11N, R4W, Sec. 29) also with a sugar maple understory; and in the Gratiot-Saginaw State Game Area (Hamilton Township, T1N, R3W, Sec. 14) with an understory of red maple (*Acer rubrum*). In Montcalm County, Michigan a beetle infestation was observed in a sugar maple understory at the Alma

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College Ecological Tract near Vestaburg (Richland Township, T12N, R5W, Sec. 34).

Flight collections of *C. punctatissimus* were made using window traps filled with ethanol (Roling and Kearby 1975). The window traps consisted of a 5 mm thick, transparent Plexiglas pane that was 51 cm high and 22 cm wide. Each pane of Plexiglas was attached to a funnel with a top diameter of 22 cm. The bottom of the tunnel was attached to a screw-top lid to which was attached a 260 ml glass collection jar filled with 95% ethanol. The window traps were suspended by a nylon cord between larger canopy trees so that the base of the collecting jar rested on the surface of the ground and the top of the Plexiglas pane was 90 cm above the ground. The traps were collected at least three times per week and replenished with fresh ethanol. Two traps were placed at Pine River Park and two at the Sumner site during 1989. During the summer of 1990, three traps were placed at Pine River, three at Sumner, and seven at the Gratiot-Saginaw State Game Area. The total numbers of beetles collected in all traps per week for both 1989 and 1990 were combined (Fig. 1).

Between June-November 1990, the number of maple saplings recently infested by *C. punctatissimus* as evidenced by boring frass and wilting was monitored weekly at all four sites previously described. Wilting saplings were lightly marked each week with a different color of spray paint. The total numbers of new saplings wilting each week from the four sites were combined and plotted (Fig. 1). The areas monitored were about 1.0 ha at Pine River Park, 0.9 ha at Sumner, 2.2 ha at the Gratiot-Saginaw State Game Area site, and 0.2 ha at the Alma College Ecological Tract.

RESULTS AND DISCUSSION

Male adults of *C. punctatissimus* accounted for 89% (N = 65) of the total collected by window traps. Roling and Kearby (1975) reported 93% of the *Corthylus columbianus* Hopkins adults collected were males in window traps with ethanol in Missouri. Finnegan (1967) observed 23% of the collected *C. punctatissimus* were males using window traps with water and detergent in the collecting trays. The sex ratio of *C. punctatissimus* in galleries was found to be 1:1 (Roeper et al. 1987b). Adults of *C. punctatissimus* caught probably represent flight beetles randomly hitting the Plexiglas and falling into the funnel and collecting jar. This assumption can be made because some of *Corthylus* caught had their elytra up with wings unfolded and appeared to be in active flight. Also, the number of beetles (N = 73) caught in window traps for 1989 and 1990 was far less than the number of saplings attacked (N = 463) in the same three areas in 1990. Since *C. punctatissimus* attacks live hosts it is doubtful the ethanol was attracting them. Other ambrosia beetles attacking suppressed, cut, or windthrown hosts are attracted to ethanol (Roling and Kearby 1975).

The first specimens of *C. punctatissimus* was captured in flight on 30 June 1989 and 27 June 1990. *Corthylus* flight was much later in the season compared with other ambrosia beetles (i.e., species of *Monarthrum*, *Xyleborus*, and *Trypodendron*) in central Michigan, that typically fly during April and May (Roeper et al. unpublished data). Two distinct flight peaks of *C. punctatissimus* were observed: the first during 2-9 July and the second 7 weeks later during 20-27 August (Fig. 1). Without providing actual data Finnegan (1967) in Ontario reported a single peak flight of *C. punctatissimus* occurring the last few days of June and flight continuing until August.

A total of 631 wilted host maple saplings was recorded from all four sites during the summer of 1990, the first wilted sapling was observed on 4 July

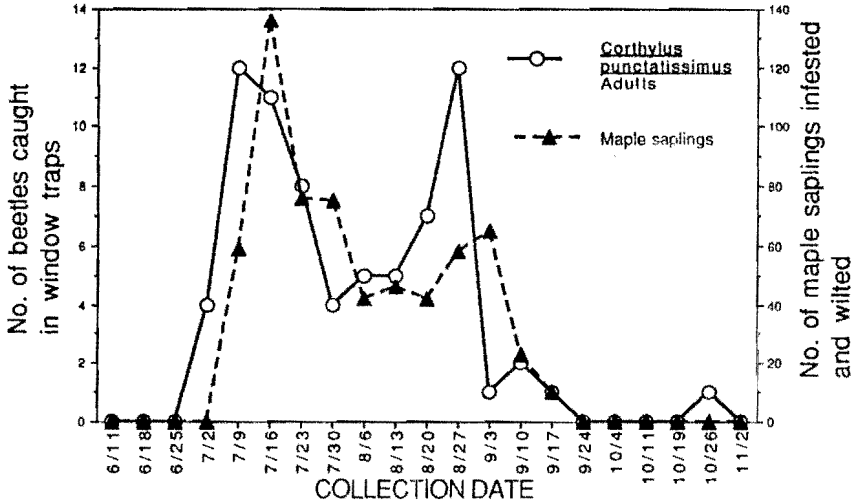


Figure 1. Number of *Corthylus punctatissimus* adults caught per week (1989, 1990) in ethanol-baited window traps and number of maple (*Acer*) saplings wilted per week (1990) due to infestation of *C. punctatissimus*.

1990. The occurrence of the attacked and wilted saplings also had two distinct peaks with the first occurring the week of 9–16 July and the second peak seven weeks later during the week of 27 August–3 September (Fig. 1).

The time difference between the peaks of flight and the observed peaks of wilted saplings suggested that one week was required by the beetles to excavate a gallery system which caused the wilting of the host saplings. This confirmed observations of dissected galleries of infested hosts (Finnegan 1967, and Roeper et al. 1987b). The numbers of beetles caught in the window traps and the numbers of infested trees were lower during the second peak. This would suggest that the second peak was due to the reemergence of the parental adults to start a second brood rather than the start of a second generation caused by emergence and subsequent attack of the progeny beetles. These observations support those made from examination of gallery systems that parental adults left galleries to start a second brood (Roeper et al., 1987b).

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