

Trypodendron domesticum and *Trypodendron signatum*: Two Scolytid Species Involved in Beech Decline in Belgium

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Introduction

Xylophagous scolytids (Ambrosia beetles) have long been known to prefer fallen or seriously weakened trees and stumps. They are attracted to this host material by ethanol produced by the fermenting phloem and sapwood. However, these insects have begun aggressively attacking living beeches in Southern Belgium, raising the issue of a possible shift towards primarity. More than 1.3 million m³ have been attacked in 2001 (Huart and Rondeux 2001). Strikingly, similar occurrences of ambrosia beetles attacking living broadleaf trees have been observed worldwide recently. A series of experiments have been carried out since December 2000 to answer a series of rather basic but essential questions : what is the beetles' phenology ? Do they have two generations a year ? What are the patterns of emergence for both species ? How far from an outbreak focus do they represent a threat to other stands?

Material and Methods

Phenology

Four baited Theyson traps (distance between traps : 50 m) were placed in four attacked sites in the Ardennes. Catches were counted and identified once each week from the beginning to the end of the flight period for both species.

Patterns of Emergence

15 individual and 23 collective emergence traps were placed on infested trees at the end of the 2001 flight period. Catches were counted and identified once each week from 12 July to 3 October for individual traps, and from 1 August to 1 October for collective traps.

Life Cycle and Parental Care

In 2001, galleries of the two species were opened periodically during the attack period, from early April to the end of June, in order to observe the behaviour of adults inside, check on the development of progeny, and to determine whether or not a second generation exists.

Dispersal of *Trypodendron* spp. from Beech Stands to Open Areas

In Recogne and Witry, three and four baited (ethanol+lineatin) traps were placed in an open area at 50, 100 and 200 m, and at 50, 100, 200, and 400 m from the edge of an infested beech stand. Catches were counted and identified once each week during the flight period - from 2 April to 23 May, 2002 for Recogne, and from 24 April to 23 May for Witry.

Results

Phenology

The flight period for *T. signatum* was about one month later than for *T. domesticum* (Fig. 1 and

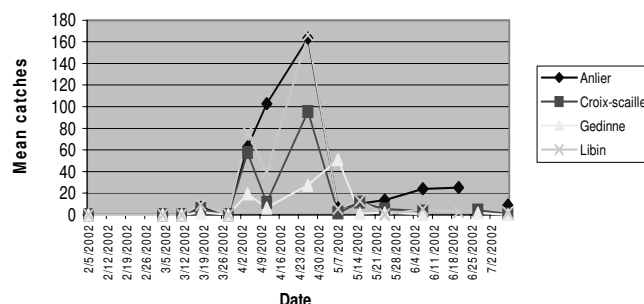


Figure 1.—Phrenology of *T. signatum*.

Fig. 2). The earlier flight of *T. domesticum* might perhaps be connected to the fact that it overwinters in the galleries where it might be able to feed throughout the winter on fungi.

Patterns of Emergence

We observed that most young adults of *T. signatum* emerged from their galleries at the end of the summer. They probably spent the winter in the litter, at which time they were not attracted to pheromone traps. *T. domesticum* did not emerge from their galleries before spring. They overwintered in the galleries.

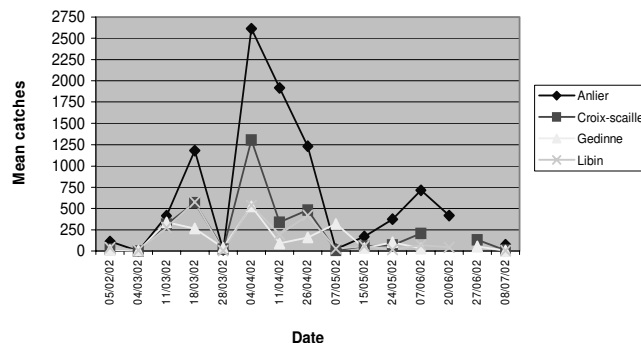


Figure 2.—Phrenology of *T. domesticum*.

Life Cycle and Parental Care

For both species, parental care (essentially cleaning of the gallery by the female) is continuous until pupation is completed. We have observed one male at the entrance of each gallery. The exact role of the male during this period is still not clear; males may be guarding the female or may help to clean the gallery. Egg laying occurred in one single period, after which the larvae developed and pupated. There was thus no sister generation within any single gallery.

Dispersal of *Trypodendron* spp. from Beech Stands to Open Areas

The two *Trypodendron* species are obviously able to disperse beyond beech stands at least as far as 400 meters (Fig. 3 and Fig. 4). This suggests that dispersal could occur between beech stands during outbreaks. Lines of baited traps placed at the edge of attacked stands might possibly prevent or reduce these movements.

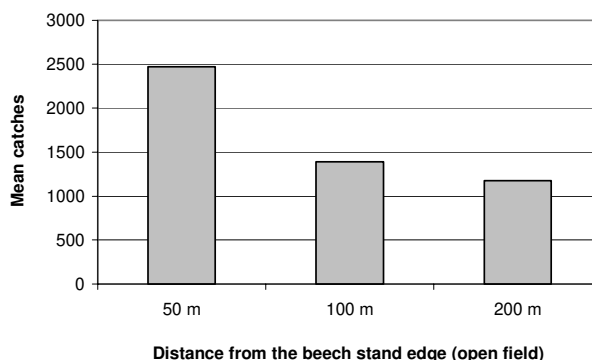


Figure 3.—Dispersal of *Trypodendron* spp. in recogne, Wallonia, Belgium (02/02/02 to 23/05/02).

Open Questions

T. domesticum and *T. signatum* diverge in many respects, for example in their reproductive biologies, modes of overwintering, spectra of host-trees, and competitiveness. We need to conduct further studies to help us understand how these species share their resources, to assess more accurately the risk that they represent, and to design appropriate control measures.

References Cited

Huart, O. and Rondeux, J. 2001. Genèse, évolution et multiples facettes d'une maladie inhabituelle affectant le hêtre en région wallonne. Forêt wallonne 52 :9-19.
DNF. 2002. Maladie du hêtre wallon : évolution et mesures. Paysages 22 :4-9.

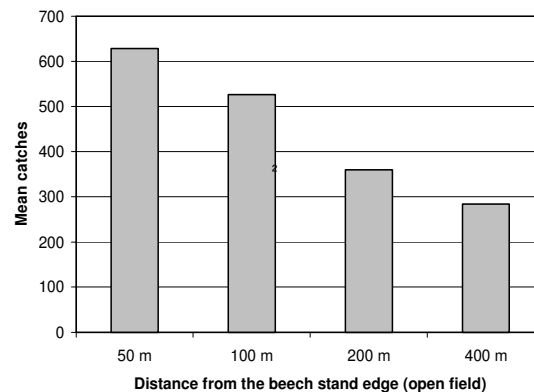


Figure 4.—Distance from the beech stand edge (open field).