

The Role of Selected Soil Fauna as Predators of *Apethymus abdominalis* Lep. (Hymenoptera, Tenthredinidae) in Oak Forests in the District Căiuți, Romania

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Introduction

The present study was initiated in 2001 in the oak forests from Trotuș valley (Forest District Căiuți – Bacău, Romania) which were heavily infested by oak sawflies *Apethymus abdominalis* Lep. (Hymenoptera: Tenthredinidae), in order to understand better the role of soil-inhabiting predators in population regulation of this pest.

A serious outbreak of this defoliator was recorded during the years 1999-2000 and thus a series of treatments with the chitin inhibitors Dimilin and Rimon were applied against larval populations in those forests. Subsequently, after the year 2000, we observed an increase in populations of its natural enemies, from egg-larval parasitoids to eonimphal predators, which gradually subdued the outbreak.

A series of soil inhabiting predators, namely from the families Carabidae (genera *Abax*, *Carabus*, *Harpalus*, *Pterostichus* etc.) and Staphilinidae (*Staphilinius*, *Optionus*, *Philontus* etc.), as well as red mites (Stigmatrombidiidae) and forest red ants were recorded.

Materials and Methods

Soil fauna was collected using a series of Barber traps. Each series consisted in 12 traps (consisting of a 10 cm diameter, 250ml cup). Nine series of traps were placed in three plots within the Forest District Căiuți-Bacău: Păltinată Forest (3), Heltiu Forest (5) and Cornățel Forest (1). During 2001, contents of the Barber traps were collected monthly beginning on the 15th of April and continuing until the 19th of October (six collecting periods).

The level of defoliation of oak trees in the forests under study was estimated by sampling branches and by estimating the number of eonimphae in the soil around trees. We also recorded the number of other defoliators that are found characteristically in oak forests.

Results

In the spring of 2000 the level of defoliation of oaks by larvae of *Apethymus abdominalis* in the study areas was estimated to be 97% in the Heltiu Forest, 15% in the Păltinată Forest and 5% in the Cornățel Forest. The numbers of eonimphae in the soil was estimated to be 4 specimens/m² in Păltinată and 20 specimens/m² in Heltiu. Minor defoliation by other forest pests including *Tortrix viridana*, *Operophtera brumata*, *Erannis delfoliaria*, *Orthosia* sp. of caterpillars was also noted in all areas, but especially in the Cornățel Forest.

As a consequence of the treatments applied in 1999-2000, the larval populations in the spring of 2001 were at extremely low levels (1-2%), meanwhile the number of eonimphae in the soil was high (maximum 40 specimens/m² in Heltiu Forest). However, the caterpillar complex caused an estimated defoliation of 50% in the Cornățel Forest.

The abundance of available larvae, especially those in the latest instar (L₆), and sawfly eonimphae induced an abundance of select invertebrate predators in the soil. The most numerous were over 30

species, of carabids such as *Abax ater*, *Carabus coriaceus*, *C. granulatus*, *Harpalus pubescens*, *Pterostichus oblongopunctatus*, and over 10 species of staphilinids such as *Staphilinius olens*, *Philontus chalceus*, *Quedius* sp.). In the forests Păltinata and Heltiu, there was an abundance of red mites (Acarina) from the genus *Eutrombidium* (Stigmatrombidiidae) during the spring of 2001.

In the Cornăţel Forest we observed intensive activity of forest red ants (*Formica ruffa*) (1751 specimens/series of 12 traps) followed by carabids (only *Harpalus pubescens* registered 195 specimens/series, other carabid larvae (698 specimens/series) and staphilinids (46 specimens/series). Most predator species were active during the months of April-May; however an omnivorous forest red ant was active during all vegetation periods.

The most heavily infested area was the Heltiu Forest, where two successive treatments were applied in 1999 and in 2000. Our results confirmed that there was a decline in a quantitative diminution of the number of predators in 2001 as compared to the previous years, however the species diversity was relatively unaffected-35 species in Heltiu Forest, 30 species in Forest Păltinata and 28 species in Forest Cornăţel.

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