

Red Oak Borer

Enaphalodes rufulus Haldeman

Coleoptera: Cerambycidae

Donley, D. E.; Rast, E. 1984. Vertical distribution of the red oak borer, *Enaphalodes rufulus* (Coleoptera: Cerambycidae), in red oak. Environmental Entomology 13: 41-44.

Objective: To develop a sampling method for *E. rufulus* based on its vertical distribution during attacks in immature stands of red oak (*Quercus* spp.).

Abstract: Red oak borer, *Enaphalodes rufulus* Haldeman, attacks both red and white oak tree groups (*Quercus* spp.) in the eastern USA and southeastern Canada. Larvae feed on the phloem and sapwood of host trees and cause large economic losses in oak-hickory forests. Initial attacks are difficult to detect as only pinhole wounds are found on the bark, but emerging adults leave noticeable exit holes measuring 10-14 mm in diameter. Evaluation of damage and execution of control measures for *E. rufulus* have been based on sampling the 5 m basal section of trees between 10 and 30 cm dbh as this pest attacks trees at a uniform height and dbh. There is a need to develop a sampling method that will determine the *E. rufulus* population from the vertical distribution in immature oak trees, since attack density is inversely related to size for trees of this age.

Infested red oaks (*Quercus rubra* L., *Q. coccinea* Muench., and *Q. velutina* Lam.) in immature stands in Indiana and Pennsylvania were examined for infestation by moderate populations of *E. rufulus*. Attack density, attacks per tree, and attacks per unit of bark surface were measured on cut trees among nine dbh classes (10.0, 12.5, 15.0, 17.5, 20.0, 22.5, 25.0, 27.5, and 30.0 cm). Attack height, attacks per tree, or attacks per unit of bark surface area did not vary between the two locations. Trees with 10-30 cm dbh had suitable wood for infestation from the ground line (0.06 m) to 22.4 m high, but *E. rufulus* attacked stems only between 0.07-17 m. Only 6 attacks were observed on limbs. Attack density decreased with tree size but attack height increased with dbh class. The authors concluded that at least 75% of *E. rufulus* attacks occur in the economically important basal 5 m of red oaks.

Sampling Procedure: Identify infested red oaks by inspecting the bark from the ground up to ≈23 m. Number each tree before cutting it down and sectioning the trunk into transportable pieces. In the lab, debark all sections with diameters of ≥7.5 cm outside the bark, which is the wood habitable by *E. rufulus*. Record the height of each attack from the original groundline. Record the total attacks per tree and the vertical distance (height) of each infestation in the stem to the original groundline for each dbh class. Calculate the cumulative frequency of attack heights from all dbh classes by plotting attack height against the cumulated percentage of attacks.

Notes: Red oak stands were selected for this study based on the presence of moderate *E. rufulus* populations that warranted control measures, and the results of

this study may differ from stands with low or high populations. No significant differences were detected in the number of *E. rufulus* attacks between peeled and unpeeled trunk sections, so managers may consider leaving the bark on the trunk sections to save time. Trees between 10-30 cm dbh are considered brood trees (Donley 1981) and are removed for control of *E. rufulus*.

Reference:

Donley, D. E. 1981. Control of the red oak borer by removal of infested trees. Journal of Forestry 79: 731-733.