Mini data sheet on *Enaphalodes rufulus*

Added in 2008 – Deleted in 2013

Reasons for deletion:
Enaphalodes rufulus has been included in EPPO Alert List for more than 3 years and during this period no particular international action was requested by the EPPO member countries. In 2013, it was therefore considered that sufficient alert has been given and the pest was deleted from the Alert List.

Enaphalodes rufulus (Coleoptera: Cerambycidae) – red oak borer

Why	In 2008, the UK NPPO intercepted consignments of sawn oak wood showing signs of infestation by wood borers. Observations strongly suggested that the wood was infested by *Enaphalodes rufulus*. Although, the identity of the pest could not be ascertained, this finding suggested that *E. rufulus*, which is an economically important wood-boring insect of red oaks in North America, could enter the EPPO region via imports of oak wood.
Where	**EPPO region**: absent. **North America**: *E. rufulus* is native to North America, it occurs in the southeastern part of Canada and the eastern part of the USA. Canada (Ontario, Quebec), USA (Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Wisconsin).
On which plants	Most oak species (*Quercus* spp.) in eastern North America can be attacked by *E. rufulus*. Its preferred hosts belong to the red oak group (*Erythrobalanus*): *Quercus rubra* (northern red oak), *Q. velutina* (black oak), *Q. coccinea* (scarlet oak). Other oak species are less commonly attacked: *Q. alba* (white oak), *Q. stellata* (post oak), *Q. palustris* (pin oak), *Q. macrocarpa* (bur oak), *Q. lyrata* (overcup oak), *Q. laurifolia* (laurel oak). There is no data on the susceptibility of European oak species (e.g. *Q. petraea, Q. pubescens, Q. robur*).
Damage	Damage is caused by larvae which bore tunnels inside the wood of their host trees. Galleries created may then become infected with decay fungi. Damage of *E. rufulus* to oak wood can be economically important. In the 1980s, in the USA, it was estimated that 38% of oak wood used for lumber, cooperage and veneer was affected by *E. rufulus*, and could lead to 40% reduction of the tree value at the time of sawing. Normally tree mortality is not associated with *E. rufulus* infestations but in the early 2000s, severe mortality of red oaks (*Q. rubra, Q. falcata* and *Q. velutina*) was observed in the Ozark National Forest (Arkansas) and then in the nearby states of Oklahoma and Missouri. This severe oak mortality and decline which affected tens of thousands of oaks, primarily *Q. rubra,* was associated with an unprecedented outbreak of *E. rufulus*. Although there might be other factors involved (e.g. drought), *E. rufulus* was considered to be an important component of this severe oak tree decline. *E. rufulus* has a 2-year synchronous life cycle. Adults are nocturnal and can be found from mid-June to mid-August. Mating takes place on the host tree and the females lay an average of 110 eggs, mainly in bark crevices, under lichen patches and climbing vines. Young larvae bore directly through the bark and spend their first year in the phloem making small tunnels. The 2-year-old larvae make larger tunnels and bore into the xylem where pupation takes place. The adult emerges near the original oviposition site by gnawing an oval hole through the bark. Pictures can be viewed on the Internet: http://www.invasive.org/browse/subthumb.cfm?sub=374&start=1
Dissemination	Adults can fly but data is lacking on their potential for natural spread. Over long distances, trade of wood and wood products can disseminate *E. rufulus* (imports

of *Quercus* plants for planting from non-European countries are usually prohibited).

Pathway *Quercus* wood and wood products from Canada and USA.

Possible risks Because larvae are hidden in the wood, they may be difficult to detect during inspection. The UK interception, although not confirmed, suggests that pathways of introduction into Europe exist (e.g. sawn wood). Considering its geographical distribution in North America, it is likely that *E. rufulus* can establish under the climatic conditions of Europe. In forests, control measures are limited (removal of highly infested trees, general measures to encourage tree vigour); in parks and gardens, insecticide treatments can be applied for high value trees. One of the main uncertainties is the availability of host plants in the EPPO region. Red oaks are grown for ornamental purposes and apparently *Q. rubra* is increasingly planted in forests (because of the quality of its wood) but data is lacking on its current distribution in European forests and economic importance. In addition, data is lacking on the susceptibility of European oak species to *E. rufulus*. Nevertheless, it cannot be excluded that oak wood boring pests such as *E. rufulus* may present a risk to European forests, timber industry, nurseries and amenity trees planted in parks and gardens.

Source(s)

Bousquet Y (Ed.) (2001) Checklist of beetles of Canada and Alaska. Agriculture Canada, 430 pp.

NPPO of the UK, 2008-04.

INTERNET (last retrieved in 2008-010)

Eastern Forest Environment Threat Assessment Center. Read oak borer. *Enaphalodes rufulus*. http://threatsummary.forestthreats.org/threats/threatSummaryViewer.cfm?threatID=116

Guldin JM, Poole EA, Heitzman E, Kabrick JM, Muzika RM (2005) Ground truth assessments of forests affected by oak decline and red oak borer in the interior highlands of Arkansas, Oklahoma and Missouri: preliminary results from overstory analysis. Proceedings of the 13th biennial Southern Silvicultural Research Conference (2005-02-28/03-04, Memphis, US), p 415-419. http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs092/gtr_srs092.pdf

Kelley MB, Wingard SW, Szalanski AL, Stephen FM (2006) Molecular diagnostics of *Enaphalodes rufulus* (Coleoptera: Cerambycidae). *Florida Entomologist* **89**(2), 251-526. http://www.fcla.edu/FlaEnt/fe89p251.pdf

Stephen FM, VB Salisbury, Oliveria FL (2003) Red oak borer, *Enaphalodes rufulus* (Coleoptera: Cerambycidae), in the Ozark Mountains of Arkansa, USA: an unexpected and remarkable forest disturbance. Integrated Pest Management Reviews. 6,247-252. http://www.uark.edu/~fstephen/new/ROB/ROB_Velaine_final-Stephen.pdf

Oliveria FL (2001) Forest health implications of current management in the Southern Region of the United States Department of Agriculture (USDA) Forest Service. Proceedings of the North American Forest Insect Work Conference (2001-05-14/18, Edmonton, CA), p 77. http://www.fsl.orst.edu/wfiwc/proc/2001proc.pdf

Timbal J, Kremer A, Le Goff N, Nepveu G (1994) Le chêne rouge d'Amérique, INRA, 564 pp. (Book extracts). http://books.google.fr/books/quae?vid=ISBN2738004792&hl=FR&printsec=toc

University of Arkansas (US). Red oak borer. Fred Stephen's Lab. http://www.uark.edu/~fstephen/new/ROB/stephenlab.html

USDA Forest Service. Forest Insect & Disease Leaflet 163. Red oak borer. http://www.na.fs.fed.us/spfo/pubs/fidls/Red%20Oak%20Borer/redoak.htm

EPPO RS 2008/178

Panel review date 2013-03 Entry date 2008-09