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Science Division

# Bullseye borer (*Phoracantha acanthocera*) in karri.

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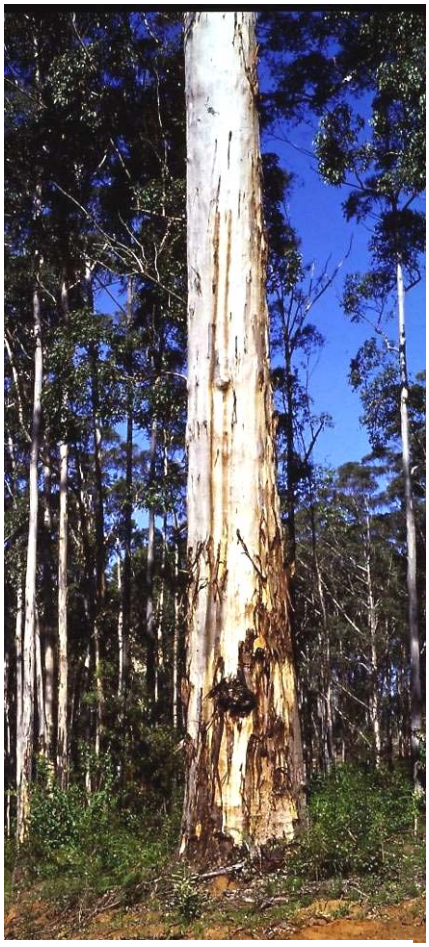
## Background

The impact of drought and water stress in our forests is becoming a matter of concern with 2010 being one of the driest winters in Western Australian recorded history.

Bullseye borer is a long lived beetle belonging to the family Cerambycidae, commonly known as longicorns. The current recognised name of this beetle is *Phoracantha acanthocera* (Macleay), but in the past it has also been known as *Tryphocaria acanthocera*. Although it has been recognised in the past as attacking apparently healthy trees our research shows water stress is a factor in this insect's biology.

Bullseye borer is distributed throughout southern Australia and infests a wide range of species within the genera *Eucalyptus* and *Corymbia*. In Western Australia its hosts include karri, jarrah and marri, and it is widespread throughout the southern forests. Although infestation does not result in tree mortality, it affects timber quality. The life cycle is approximately two years, during which time more than 18 months is spent as a larva within the tree bole. The larval stage culminates in the creation of a pupal cell with a crescent shaped slot, which can resemble a "bullseye".

This information sheet summarises research conducted on Bullseye borer attack in *Eucalyptus diversicolor* (karri) regrowth in the south-west of Western Australia.



Infected karri stem showing kino stains

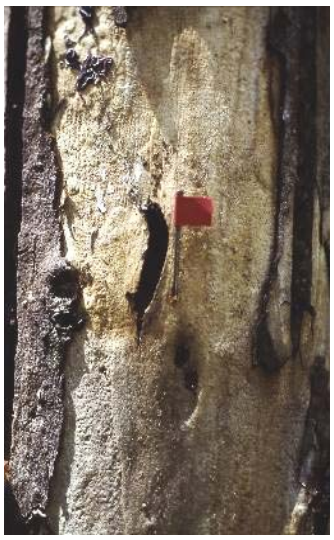
Adult beetles: Above left, female; right male.

Right: Bullseye emergence hole

## Findings

### *Symptoms of attack*

The most reliable indicators of attack are: a saw-dust like material (frass) collecting in bark crevices and at the base of the stem; kino staining from frass ejection vents seen as dark stains down the tree bole. The presence of "bullseyes" and crescent shaped slots in the tree bark are definitive evidence that the species *P. acanthocera* is present rather than another borer species and indicate adult beetle emergence. Bark scars in a helical pattern up the tree bole, horizontal bark fissures in rough barked trees, and swellings on the tree bole are a poor predictor of bullseye borer attack and need to be used together with other more reliable symptoms to estimate borer abundance.



Left: helical pattern of frass ejection vents and kino stains.
Centre: infected karri stem showing helical bark scar
Right: adult crescent shaped emergence hole in karri.

### *Survey for borers*

The external symptoms mentioned can be used as a rapid survey technique to estimate borer abundance within a forest stand. However, in marri, external symptoms increase with tree age resulting in over estimate of borer damage. Thus surveys need to be stratified across species and tree age classes. In 20-35 year old karri, a mean of more than six symptoms per tree indicates a high level of borer attack. Borers prefer trees with a diameter over bark at breast height of 20 cm or greater. In addition, although marri appears to have a higher incidence of attack, this is a result of its high symptom expression and karri is the preferred host.

Cross section of karri billet showing borer infestation and associated brown wood staining.

Borer incidence is also correlated with the incidence of incipient rot (i.e. brown wood) in karri. However, the presence of incipient rot and borer infestation are not mutually dependent, and one can occur without the other. Evidence suggests borer infestation facilitates incipient rot infection by providing sites for tree invasion.

Although *P. acanthocera* is known to attack healthy trees, research indicates borer incidence in karri is greater in less productive drier sites, and small coupes close to jarrah/marri. This suggests that water stress will increase susceptibility to bullseye borer.

## Management Implications

- A rapid survey technique involving the incidence of external symptoms of borer attack can adequately estimate the degree of borer infestation and thus the incidence of incipient rot within regrowth karri stands.
- Management practices that limit water stress in regrowth stands may reduce the incidence of borer attack. Stands on less productive drier sites on the margins of the karri forest distribution are more likely to experience a high incidence of borer attack, and may warrant consideration for early thinning.

For more information please locate the following reprints from the Conservation Library and Information Centre:

Farr, J.D., Dick, S.G., Williams, M.R., and Wheeler, I.B. (2001) Incidence of bullseye borer (*Phoracantha acanthocera* (Macleay), Cerambycidae) in 25-35 year old karri in the south west of Western Australia. *Australian Forestry* 63:107-123

Abbott, I., Smith, R., Williams, M., and Voutier, R. (1991). Infestation of regenerated stands of karri (*Eucalyptus diversicolor)* by bullseye borer (*Tryphocaria acanthocera*, Cerambycidae) in Western Australia. *Australian Forestry* 54: 66-74.

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