Crown decline in Wandoo

Supplement 2004

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Summary

CALM Science division was alerted in early 1999 to foliage death in an extensive area of Wandoo (*Eucalyptus wandoo*) woodland in Talbot forest block visible from the York Road. Causes of initial foliage thinning at Talbot forest block were unclear though initially attributed to below average winter rainfall in the winter of 1997.

A series of Wandoo crowns in open woodland in the north end of Talbot forest block near Wundabiniring Brook (31° 53.103' S, 116° 30.511' E) were photographed on 9 June 1999 then rephotographed on 4 July 2000, 23 May 2001, 9 September 2002 and 6 May 2004 to facilitate a more rigorous and objective assessment of changes in crown condition.

Wandoo stands in Talbot Block exhibit a range of decline between individual tree crowns (Plate 1A-C.). Tree crown conditions range from no branch die-back between June 1999 and May 2004 (Plate 2A and B), through severe branch die-back (Plate 4A and B), to death of some trees (Plate 4C).

Onset of branch die-back is not synchronous between all canopies within stands (Plate 5A). In general though, the most rapid loss of foliage occurred by autumn 2000 (Plates 3B, 4A and 4B, 5A.).

Presence and severity of branch die-back is largely independent of stand density. Branch die-back is present in singleton trees (Plate 3A-E), as well as in dense regrowth stands (Plate 5A-D).

Changes to leaf area within crowns since 2001 have been subtle, there seems to be stabilization in most crowns. Loss of foliage is at least equalized by development and thickening of epicormic foliage by May 2004.

Tree mortality is about 5%-10% in dense stands and further deaths of the least vigorous trees are possible. Most trees will probably survive and rebuild their canopies should favorable rainfall conditions prevail. The net result is likely to be a small thinning of stand density in the most severely affected stands.

Evidence of branch boring Cerambycidae was found in both unaffected and severely affected crowns on branches up to about 50mm diameter. Branch death is possibly related to insect boring activity. **Tree responses to activity of branch borers appear to be an important aspect of expression of canopy decline.**

Evidence of Cerambycid larval activity on dead tree trunks greater than 100cm diameter was not always present. **Tree death was not necessarily related to girdling of large stems by borers.**

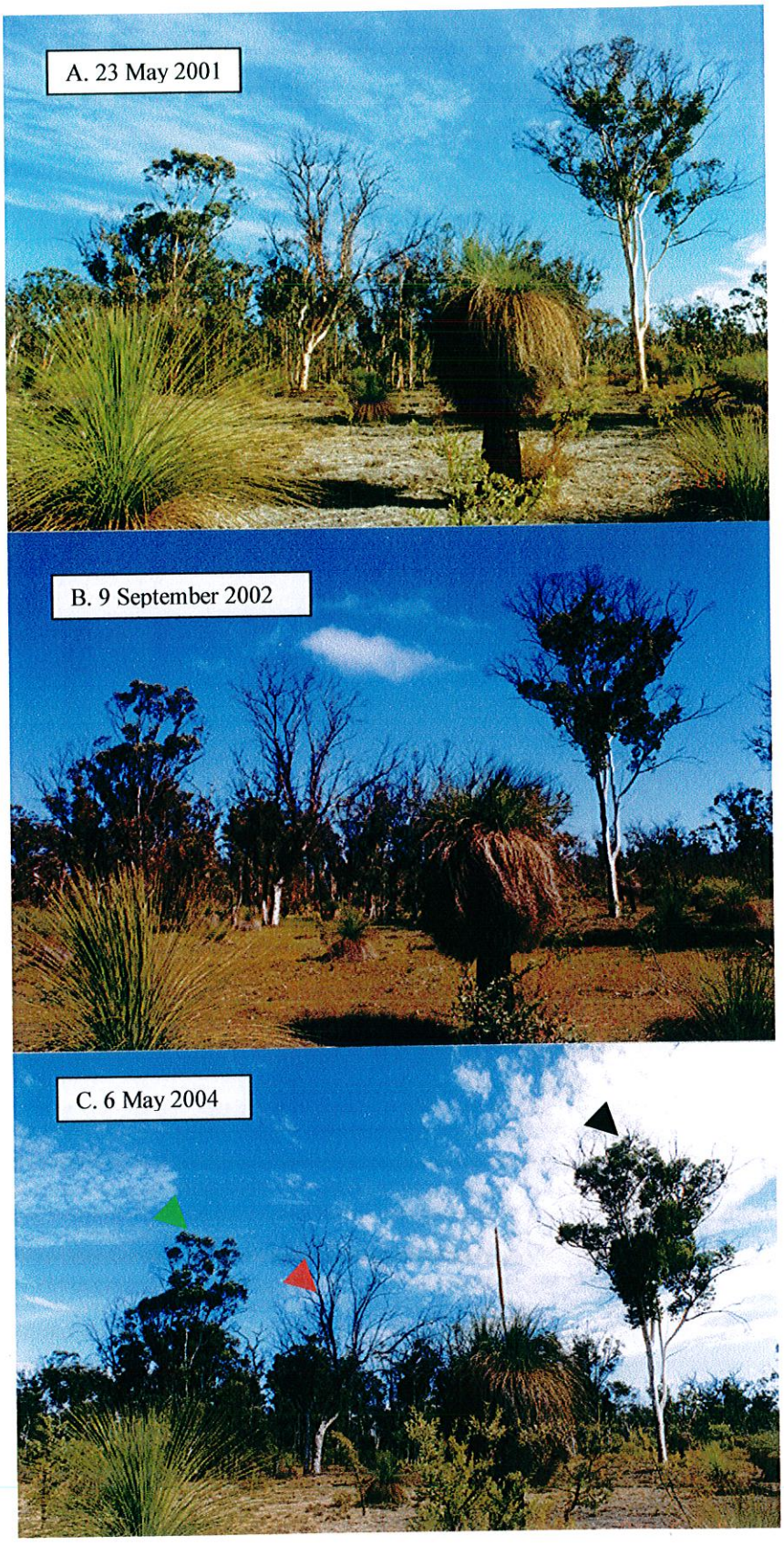

Plate 1 A, B and C. Different trees show canopy decline to different extent. Severe die-back of canopy before 2001 and ongoing collapse of epicormic growth (Red arrow). Some loss of terminal leaf clusters since 2001 (Green arrow). Loss of terminal foliage before and after 2001, thickening of remaining foliage by 2004 (Black arrow).

Plate 2 A, B. Difference in expression of decline can be persistent. A tree showing minimal changes to the canopy since June 1999.

Plate 3 A, B. Evidence of crown decline can persist for very long time spans. A very old crown showing different episodes of crown die back. Uppermost branches are dead in Plate 3A from an earlier crown decline. Note overall loss of terminal foliage and branch die-back, and thick epicormic growth by May 2004 in Plate 3B. Crown decline events are probably an important part of the process of hollow formation (green arrow).

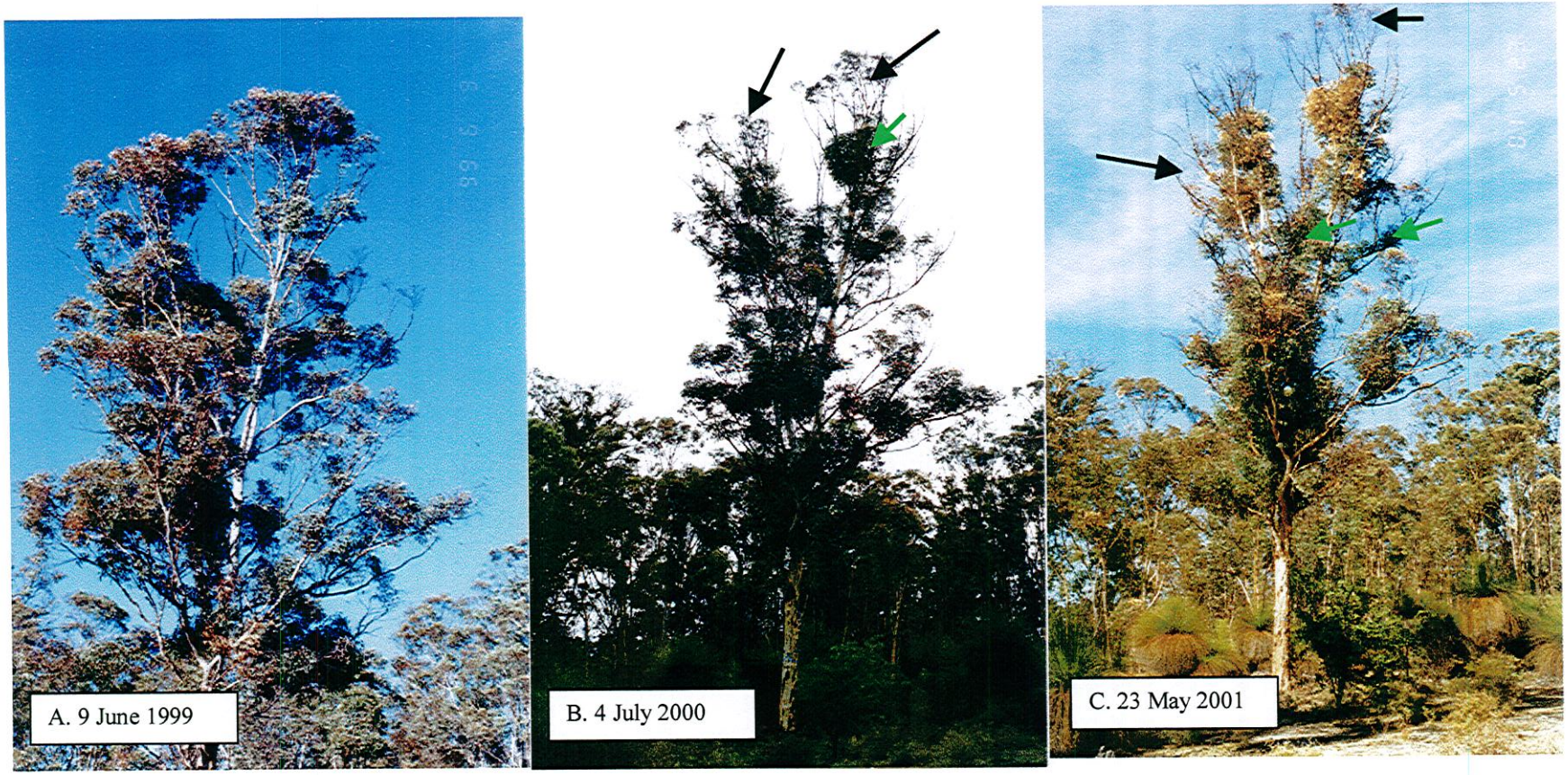
A. 9 June 1999
B. 4 July 2000
C. 23 May 2001

Plate 3 A-E. Onset of crown decline in one tree. A. Some thinning of foliage and initiation of epicormic growth prior to June 1999. B. Heavy thinning of foliage in upper crown (black arrows) thickening of epicormic growth (green arrows). C. Continued loss of terminal foliage (black arrows) and thickening of epicormic foliage (green arrows). D and E. Continued thickening of foliage.


A. 9 June 1999


B. 4 July 2000


C. 23 May 2001

Plate 4 A-E. A small stand severely affected. A. thinning of terminal foliage and initiation of epicormic foliage by June 1999. B. Further loss of terminal foliage and thickening of epicormic clusters. C. Some loss of epicormic leaves (black arrows). Some thickening of foliage (green arrow). Dead tree arrowed red. D and E. Continued thickening of epicormic clusters.


A. 4 July 2000


B. 23 May 2001

Plate 5 A-D. A severely affected stand. Decline has progressed at different rates in different parts of the stand. A. Onset of decline first in left half of stand probably before 1999 followed by right half of stand in 1999-2000. B and C. Continued loss of epicormic clusters in 2001 and 2002. D. Thickening of epicormic growth by May 2004.

Plate 6. Cerambycid borer damage associated with branch die-back. Green arrow indicates empty pupation chamber. Red arrow indicates characteristic 'J' shaped gallery. Dead bark has been removed. Stem diameter about 50 mm.

Plate 7. Borer activity on branches of Wandoo showing almost no branch die-back (inset). Borer galleries overgrown by bark arrowed red and green. Branch diameter about 50 mm.