Observations of Marri and Jarrah Crown Decline near North Bannister

Mike Stukely and Allan Wills, Science Division, 3 November 2005

1. Edited extracts of Reports received from Peter White, CALM Narrogin, September – October 2005:

> In an area of State Forest along Albany Highway, from North Bannister to about 10-15km further north, symptoms were observed on both *Corymbia calophylla* and *Eucalyptus marginata* that are similar to the "flagging" on *E. wandoo* affected by Wandoo Crown Decline. There is a range of stages of development of symptoms present, from those where the foliage has been dead for several weeks through to very recent death. In some cases, entire trees are sporting partially dead canopies.
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> When branch samples were cut through at various points, borer galleries were not encountered either above or below the dead foliage line. There was some, what appeared to be, scarring on the underside of the branchlet – similar to the fusiform scarring that Ryan Hooper reported in his assessment on *E. wandoo*.
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> The area that is affected continues about 10 - 15km along the highway and symptoms diminish rapidly either side of this area, both to the north and south. Affected trees are not confined to the road verges, with symptoms being visible on trees several hundred metres into the bush.

2. Observations on 3rd November by Stukely and Wills:

Brief details of observations made at two sites with widespread symptoms are given below.

Site A (code MAR3 = 32° 30.421' S, 116° 22.143'E).

Location and Site – East side of Albany Highway, upper slope and onto laterite ridge-top, with outcropping granite; stand of Jarrah/Marri above wandoo gully (on west side of Highway). Generally a harsh site. Symptoms extend at least 200m into the forest.

Symptoms – Heavy flagging of dead foliage was seen on scattered ground and advance-growth Jarrah coppice and saplings (Fig.1), and marri up to small pole size (Fig.2). Some larger, mature trees had scattered flagging of mainly small twigs, but many also showed old branch dieback and extensive epicormic growth. The condition of affected foliage ranged from very freshly killed to fully brown (dead several months), and old dieback of leaders and epicormic shoots (now defoliated) was also common. Small longitudinal splits were often present in the bark of branchlets and on petioles below dead and dying foliage. The cause of these is unknown. Fresh, healthy epicormics are now emerging from live tissue below the dead wood on many trees.

Coppices showed a clear succession of symptom development dating back over several years, with the leader having been killed and replaced by adjacent branches or epicormics, which had subsequently also been killed and replaced (Fig.3). This succession appeared to be predated by fire damage, estimated to have occurred at least 5 years ago, which killed the then leaders.

Causal Agents – There was some evidence of stem damage caused by insect activity, including **borers** (frass vent) and **moths** (webbing present in frass), on only two affected trees. A small gallery beneath a split in the bark of a dead twig (jarrah) contained Dipteran (fly, possibly Cecidomyiidae) larvae. Jarrah leafminer was not present. [Note: In Wandoo, insect damage is not necessarily readily apparent on the stem surface in the early stages of gallery development.]

On Jarrah advance growth coppices, removal of the bark towards the base of branches with dead and dying foliage revealed clear evidence of downward-advancing lesions, probably caused by **canker fungi**. Type 1 galleries as described by Ryan Hooper on Wandoo were not visibly present after removing of bark of affected branches.

Site B (code MAR4 = 32° 32.227' S, 116° 24.129'E).

Location and Site – West side of Albany Highway, upper to mid slope with occasional granite boulders, stand of mostly Jarrah above a wide, wet open area. Symptoms extend at least 500m into the forest.

Symptoms – Severe flagging of dead foliage, giving the appearance of widespread crown scorch, was seen on most understorey and mid-storey Jarrah. Over-storey trees had minor flagging but often also carried extensive old branch dieback (now defoliated), and epicormic growth.

The condition of affected foliage ranged from very freshly killed to fully brown (dead several months), and old dieback of leaders and epicormic shoots (now defoliated) was also common. Small longitudinal splits were often present in the bark of branchlets and on petioles below dead and dying foliage, as at Site A. The cause of these is unknown. Fresh, healthy epicormics are now emerging from live tissue below the dead wood on many trees.

As at Site A, coppices showed a clear succession of symptom development dating back over several years, with the leader having been killed and replaced by adjacent branches or epicormics, which had subsequently also been killed and replaced. This succession appeared to be predated by fire damage, estimated to have occurred at least 5 years ago, which killed the then leaders.

Causal Agents – There was again some evidence of stem damage caused by insect activity, a longicorn **borer gallery** was present on one affected small sapling. Jarrah leafminer was not present.

On Jarrah advance growth coppices, removal of the bark towards the base of branches with dead and dying foliage revealed clear evidence of downward-advancing lesions, probably caused by **canker fungi**.

Conclusions

Canker fungi are clearly involved, and are causing damage at a level more severe than usual. The involvement of insects was apparently less consistent. Canopy dominants appear to be least affected.

Recommendations

More detailed definition of the extent and severity of crown decline is warranted as a baseline for determining the longer term spread of this problem.

Investigation of causal agents may reveal novel pathogens.

Management options for controlling the problem are probably limited.

Fig. 1(a). Jarrah ground coppice with recent flagging. Albany Highway 12 km N of North Bannister.

Fig. 1(b). Jarrah sapling with flagging. Albany Highway 12 km N of North Bannister.

Fig. 2. Branch dieback in Marri saplings. Death of terminal foliage followed by recurrent death of epicormic foliage and stems. Note weathering of dead branches indicating long term presence of this condition. Albany Highway 12 km N of North Bannister.

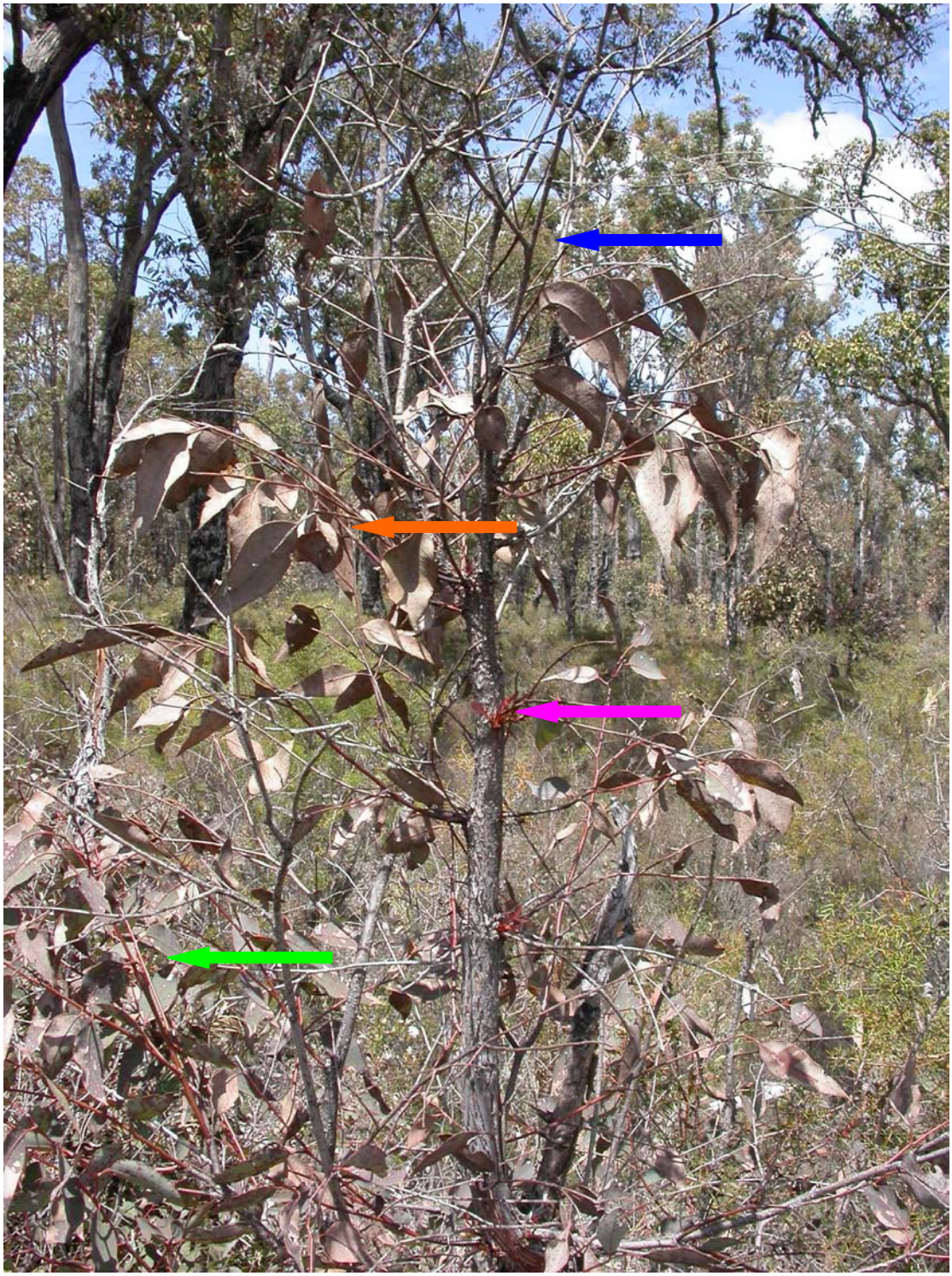

Fig. 3. Jarrah advance growth showing progressive decline. Blue arrow: Growing apex dead last year. Orange arrow: foliage dead this year. Purple arrow: Epicormic shoots. Green arrow: green foliage produced last growing season. Albany Highway 12 km N of North Bannister.