Armillaria mellea - A DANGEROUS PATHOGEN?

By F. Batini.

Introduction.

A report of an unexplained mortality in Karri from an area of virgin bush in Warren Block, Pemberton, was received from the D. F. O. and the area inspected by Officers of the Research Branch. A number of dead and dying Karri trees were observed and it appears that the disease is localised at the present time. Representatives of all age classes from pole to veteran were affected.

Examination of the lower bole and roots revealed white sheets of mycelium (a mass of thread-like strands) between the bark and the wood. In some cases the wood was reduced to a white pulpy mass filled with mycelium. Infected samples were plated and a Basidiomycete recovered. (A wide variety of fungi are classified in this group. It includes the rusts, smuts, mushrooms, toadstools and bracket fungi.) The area was also baited for P. cinnamomi with negative results.

Basidiomycetes are difficult to identify on mycelial characteristics and the local D. F. O. was advised to inspect the area regularly for the development of fruiting bodies. In June, masses of fruiting bodies developed on the diseased trees. These were identified as belonging to the plant pathogenus fungus Armillaria mellea.

Description.

A. mellea is a Basidiomycete in the family Agaricaceae (the gilled fungi). The fruiting body is that of a typical toadstool. The young fruiting body is always umbrella shaped, but in older specimens the edges are often turned outwards. A distinct annulus (ring) is present on the stalk. The fruiting body is variable in colour ranging from orange-yellow to dark brown. The gills are yellowish and the spores are white.

Fruiting bodies are usually produced in clusters from the collars, roots and stems of diseased trees. They normally appear in autumn prior to the first frosts.

When the fungus is well established, it forms sheets of creamy white mycelium with dark streaks between the bark and the wood, especially on the lower trunk, collar and major roots. Eventually the wood is reduced to a stringy sodden mass which is normally white in hardwoods and brown in conifers. The fungus can cause heart rot as well as root and collar rots.

A. mellea is also known to produce black boot-lace like strands (rhizomorphs) which grow either through the soil or between the bark and wood. Rhizomorphs were not observed on the samples inspected.

The Disease.

The ability to infect healthy trees depends on the volume of food source (substrate) available. Group attack in forests is almost invariably associated with the presence of large infected stumps. It may attack any age class but trees less than ten years old are usually more susceptible. The attack is normally restricted to trees which have been weakened by other environmental factors, e.g. waterlogging or drought. Any treatment which will increase the vigour of attacked trees should enable these to cope with infection by A. mellea. The host range is very large and an abbreviated list is shown in the Appendix.

The pathogen is troublesome in exotic plantings of P. radiata in New Zealand. The overall loss is small but severe localised mortality can occur. After the age of ten years, P. radiata appears to become more resistant but may still suffer from butt rot and windthrow at a later age.

In Western Australia, severe loss of orchard trees, particularly apples and citrus, have occurred. In one case the loss of 100 apple trees in a season has been reported.

Methods of Control.

(1) Salvage of merchantable timber.

(2) All unmerchantable timber should be pushed and an attempt made to remove the stumps and at least some of the major roots. These should be windrowed and burnt.

(3) All stumps which are too large could be split with dynamite and then excavated. An alternative is to poison these with sodium arsenite, 2-4-5 T or tordon so as to speed up their colonisation by saprophytic fungi and their eventual decay.

(4) A ditch should be dug around the affected area to a depth of $2\frac{1}{2}$ to 3 feet.

(5) The affected area should not be replanted for a considerable time (probably not less than ten years).

(6) A five chain strip around the affected area should not be logged for at least 5 to 10 years. If logging of the surround is essential, all cut stumps and damaged boles and roots should be painted with creosote to inhibit the germination

of the pathogen's air borne spores.

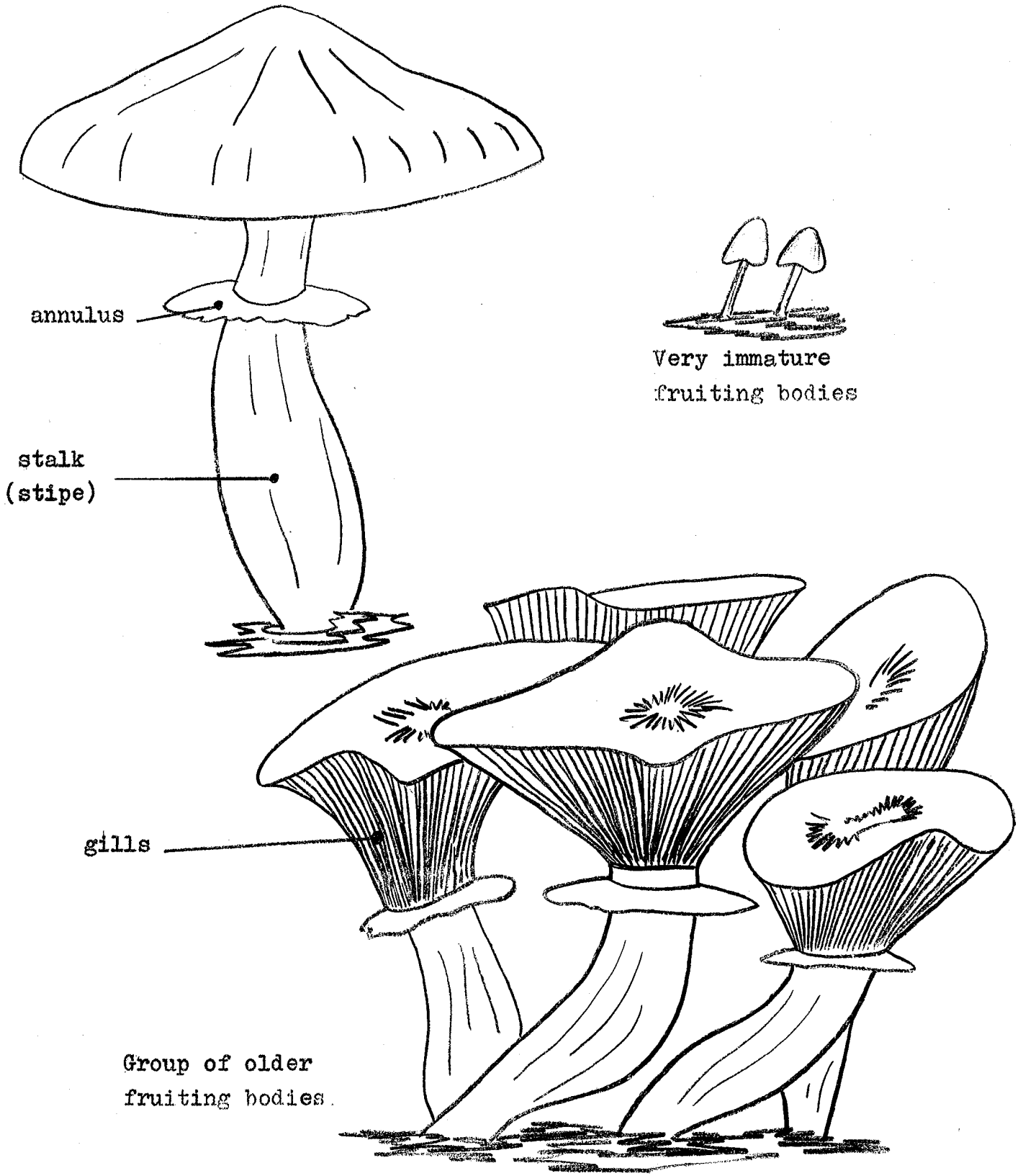
Conclusion.

It is considered unlikely that A. mellea will become a major cause of tree diseases in West Australian forests. However this pathogen could cause severe damage in localised areas. When unexplained deaths in conifers or hardwoods are observed, a search for mycelial mats and fruiting bodies of A. mellea is warranted.

Hosts of Armillaria mellea.

Acacia melanoxylon
Acacia decurrens
Acacia pycnantha
Araucaria cunninghamii
Callitris species
Cupressus macrocarpa
Cupressus lusitanica
Eucalyptus calophylla
Eucalyptus citriodora
Eucalyptus globulus
Eucalyptus delegatensis
Hevea brazilliensis
Larix decidua
Larix leptolepsis
Pinus contorta
Pinus caribaea
Pinus elliottii
Pinus halepensis
Pinus jeffreyi
Pinus muricata
Pinus patula
Pinus pinaster
Pinus ponderosa
Pinus radiata
Pinus taeda
Populus species
Quercus species
Salix species

FRUITING BODIES OF A. mellea



Very immature fruiting bodies

Group of older fruiting bodies