Access Id. No.:
Date:

Phytophthora cinnamomi (P.c.)

REPORT

MELALEUCA PARK

INTERPRETER: M Reynolds

REPORT AUTHOR AND DATE: M Reynolds 6 June, 2000

MAP FILE NAME AND/OR IDENTIFICATION NUMBER:

Total area interpreted (ha)	3 227
DRA - Yes / No	No
Method of interpretation 230 mm film/Stripline/Recheck/ Road Alignment/Other (specify)	Probability survey
Scale of film: Date of photography	
Major tree species (eg. JMK)	Banksia
Map Scale:	1:20 000
Commencement date	30 March 2000
Completion date	29 May 2000
Products	*Phytophthora cinnamomi* Hygiene Management Map

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DATE: _____

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1 INTRODUCTION

Melaleuca Park has been interpreted for disease caused by the root rotting pathogen *Phytophthora cinnamomi* using the probability survey method. Areas at risk of vectored inoculum spread such as roads, tracks, easements and trails were assessed for secondary symptoms of infestation. Areas with a high probability of inoculum survival such as creeks, wetlands and drainage features were also assessed.

Assessment began on 30 March 2000 and was completed on 29 May 2000 by Fieldview Nominees Pty Ltd trading as Fungus Doctors. All fieldwork and reporting was completed by CALM accredited disease assessor M Reynolds. Disease information was plotted on a 1:20 000 map during field assessment and digitised by CALM Forest Management Branch (Como).

1.1 LOCATION

Melaleuca Park is approximately 11 km north east of the Wanneroo CALM office. The cell boundary is mapped on the attached *P. cinnamomi* Hygiene Management Map (Appendix I). The park is not within a Disease Risk Area.

1.2 BACKGROUND INFORMATION

1.2.1 Previous interpretation

Melaleuca Park has had some prior assessment. A segment of the south east corner of the park was assessed by Hart, Simpson and Associates Pty Ltd in 1996. The results and map of the survey are presented in the unpublished report "Water and Rivers Commission. Lexia Area. Dieback" (Hart, Simpson & Associates, 1996). The remaining area has had no prior assessment.

1.2.2 Land use

The designated land use for Melaleuca Park is conservation and recreation.

1.2.3 Harvesting history

There has been no logging activity within Melaleuca Park.

1.2.4 Burning history

There is a mosaic of fuel ages and fire intensities. The most recent burning was a 1999 prescribed burn adjacent to Neaves Road.

1.2.5 Rainfall zone

Melaleuca Park receives an average rainfall of 820 mm per annum.

1.2.6 Landforms and vegetation types

Melaleuca Park is predominantly undulating sandy rises (Bassendean dunes system) with occasional wetlands in swales. Dry land vegetation on sandy rises occupies approximately 98% of the park and consists predominantly of a low *Banksia attenuata, Banksia menziesii* woodland with occasional *Banksia ilicifolia* and *Nuytsia floribunda* over a shrub layer of *Hibbertia spp.* and *Patersonia spp.*

The wetland vegetation varies and appears dependent on the size and water gaining potential of the site. Smaller wetlands vegetation consists of a Melaleuca shrubland (Tea Tree) over sedges. Larger wetlands have an overstorey component of *Melaleuca rhaphiophylla* (Paperbark) and *Eucalyptus rudis* over a shrubland of Tea Tree and sedges.

2 MATERIALS AND METHODS

The probability survey method has only recently been developed and is currently in draft form only. The draft indicates that areas to the east of the 900 mm isohyet (less than 900 mm annual rainfall) can be surveyed by assessing potential inoculum vectors such as roads and tracks, and water gaining sites where there is a higher potential for inoculum survival such as creeks and wetlands.

Melaleuca Park receives an average annual rainfall of 820 mm and was considered suitable for a probability survey by the CALM Disease Standards Officer. The method of survey was the assessment of all roads, tracks, easements and firebreaks from a slow moving vehicle for secondary symptoms of infestation. Areas that could not be surveyed from a vehicle were accessed on foot. This included wetlands, creeks, drains, trails and rehabilitated firebreaks.

3. RESULTS

3.1 DISEASE DISTRIBUTION

The disease distribution mapped by Hart, Simpson and Associates Pty Ltd in 1996 in the south east corner of the park varies slightly from this survey. The differences are attributed to different mapping techniques and two infestations not being detected in 1996.

The infestations detected within the survey area are mapped in appendix I. There is a large infestation in the south east corner of the survey area in a Melaleuca wetland. There are numerous smaller infestations within a one kilometre radius of the large infestation. Evidence suggests that some of these smaller infestations were vectored from the large infestation.

There are 14 isolated infestations in the remainder of the park. Ten of the infestations are adjacent to potential inoculum vectors such as tracks or gas pipeline easements. The remaining four infestations are not associated with a detectable inoculum vector.

3.2 DISEASE SYMPTOMS

3.2.1 Disease expression

All detected infestations in Banksia woodland were displaying extremely high impact in the Banksia overstorey and moderate to very high impact in the understorey. Chronological disease pattern development as a result of autonomous disease spread was consistent and readily recognisable. Infestations in Melaleuca wetlands were displaying negligible impact in the wetland vegetation, but extremely high impact in the fringing Banksia woodland.

Susceptible species that readily and consistently displayed secondary symptoms of infection were *B. attenuata, B. menziesii,* and *B. ilicifolia.* Susceptible species that had a varied response to infection and were considered not particularly reliable were *A. cygnorum, Leucopogon spp., Patersonia spp.* and *Xanthorrhoea preissii.*

3.2.2 Other Phytophthora species

There were no Phytophthora species detected other than *P. cinnamomi.* As all infestations were not sampled, it is possible that other species may be present as either primary or secondary pathogens.

3.2.3 Drought and fire damage

There is a mosaic of fuel ages and fire intensities within the park. Fire damage was evident from moderate to high intensity fires, particularly within and

adjacent to some wetlands. The prescribed burn south of Neaves Road in 1999 was low intensity, with the average scorch hight below two metres. No areas were uninterpretable do to fire damage.

No deaths of reliable susceptible species were attributed to drought.

3.2.4 Armillaria

There were no conclusive observations of *Armillaria luteobubalina.* At sample sites two, four, five and six, there was some evidence of mycelium that could not be conclusively identified as *A. luteobubalina.* Samples two, five and six returned a positive result for *P. cinnamomi* and it is possible that there may have been a secondary infestation of *A. luteobubalina.*

3.2.5 Expression anomalies

Disease expression was constant within vegetation associations.

There were many incidences of lighting strike that had resulted in individual or groups of Banksias being killed. The relatively high incidence of recent lightning strike suggests that some of the scattered Banksia stags (older deaths) may also be attributed to lightning strike in the past.

3.3 ALLOCATION OF CATEGORIES

3.3.1 Area statement

AREA STATEMENT		
Categories	Area (ha)	Notes
UNINFESTED	3 113	
UNINTERPRETABLE	0	
INFESTED	114	
UNPROTECTABLE	N/A	

3.3.2 Uninterpretable

The entire survey area was assessable for disease, with no segments of uninterpretable.

3.3.3 Areas burnt or logged

The vegetation within Melaleuca Park is in good to pristine condition and has had very little disturbance. The exception to this is roads and tracks, powerline easements and gas pipeline easements.

3.3.4 Protectable and unprotectable

No assessment was made for protectable/unprotectable, with the map displaying disease distribution only.

3.4 ROADS AND TRACKS

Neaves Road is the only sealed road in the park. Seismic Road between Neaves Road and the wetland two kilometres to the north is limestone road base. Wise Road is a formed gravel road. The remaining roads, tracks and easements are cleared sandy tracks with no imported road building materials. All open roads and tracks appear to have regular use.

3.5 SAMPLE RESULTS

Six soil/tissue samples were taken within Melaleuca Park and are summarised in Appendix II. At the time of assessment, an adjacent area was assessed (Lexia Project Area) with nine samples being taken. The results of all fifteen samples were taken into account when analysing modes of inoculum vectoring.

4. DISCUSSION

4.1 INOCULUM VECTORING

The size, shape and location of infestations indicates that there has been no viable vectoring of inoculum along roads and tracks for the past 20 years. It is probable that the infestations were initiated during road/track construction many decades ago. This is supported by negative sample recoveries from isolated roadside deaths. Isolated infestations with no visible vectors may have been initiated during fire control.

As there is considerable use of the roads and tracks by vehicles with no hygiene constraints and the potential for soil movement, it would be expected that new infestations would develop. The reasons for the lack of new infestations may be due to low inoculum levels in infested soil, the type of inoculum present, low volume of infested soil moved, no survival of vectored inoculum, or a combination of several of these factors.

4.2 LIMITATIONS OF THE SURVEY

The survey was restricted to areas of high risk of infestation and areas with a high probability of inoculum survival. Some isolated infestation were detected 150 metres from the surveyed transects through observation of secondary symptoms. In some of the thicker vegetation, infestations as close as 50 metres could have gone undetected. It is probable that there are undetected infestations remote from survey transects.

4.3 AUTONOMOUS DISEASE SPREAD

Disease will spread autonomously from existing infestations to adjacent vegetation at a rate of approximate one metre per year. The buffer between the disease front and the demarcation boundary (demarcated on roads, tracks only) will be eroded with time. The mapped disease boundaries will also become inaccurate with time.

5 RECOMMENDATIONS

Vehicle access should be considered as low risk of viable inoculum vectoring.

Activities with demonstrated risk such as road construction and maintenance, firebreak construction and maintenance and other activities with the potential to move significant volumes of infested soil should be conducted with hygiene control.

Areas more than 50 metres from a survey transect should be assessed for disease prior to activities with a demonstrated risk (ie road construction). In the case of wild fire control, all vehicle and plant should be clean prior to entry into uninfested native vegetation.

The buffer between infestations and the roadside demarcation should be checked before operations proceed after May 2005. As there is limited field demarcation (road/infestation intersections only), it will be necessary to install demarcation prior to activities crossing infested/uninfested boundaries (if remote from existing roads)

6 REFERENCES

CALM. (1994) Dieback Interpretation Procedures Manual. Internal document, Department of Conservation and Land Management, Bunbury.

CALM. (1999) Phytophthora cinnamomi and disease caused by it . Volume 1, Department of Conservation and Land Management, Dwellingup.

Hart, Simpson & Associates (1996) Water and Rivers Commission. Lexia area. Dieback. Unpublished document. Water and Rivers Commission, Victoria Park, Western Australia.

_____ DATE: _____

Matthew Reynolds. Director Fieldview Nominees Pty Ltd

Signed by Forest Officer Receiving: _____

Date: _____

APPENDIX II

SAMPLE SUMMARY

Plant Species	No. of samples	No. of *Pc* positive	*Pc* %	ISD *Pc* positive M	C	S	I	ISD *Pc* negative M	C	S	I	ISD *P spp* positive M	C	S	I
Banksia attenuata	6	3	50	3				1	1	1					
Banksia Other spp															
Xanthorrhoea gracilis															
Xanthorrhoea preissii															
Patersonia Spp															
Podocarpus drouyniana															
Persoonia longifolia															
Macrozamia riedlii															
Leucopogon Capitellatus															
Soil only															
TOTALS	6	3		3				1	1	1					

INDICATOR SPECIES DEATH (ISD)

M = Multiple

C = Cluster

S = Scattered

I = Isolated