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RESEARCH NOTE No. 15

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RELATIONSHIP OF
VESSEL DIAMETER TO
LYCTUS SUSCEPTIBILITY
IN SOME
NEW SOUTH WALES
HARDWOODS

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SUMMARY

Measurements have been made of the mean, range and standard deviation of the vessel diameters of timbers listed by the Division of Wood Technology as resistant to the *Lyctus* borer.

A considerable proportion of the timbers listed as resistant have a mean vessel diameter greater than 90 microns and it is suggested that their resistance to *Lyctus* is due to a low concentration of starch in the sapwood.

The standard deviation has been found to increase with increasing mean vessel diameter.

INTRODUCTION

In New South Wales one of the most common timber pests is *Lyctus brunneus* Steph. This borer attacks the sapwood of seasoned hardwoods and under favourable conditions can cause the complete degrade of this region.

Female *Lyctus* beetles lay their eggs in the vessels of timber and the larvae which develop from the eggs feed and work in the sapwood. Mature larvae pass through a pupal stage before the adults emerge and bore tunnels to the exterior.

Campbell (1925) showed that lyctid larvae cannot digest the constituents of the cell wall and Wilson (1933), extending the work of Mer (1893 and 1903), showed that starch is the principal component of their food. The degree of *Lyctus* attack can therefore be related to the starch concentration. Due to natural variations which can occur in the starch content (Bamber and Humphreys 1961) it is possible for the level to fall to a concentration which cannot support *Lyctus* infestation. Humphreys (1964) suggests that this threshold level for starch in *Eucalyptus maculata* is approximately 1 per cent of the oven dried weight of the wood.

Clark (1928) indicated that *Lyctus* susceptibility may be determined by the vessel diameter. Where this is less than the size of the egg then attack could not occur. Later, Parkin (1934) modified the work of Clark and showed that even though the starch levels may be high enough to support *Lyctus* infestation, susceptibility was determined by the relationship between the vessel diameter and the diameter of the insect's ovipositor.

It was shown by Cummins and Wilson (1936 and 1939) that the sapwood of *Lyctus* susceptible species could be impregnated satisfactorily with chemicals which would prevent attack and further that this was a sound economic practice.

It is interesting to note that starch resorption induced by high ringing (see Brimblecombe 1945) which was shown to be fairly effective was not taken past the experimental stage as its costs and reliability compared unfavourably with immunization by chemicals.

In view of the prevalence of *Lyctus* attack and the availability of sound economic techniques for the immunization of sapwood the New South Wales Timber Marketing Act (1945-52) was passed in New South Wales. This Act restricts the use and the sale of *Lyctus* susceptible timber unless it is treated with an approved preservative.

As a guide to the timber industry, lists of timbers of known susceptibility to *Lyctus* have been prepared by the Division of Wood Technology and in this list timbers are rated as S (susceptible), R (resistant), and I (immune). Those timbers rated as S must have their sapwood immunized by an approved preservative treatment before use in any manufactured article where *Lyctus* attack would be detrimental to the use or service reasonably expected from the article. The timbers rated as R are usually not immunized because their sapwood is rarely attacked. The treatment of the timbers rated as I is not required.

As these ratings have been given solely on the basis of known incidence of attack it is not clear in many cases whether resistance is due to vessel

diameter being less than the 90 microns (1 micron = 0.001 mm) suggested by Cummins and Wilson (1934) or because the starch levels are insufficient to support *Lyctus* infestation. Information on both of these characteristics is lacking for most species. This investigation has been undertaken to obtain further knowledge on the first of these two points so as to obtain a better understanding of the relative susceptibilities.

MATERIALS AND METHODS

The species selected for examination were mainly those rated by the Division of Wood Technology (1961) as resistant to *Lyctus* attack. A few species about which some doubt is held were included.

The timbers were not specially sectioned for the study since prepared sections of all the species were available in the slide collection of the Division. Measurements were made of the tangential diameter of the vessels on the projected image of the section using a calibrated screen. A total of 75 vessels were measured on each section and the individual measurement for each vessel recorded. From these measurements the mean diameter and the standard deviation were calculated.

RESULTS AND DISCUSSION

The mean, range and standard deviation for the vessel diameters of the material examined are given in Table 1, which also includes the *Lyctus* susceptibility ratings given by the Division of Wood Technology, the Division of Forest Products (1961) and where applicable the Queensland Timber Users' Protection Act (1949).

It is quite evident from these results that many of the species showing resistance to *Lyctus* attack have mean vessel diameters greater than the figure of 90 microns suggested by Cummins and Wilson (1934). A number of these resistant species with vessel diameters larger than 90 microns are known to have very low starch contents for example, *Eucalyptus delegatensis*, *E. capitellata*, and *Flindersia brayleyana*. It is likely that the resistance of species with vessel size larger than 90 microns is due to low starch content but unfortunately information on this aspect is not available for all the species under consideration. The possibility that resistance is related to the presence of unpalatable chemicals in the timber cannot be overlooked but as far as the authors are aware this has yet to be demonstrated.

From the data presented in Table 1 it can be seen that the mean diameter gives a poor indication of the range of vessel sizes represented in a sampling. In an average sample having a mean vessel diameter of 70 microns about 8 per cent of the vessels could be expected to be equal to or larger than 90 microns.

From Table 1 it can be seen that species with larger mean vessel diameters have a much larger range of diameters than those with smaller mean vessel diameters and also that considerable overlap in their size range occurs.

The differences in size classes of vessels between timbers with larger and smaller vessels is shown in respect to the standard deviations which increase from 10 for a mean vessel diameter of 40 microns to 30 for a

mean vessel diameter of 150 microns. The relationship between mean vessel diameter and the standard deviation is shown in Figure 1.

The relationship between vessel diameter and standard deviation appears to be due to the way in which vessels are formed. Vessels originate from cambial mother cells which are of much the same size both within species and between species, all axially oriented cells being produced by similar cambial cells. The differences in size between vessels and other cells and between vessels of different species are due to different degrees of enlargement so that the greater the enlargement the greater the size range.

CONCLUSIONS

The mean vessel diameters of the species examined ranged from 34 microns in the case of *Eremophila mitchelli* to 209 microns in *Eucalyptus marginata*.

Approximately 55 per cent of the species listed by the Division of Wood Technology as resistant to the *Lyctus* borer had a mean vessel diameter larger than 90 microns. Resistance of these species is considered to be due to a low starch content in the sapwood.

The standard deviation increases with increasing mean vessel diameter.

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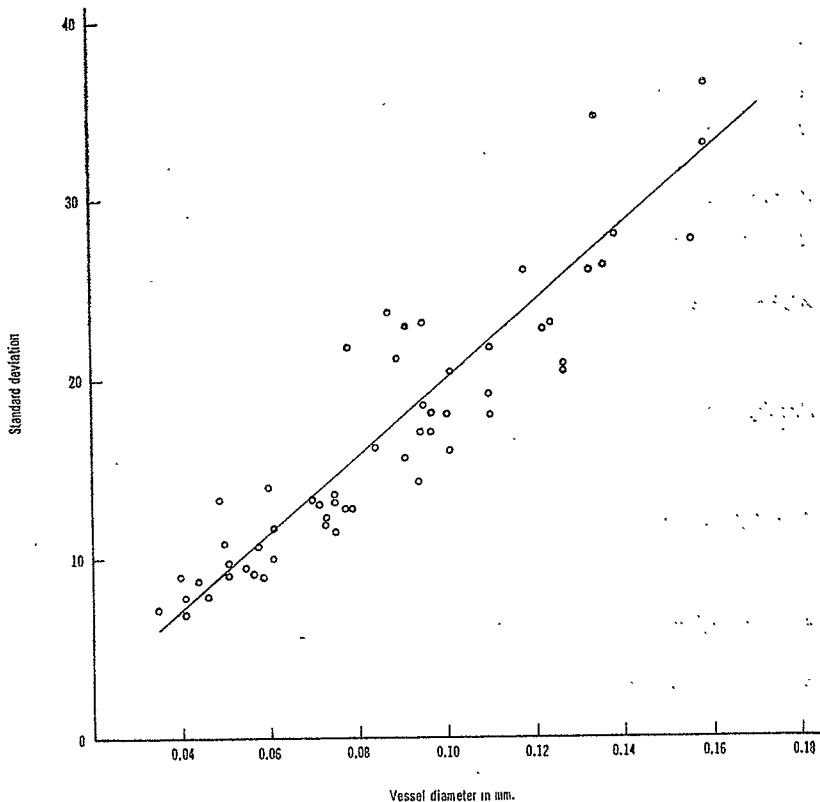


FIGURE 1. RELATIONSHIP OF MEAN VESSEL DIAMETER AND STANDARD DEVIATION.

TABLE 1
VESSEL DIAMETER OF TIMBERS RATED AS SUSCEPTIBLE TO LYCTUS
BY THE DIVISION OF WOOD TECHNOLOGY

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>Acacia cambagei</i>	No number	R	..	46	8.0	30-60
	No number		..	63	15.3	30-120
<i>A. longifolia</i>	6384	R	..	78	21.6	30-120
	1268		..	136	25.4	70-200
<i>A. mollissima</i>	4476	R	..	87	23.9	40-140
	4475		..	79	15.3	50-120
<i>A. penninervis</i>	3562	R	..	101	16.5	60-160
	6403		..	101	20.6	50-160
	6402		..	107	12.9	70-140
<i>A. salicina</i>	3459	R	..	127	22.2	70-180
<i>Ackama australiensis</i>	7860	R	..	77	12.8	40-110
<i>A. muelleri</i>	1/25	R	..	70	13.2	40-100
	2912		..	64	9.4	40-90
<i>A. paniculata</i>	7688	S	..	59	9.0	40-80
<i>A. quadrivalvis</i>	2613	R	..	73	12.0	50-100
	2614		..	72	10.7	40-90
<i>Alphitonia excelsa</i>	D450	R	..	75	11.5	40-90
	3884		..	85	13.3	60-110
	2709		..	72	13.0	50-110
	D3642		..	80	10.6	60-100
<i>Anodopetalum biglandulosum.</i>	2569	R	..	41	7.1	20-70
	4005		..	41	6.9	30-60
	2568		..	37	7.8	20-60
	2566		..	39	9.0	20-60
<i>Atherosperma moschatum</i>	10555	R	..	35	7.2	20-50
	3746		..	41	10.8	20-60
	9793		..	41	6.9	30-60
	8361		..	36	7.8	20-60
<i>Avicennia officinalis</i>	7446	R	..	67	12.2	30-90
	3843		..	65	13.4	40-100
<i>Backhousia bancroftii</i>	4137	R	..	110	19.2	60-150
	11585		..	107	17.5	70-160
<i>B. myrtifolia</i>	7368	R	..	57	9.2	30-70
	3294		..	58	9.5	30-80
<i>Banksia integrifolia</i>	11445	R	..	49	13.2	20-70
	4425		..	58	15.6	20-90
	2371		..	61	17.4	20-100
	4424		..	61	16.2	30-110

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>B. serrata</i>	783	R	..	95	23.2	50-150
	4427		..	77	18.2	40-120
	1607		..	51	10.6	30-80
	4426		..	78	17.3	30-110
<i>B. verticillata</i>	3539	R	..	89	21.2	40-130
	3540		..	75	22.8	40-130
	3541		..	84	21.4	40-130
	3542		..	70	15.6	30-100
<i>Casuarina cambagei</i>	774	R	..	61	11.6	40-90
	6335		..	53	6.7	40-70
<i>C. luehmannii</i>	2285	R	..	75	13.3	50-110
<i>C. suberosa</i>	3282	R	..	50	10.9	20-80
	7528		..	108	16.8	60-150
	3280		..	49	11.8	30-80
	3279		..	45	11.5	20-70
<i>C. torulosa</i>	1603	R	..	97	17.0	60-130
	1531		..	93	16.4	50-140
	7531		..	103	19.3	40-140
<i>Ceratopetalum apetalum</i>	3136		..	82	18.5	40-140
	3673	R	LN †	55	9.6	40-80
	A184/5		..	54	10.1	20-80
<i>C. succirubrum</i>	4146	S	..	75	13.3	30-130
	3580		..	65	13.1	30-100
<i>C. virchowii</i>	4693		..	58	10.7	10-90
	4691		..	51	8.4	30-70
<i>Choricarpia leptopetala</i>	3/33		..	51	9.8	30-70
	3346		..	62	13.7	30-100
	7363		..	48	9.6	30-70
<i>C. subargentea</i>	D92-84A		..	44	8.8	30-70
	D92-84B		..	42	9.8	20-60
<i>Citronella moorei</i> *	7683S	R	..	71	13.0	40-90
	3227		..	72	8.1	50-90
	3093		..	69	12.2	40-90
<i>Cryptocarya glaucescens</i>	3305	R	..	77	12.8	50-110
	3891		..	63	12.5	40-100
	4478		..	62	12.0	30-100
	3311		..	74	15.7	30-110
<i>Daphnandra aromatica</i>	11,053	R	..	59	10.4	30-90
	7856		..	64	11.0	40-100
	7/25		..	69	13.5	40-100

* Rated as susceptible by the Queensland Forest Service

† Commercially non-susceptible

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>D. micrantha</i>	7449	R	..	51	8.2	30-70
	3081		..	47	9.1	30-70
	6352		..	57	10.7	30-90
	6351		..	48	11.0	20-70
<i>Doryphora sassafras</i>	3520	R	LN	61	10.1	30-80
	3681		..	59	11.8	30-80
	3538		..	61	8.7	40-90
	604/24-9/26		..	61	11.6	30-90
<i>Elaeocarpus coorangooloo</i>	D2160-32	R	..	127	20.5	80-170
<i>E. holopetalus</i>	A	R	..	40	9.0	20-60
	2408		..	56	11.3	30-90
	B		..	41	8.4	20-60
<i>E. obovatus</i> *	10,525	R	..	92	15.6	40-120
	7168		..	92	15.6	50-130
	A3		..	61	10.7	40-100
<i>Endiandra compressa</i>	3065	R	..	60	14.1	30-100
	3962		..	60	14.8	30-90
<i>E. discolor</i>	3898	S	..	97	18.1	50-140
	3296		..	92	15.7	40-120
<i>E. palmerstonii</i> *	4129	R	..	136	26.6	70-200
	3571		..	114	18.5	70-170
	2680		..	114	19.8	50-160
	3574		..	117	17.6	80-160
<i>E. sieberi</i>	6331	S	..	106	20.3	60-150
	7460		..	112	18.0	70-170
	3896		..	125	21.1	60-190
	D4438-1/35-1		..	100	13.3	70-130
<i>E. virens</i> *	2529-1	R	..	101	18.1	50-140
	32		..	99	18.6	50-140
	2529-2		..	99	18.6	50-140
	32		..	99	18.6	50-140
<i>Eremophila mitchelli</i>	D6652A	R	..	34	8.3	20-50
<i>Eucalyptus accedens</i>	1405	R	..	98	19.8	60-140
	1410		..	84	18.7	50-120
	1409		..	84	17.7	40-120
	1411		..	89	17.3	50-130
<i>E. acmenioides</i>	706	R	..	92	20.7	50-130
	1564		..	98	21.6	50-150
	1041		..	105	25.3	40-170
	1760		..	139	30.2	70-200
<i>E. agglomerata</i>	R899/1-1	R	..	118	20.4	70-160
	R899/1-2		..	118	22.0	60-180

* Rated as susceptible by the Queensland Forest Service

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>E. albens</i>	3751	R	..	84	18.3	50-120
	2200		..	83	13.1	50-110
<i>E. astringens</i>	3484	R	..	84	13.7	50-110
	3479		..	81	14.6	40-110
	1922		..	143	33.5	70-220
<i>E. botryoides</i>	3771	R	..	159	36.5	80-230
<i>E. calophylla</i>	237	R	..	134	34.7	70-230
	1818		..	182	43.9	70-240
	1822		..	158	35.4	80-230
	3041		..	191	43.1	90-251
<i>E. campaspe</i>	R403-2A	R	..	41	7.9	20-60
	R403-2B		..	38	8.0	20-60
	2068		..	38	10.7	20-70
<i>E. camphora</i>	6110	R	..	133	26.0	60-190
<i>E. capitellata</i>	600	R	..	121	22.7	60-170
	2357		..	100	18.4	50-130
	1549		..	105	18.9	60-150
	3811		..	131	23.9	60-180
<i>E. cloeziana</i>	1157	R	LN	118	26.0	70-190
<i>E. considentana</i>	3701	R	..	124	23.2	50-180
	2393		..	111	25.0	60-150
	252		..	143	13.2	70-200
<i>E. coolabah</i>	1890	R	..	84	15.3	50-110
<i>E. coriacea</i>	6107	R	..	110	21.7	60-170
	5079		..	106	23.9	50-160
<i>E. cornuta</i>	1807	R	..	94	14.3	60-130
	1808		..	90	17.7	50-140
	2044		..	91	15.9	60-120
	2048		..	94	17.4	50-140
<i>E. crebra</i>	1267	R		91	23.0	50-150
	1142		..	97	21.2	50-160
	1898		..	107	21.9	50-150
	D7070-9/25		..	94	16.6	50-140
<i>E. dawsoni</i>	9/17	R	..	95	18.5	60-130
<i>E. decorticans</i>	3-26	R		94	17.1	50-130
<i>E. delegatensis</i>	10/29	R	LN	149	33.4	50-200
	D9422-2/26		..	136	24.2	70-190
	1150		..	157	27.8	90-210
	3818		..	157	37.2	90-230
	8784		..	132	26.4	60-200
	3717		..	125	26.8	60-170

* Rated as susceptible by the Queensland Forest Service

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>E. diversicolor</i>	878	R	LN	129	28.1	60-180
	919		..	132	17.7	80-170
	887		..	172	31.6	90-250
	10980		..	163	33.5	70-230
<i>E. dwyeri</i>	11,569	R	..	65	13.3	40-100
<i>E. eugenoides</i>	2297	R	LN	111	18.1	50-140
	3754		..	122	23.1	60-170
	1536		..	110	17.9	50-140
<i>E. grandis</i>	7941	R	LN	148	22.8	90-200
	D10,064/98-3		..	117	20.2	70-160
	1050		..	110	21.6	60-150
	1776		..	118	19.7	50-150
<i>E. haemastoma</i>	1650	R	..	104	19.5	50-140
<i>E. haematoxylon</i>	1824	R	..	148	32.5	80-230
	235		..	139	32.4	70-210
	1830		..	139	31.6	80-230
<i>E. hemiphloia</i>	3726	R	..	111	20.2	70-150
	6327		..	113	17.7	60-160
	2174		..	95	14.7	60-130
	2175		..	81	11.9	50-110
<i>E. jacksonii</i>	D9958(9)3	R	..	157	42.4	60-230
	4078A		..	159	37.0	70-230
	4080		..	169	31.6	80-240
	4078B		..	183	32.9	100-230
<i>E. longicornis</i>	2056	R	..	105	17.8	60-150
	2057		..	97	19.0	60-150
	2061		..	102	16.5	60-140
	2062		..	120	22.5	70-180
<i>E. maculosa</i>	2263	R	..	108	22.4	60-150
	2264		..	118	22.1	70-160
	2444		..	104	23.3	50-160
	6322		..	107	18.3	60-140
<i>E. marginata</i>	866	R	LN	209	48.8	90-300
	1810		..	121	22.7	70-170
	920		..	165	30.6	90-220
<i>E. melliodora</i>	2166	R	..	90	20.6	40-130
	281		..	139	22.2	80-190
	3778		..	111	19.9	60-150
	3/16		..	95	23.1	50-140
<i>E. micrantha</i>	117A	R	..	145	31.9	50-200
	117B		..	144	32.0	60-220
	2300		..	131	29.2	80-210
	No number		..	105	13.5	70-130

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>E. microtheca</i>	3/16	R	..	85	15.1	50-120
<i>E. muelleriana</i>	2154	R	LN	131	24.0	80-190
	2370		..	138	31.5	70-200
	3757		..	137	24.4	90-190
<i>E. Oreades</i>	D9728 3/26	R	..	131	36.1	50-200
	2335		..	125	20.9	80-170
	D6484		..	138	30.9	60-190
	2336		..	118	24.3	40-170
<i>E. paniculata</i>	D7646A	R	..	95	19.1	50-140
	D7646B		..	94	16.0	60-120
<i>E. pilularis</i>	1456	R	LN	113	38.5	40-210
	1767		..	167	36.1	70-230
	1773		..	159	36.6	80-230
	2303		..	127	23.8	50-170
<i>E. piperita</i>	11,787	R	..	103	18.3	60-150
	3/16		..	132	34.1	50-190
	2386		..	109	22.7	60-150
	2387		..	143	31.2	50-200
<i>E. planchoniana</i>	7322	R	..	115	23.2	60-170
	8806		..	136	30.1	50-220
<i>E. propinqua</i>	D7637A	R	..	99	16.3	60-130
	144		..	118	24.6	60-170
	D7637B		..	102	18.3	60-150
<i>E. punctata</i>	D5503 9/25	R		115	23.3	50-170
<i>E. quadrangulata</i>	R389/1A	R	..	148	35.8	60-220
	R389/1B		..	134	30.4	80-200
<i>E. redunca</i>	1400	R	..	93	16.8	50-130
	499		..	100	15.7	50-130
	1391		..	84	10.7	60-110
	1393		..	90	14.3	60-120
<i>E. regnans</i>	1109	R	LN	119	18.2	50-150
	D7244		..	167	29.5	100-230
	2136		..	182	31.0	90-230
	3712		..	149	30.5	50-200
<i>E. saligna</i>	1599-2	S	LS ‡	105	22.9	60-150
	1723		..	147	34.0	50-200
	1757		..	148	44.2	60-250
	1481		..	117	24.3	50-170
<i>E. salmonophloia</i>	9990	R	..	88	20.1	40-130

‡ Susceptible to attack

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>E. salubris</i>	1514	R	..	50	9.8	20-70
	1424		..	54	10.3	30-80
<i>E. seeana</i>	1167	R	..	138	21.0	70-180
<i>E. siderophloia</i>	D18484	R	..	136	29.1	60-190
	D8524 9/25		..	105	19.8	50-150
<i>E. thozetiana</i>	7136	R	..	57	10.5	30-90
<i>Eucryphia billardieri</i> (<i>syn. lucida</i>)	2767	R	..	40	6.7	30-60
	6243		..	40	8.0	20-60
	6236		..	37	6.9	20-50
	A		..	39	7.2	20-60
<i>Eugenia francisii</i> *	3017	R	..	71	14.9	30-110
	R382-10		..	74	11.0	50-110
<i>E. smithii</i> *	284-42	R	..	75	14.5	50-110
<i>Evodia accedens</i>	7173	R	..	75	19.5	60-160
	D2542		..	119	20.8	70-170
<i>Evodia micrococca</i>	D4153	R	..	82	13.2	50-110
	A		..	65	13.0	40-100
<i>Exocarpus cupressiformis</i>	4214	R	..	41	10.5	20-70
	11629		..	62	11.8	30-90
	12.1.40		..	56	11.4	30-80
	3286		..	56	12.7	30-90
<i>Flindersia brayleyana</i>	4156	R	LN	146	26.1	60-200
	12,726		..	158	35.3	60-220
	15.5.30		..	158	34.5	70-230
	R286-4		..	123	18.4	80-160
<i>F. laevicarpa</i>	A	R	..	108	21.9	50-150
	11,039		..	113	21.7	60-160
	4656		..	103	19.8	50-160
	4189		..	98	20.6	50-170
<i>F. pimenteliana</i>	4127	R	..	138	27.3	50-190
	4149		..	151	29.0	90-220
	11610		..	121	29.3	50-200
	4151		..	130	20.6	90-170
<i>Geissois benthami</i> *	3211	R	..	78	14.3	50-110
	2967		..	83	15.0	50-130
	D7734		..	86	17.4	50-140
	3194		..	69	10.9	50-110
<i>G. biajtana</i> *	3845		..	98	19.8	40-150
	2973		..	80	14.4	40-110
	11,380		..	109	24.1	60-160
	11,437		..	115	20.6	70-160
	10,259		..	131	28.9	80-220
	11,384		..	101	12.8	70-130

* Rated as susceptible by the Queensland Forest Service

TABLE 1—continued

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>Glochidion ferdinandi</i>	3274	R	..	87	20.2	50-140
<i>Gmelina fasciculiflora</i>	11397	R	..	139	27.0	70-220
<i>G. leichhardtii</i>	7987	R	..	130	26.9	70-200
	D10,151/56B		..	125	32.3	50-220
	D,10,151/56A		..	128	27.6	60-190
	7652A		..	118	21.6	60-160
<i>G. macrophylla</i>	3051	R	..	142	26.0	90-200
	7441		..	141	24.5	70-200
<i>Harpullia pendula</i>	3085	R	..	74	12.4	40-100
	10431		..	63	10.5	40-90
	D10151-27		..	63	9.6	40-90
	D39853/26		..	70	11.9	40-900
<i>Hemicyclia australasica</i> *	D10151-51	R	..	38	9.7	20-80
	3105-37		..	40	7.3	30-60
	7671		..	44	9.2	20-60
	11090		..	49	12.4	30-80
<i>Melaleuca genistifolia</i>	7317	R	..	69	16.0	30-100
<i>M. quinquenervia</i>	6721	R	..	102	25.6	40-150
	6492		..	53	9.9	30-70
	10231		..	91	20.2	40-130
	6504		..	110	21.7	50-150
<i>M. linariifolia</i>	2639	R	..	57	14.3	30-90
<i>Myoporum serratum</i>	8106	R	..	47	10.8	20-70
<i>Olearia argophylla</i>	6115	R	..	39	8.2	20-60
	2000		..	42	8.4	20-60
<i>Orites excelsa</i>	3155	R	..	89	19.8	50-140
	4444		..	85	17.0	50-130
	4445		..	97	19.7	50-150
	3356		..	78	16.2	40-120
<i>Owenia venosa</i>	3443	R	..	98	23.1	50-150
	A		..	121	24.9	60-190
	11,375		..	92	18.0	40-130
	11,479		..	98	15.3	70-130
<i>Phebalium squameum</i>	2018	R	..	39	9.1	20-70
<i>Rhodamnia trinervia</i>	3267	R	..	87	17.3	50-120
	No number		..	89	17.5	40-130
<i>Schizomeria ovata</i>	3537	S	LS	78	13.1	50-110
	2964		..	63	11.7	40-90
	1907		..	68	15.3	40-110
	2969		..	67	13.4	40-100

* Rated as susceptible by the Queensland Forest Service

TABLE 1—*continued*

Species	Slide No.	Lyctus susceptibility rating		Vessel diameter in microns		
		DWT	CSIRO	Mean	S.D.	Range
<i>Syncarpia glomulifera</i>	3465		..	83	16.0	50-120
	8/16		..	67	14.6	30-100
	4343		..	91	17.6	50-130
	3466		..	90	14.0	50-120
<i>S. hillii</i>	7364	R	LN	100	18.5	60-150
	11/29		..	98	18.7	50-140
	10/29		..	102	18.3	50-160
	3490		..	87	17.8	50-120
<i>Tristania conferta</i>	4369	R	LN	94	22.5	50-140
	3560		..	93	15.8	50-130
	11,002		..	90	16.2	40-130
	3511		..	99	19.5	50-150
<i>T. laurina</i>	D4455	R	..	57	11.5	30-90
	936		..	61	11.8	30-90
	3776		..	45	8.7	20-60
<i>T. suaveolens</i>	No number	R	..	83	23.8	30-130
<i>Vitex lignum-vitae</i>	D10151-19A	R	..	46	10.2	30-70
	D10151-19B		..	46	9.2	20-60
<i>Xanthostemon chrysanthus</i>	286-28A	R	..	117	27.3	60-180
	286-28B		..	118	29.2	50-180
<i>X. pachyspermus</i>	7366	R	..	75	15.3	40-110
<i>X. pubescens</i>	10,467	R	..	107	25.3	50-160

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