Foster City Tree Inventory 2000

City of Foster City
Estero Municipal
Improvement District

FOREWORD

Welcome to the City of Foster City Tree Inventory 2000. This Tree Inventory deals with the botanical identification of our trees, the number of trees we maintain, and the locations where they grow in the Foster City Parks system.

The urban forest of Foster City has grown quite well considering the shallow soil profile and constant winds our trees grow in.

The Foster City Parks Department hopes you will find this Tree Inventory useful in identifying the different trees in our urban forest as they continue to rise up towards maturity.

This report was submitted to Kevin Miller, Director of Parks and Recreation, by Rick Heffern, Parks Supervisor (I.S.A. Certified Arborist #WC1150), on April 7, 2000.

CITY OF FOSTER CITY TREE INVENTORY 2000

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HIGHLIGHTS OF TREE INVENTORY FOR 2000

1. There are many different type of trees planted in the public landscaped areas maintained by the Foster City Parks Department.

2. The Monterey Pine (Pinus radiata) is the tree planted most often in our urban forest.

3. The most serious pest affecting our trees at present is Redgum Psyllid that causes premature leaf drop on five varieties of Eucalyptus trees.

4. Overcrowding of Monterey Pines exists on Beach Park Blvd. and at Sea Cloud Park.

5. There is concern of pitch canker (fungus disease) infesting Monterey Pines in the future. Please see enclosed *Hort Scripts* for more detailed information.

6. It is estimated that it will take a two-person crew 897 days to prune and structure every tree maintained by the Foster City Parks Department.

7. Parks staff has evaluated the disease and recommended replacement species for approximately 50 trees per year on private property as a service to Foster City residents.

8. The largest tree taking up residence in Foster City makes its home on Shell Blvd at the northern corner of the Shell Cove Apartment complex.

   It is a Eucalyptus tree (Eucalyptus melliodora). It is currently 70 feet tall and 70 feet wide. The trunk has a circumference of 145 inches (12 feet). It is estimated to be around 30 years old.

9. The tallest tree in Foster City takes up residence at 1150 Chess Drive. It is a Cottonwood tree (Populus fremontii). It is approximately 95 feet tall.

FOSTER CITY TREE LIST IN ALPHABETICAL ORDER

BOTANICAL NAME	COMMON NAME	NO. OF TREES
Acacia baileyana	Bailey acacia	1
Acacia melanoxylon	Blackwood acacia	140
Acer macrophyllum	Big leaf maple	4
Acer palmatum	Japanese maple	1
Aesculus californica	California buckeye	3
Aesculus carnea	Red horse chestnut	8
Alnus cordata	Italian alder	174
Alnus rhombifolia	White alder	142
Arbutus 'Marina'		14
Brachychiton populneus	Bottle tree	3
Callistemon citrinus	Lemon bottlebrush	9
Callistemon viminalis	Weeping bottlebrush	5
Calocedrus decurrens	Incense cedar	1
Catalpa bignonioides	Indian bean	12
Cedrus atlantica 'Aurea'	Green atlas cedar	3
Cedrus atlantica 'Gluaca	Blue atlas cedar	1
Cedrus deodara	Deodar cedar	1
Celtis australis	European hackberry	40
Ceratonia siliqua	Carob tree	6
Chamaecyparis lawsoniana	Port orford cedar	7
Chitalpa tashkentensis	Chitalpa	26
Crataegus laevigata 'Double Red'	English hawthorn	36
Crataegus phaenopyrum	Washington thorn	21
Cupressocyparis leylandii	Leyland cypress	7
Cupressus macrocarpa	Monterey cypress	41
Cyathea cooperi	Australian tree fern	2
Eucalyptus camaldulensis	Red gum	83
Eucalyptus cladocaylx	Sugar gum	89
Eucalyptus globulus	Blue gum	1
Eucalyptus globulus 'Compacta'	Dwarf blue gum	19
Eucalyptus lehmannii	Bushy yate	66

Eucalyptus melliodora		8
Eucalyptus polyanthemos	Silver dollar gum	29
Eucalyptus sideroxylon	Red ironbark	50
Franinus oxycarpa 'Reywood'	Raywood ash	177
Fraxinus udhei	Shamel ash	20
Fraxinus velutina 'Modesto'	Modesto ash	2
Geijera parviflora	Australian willow	6
Ginko biloba	Maidenhair tree	7
Gleditsia triacanthos 'Inermis'	Thornless honeylocust	9
Koelreuteria bipinnata	Chinese flame tree	3
Lagerstroemia indica	Crape myrtle	51
Liquidamber styraciflua	American sweet gum	9
Liriodendron tupilfera	Tulip tree	1
Lyonothamnus floribundus	Catalina ironwood tree	8
Magnolia grandiflora	Southern magnolia	21
Magnolia soulangiana	Saucer magnolia	5
Maytenus boaria	Mayten tree	9
Melaleuca linarifolia	Flaxleaf paperbark	17
Melaleuca quinquenervia	Cajeput tree	15
Metrosideros excelsus	New zeland christmas tree	38
Morus alba		4
Myprorum laetum	Myoporum	205
Olea europaea	Olive tree	3
Picea pungens 'Gauca'	Colorado blue spruce	2
Pinus canariensis	Canary island pine	43
Pinus densiflora 'Umbraculifera'	Tanyosho pine	4
Pinus halepensis	Aleppo poine	11
Pinus muricata	Bishop pine	6
Pinus pinaster	Cluster pine	51
Pinus pinea	Italian stone pine	26
Pinus ponderosa	Ponderosa pine	1
Pinus radiata	Monterey pine	512
Pinus sylvestris	Scotts pine	13
Pinus thunbergiana	Japanese black pine	19
Pistacia chinensis	Chinese pistache	49
Pittosporum undulatum	Victorian box	6
Platanus acerifolia	Sycamore	54
Platanus acerifolia 'Yarwood'		50

Podocarpus gracilior	Fern pine	24
Pupulus fremontii	Cottonwood tree	15
Populus nigra 'Italica'	Lompardy poplar	27
Prunus blireiana	Flowering plum	69
Prunus serrulata 'Kwanzan'	Flowering cherry	2
Pyrus calleryana 'Aristocrat'		56
Pyrus calleryana 'Bradford'	Ornamental pear	83
Pyrus calleryana 'Chantiler'	Chantiler pear	45
Pyrus kawakamii	Evergreen pear	29
Quercus coccinea	Scarlet oak	2
Quercus ilex	Holly oak	24
Robinia ambigua 'Idahoensis'	Idaho locust	5
Robinia ambigus 'Purple Robe'	Lucust	6
Robinia pseudoacacia 'Tortuosa'		5
Salix babylonica	Weeping willow	60
Schinus molle	California pepper	19
Schinus terebinthifolius	Brazilian pepper	22
Sequoia sempervirens	Coast redwood	56
Sequoiadendron giganteum	Big tree	2
Tristania conferta	Brisbane box	1
Tristania laurina		4
Tristania laurina 'Elegant'		2
Ulmus parvifola	Chinese elm	2
Ulmus pumila	Siberian elm	38
Zelkova pumila	Sawleaf zelkova	4

Number of Trees per Species

1.	Pinus radiata	512
2.	Myoporum laetum	205
3.	Fraxinus oxycarpa 'Raywood'	177
4.	Almus cordata	174
5.	Alnus rhombifola	142
6.	Acacia melanoxylon	140
7.	Eucalyptus cladocaylx	89
8.	Eucalyptus camaldulensis	83
9.	Pyrus calleryana 'Bradford'	83
10.	Prunus blirieana	69
11.	Eucalyptus lehmannii	66
12.	Salix babylonica	60
13.	Pyrus calleryana 'Aristocrat'	56
14.	Sequoia sempervirens	56
15.	Platanus acerifolia	54
16.	Lagerstroemia indica	51
17.	Pinus pinaster	51
18.	Eucalyptus sideroxylon	50
19.	Platanus acerifola 'Yarwood'	50
20.	Pistacia chinensis	49
21.	Pyrus calleryana 'Chantiller'	45
22.	Pinus canariensis	43
23.	Cupressus macrocarpa	41
24.	Celtis australis	40
25.	Metrosideros excelsus	38
26.	Ulmus pumila	38
27.	Crataegus laevagana 'Double Red'	36
28.	Eucalyptus polyanthemos	29
29.	Pyrus kawakamii	29
30.	Populus nigra 'Italica'	27
31.	Chitalpa tashkentensis	26
32.	Pinus pinea	26
33.	Podocarpus gracilior	24
34.	Quercus ilex	24
35.	Schinus terebinthifolius	22

36.	Crataegus phaenopyrum	21
37.	Magnolia grandiflora	21
38.	Fraxinus uhdei	20
39.	Eucalyptus globulus 'Compacta'	19
40.	Pinus thunbergiana	19
41.	Schinus molle	19
42.	Melaleuca linariifolia	17
43.	Koelreuteria bipinnata	15
44.	Melaleuca quinqueneruia	15
45.	Populus fremontii	15
46.	Arbutus 'Marina'	14
47.	Pinus sylvestris	13
48.	Catalpa bignonioides	12
49.	Pinus halepensis	11
50.	Callistemon citrinus	9
51.	Gleditsia trianchanthos 'Inermis'	9
52.	Liquidanber styraciflua	9
53.	Maytanus boaria	9
54.	Aesculus carnea	8
55.	Eucalyptus melliodora	8
56.	Lyonothamus floribundus	8
57.	Ginko biloba	7
58.	Chamaecyparis lawsoniana	7
59.	Cupressosyparis leylandii	7
60.	Ceratonia siliqua	6
61.	Pinus muricata	6
62.	Pittosporum undulatum	6
63.	Robinia ambiqua 'Purple Robe'	6
64.	Callistemon viminalis	5
65.	Magnolia soulangiana	5
66.	Robinia ambiqua 'Idahoensis'	5
67.	Robinia pseudoacacia 'Tortuosa'	5
68.	Acer macrophyllum	4
69.	Morus alba	4
70.	Pinus densiflora 'Umbraculifera'	4
71.	Tristania laurina	4
72.	Zelkoua serrota	4

73.	Aesculus californica	3
74.	Brachychiton populneus	3
75.	Cedrus atlantica 'Aurea'	3
76.	Juniperus chinensis 'Tortulosa'	3
77.	Laurus nobilis	3
78.	Olea europaea	3
79.	Cyathea cooperi	2
80.	Fraxinus velutina 'Modesto'	2
81.	Picea pungens 'Glauca'	2
82.	Prunus serrulata 'Kwanzan'	2
83.	Quercus coccinea	2
84.	Tristinia laurina 'Elegant'	2
85.	Ulmus parvifola	2
86.	Acacia baileyana	1
87.	Acer palmatum	1
88.	Calocedrus decurrens	1
89.	Cedrus atlantica 'Gluaca'	1
90.	Cedrus deodora	1
91.	Eucalyptus globulus	1
92.	Liriodendron tulipiferra	1
93.	Pinus ponderosa	1
94.	Tristania conferta	1

PARKS	TREES
LOCATION	TOTAL TREES
ARCTURUS PARK	8
Acer macrophyllum	4
Brachychiton populneus	3
Myoporum laetum	1
BOOTHBAY PARK	182
Alnus cordata	4
Catalpa bignonioides	12
Chitalpa tashkentensis	26
Cupressocyparis leylandii	7
Eucalyptus sideroxylon	20
Fraxinus uhdei	7
Fraxinus velutina 'Modesto'	2
Myoporum laetum	2
Pinus Canariensis	3
Pinus halepensis	1
Pinus radiata	20
Platanus acerifola 'Yarwood'	4
Populus fremontii	15
Prunus blireiana	11
Pyrus calleryana 'Aristocrat'	4
Pyrus calleryana 'Bradford'	15
Pyrus kawakamii	8
Robinia pseudoacacia 'Tortusoso'	5
Salix babylonica	14
Schinus terebinthifolius	2
CATAMARAN PARK	68
Alnus rhombifolia	53
Pinus radiata	15
CORPORATION YARD	38
Meterosideros excelsus	28
Myoporum laetum	2
Schinus terebinthifolius	8

Parks continued

CIVIC CENTER COMPLEX	90
Callistemon viminalis	2
Cedrus deodara	1
Ceratonia siliqua	6
Eucalyptus lehmannii	27
Eucalyptus polyanthemos	2
Eucalyptus sideroxylon	7
Liquidamber styraciflyra	2
Maytenus boaria	2
Melaleuca quinquenervia	2
Olea europaea	3
Picea pungens 'Glauca'	2
Pinus canariensis	1
Pinus densiflora 'Umbraculifera'	4
Pinus radiata	7
Pinus thunbergiana	3
Pittosporum undulatum	2
Platanus acerifolia	10
Prunus blireiana	3
Pyrus kawakami	1
Pyrus serrulata 'Kwanzan'	3
EDGEWATER PARK	122
Alnus rhombifolia	14
Eucalyptus sideroxylon	3
Fraxinus velutina 'Modesto'	2
Gleditsia triacanthos 'Inermis'	6
Myoporum laetum	3
Pinus halapensis	5
Pinus radiata	68
Pittosporum undulatum	3
Pyrus kawakamii	1
Quercus ilex	2
Salix babylonica	2
Sequoia sempervirens	13

Parks continued

ERCKENBRACK PARK	24
Aesculus californica	3
Callistemon viminalis	2
Cupressus macrocarpa	1
Liquidamber styraciflura	2
Liriodendron tulipifera	1
Pinus halepensis	4
Pinus radiata	3
Pistacia chinensis	3
Quercus coccinea	2
Salix babylonica	5
FARRAGUT PARK	87
Aesculus carnea	3
Alnus cordata	10
Liquidamber styraciflua	3
Morus alba	4
Pyrus calleryana 'Bradford'	56
Salix babylonica	5
Schinus molle	6
GATESHEAD PARK	18
Ginko biloba	2
Liquidamber styraciflua	2
Myoporum laetum	6
Platanus acerifolia 'Yarwood'	1
Salix babylonica	7
KETCH PARK	62
Ginko biloba	5
Gleditsia triacanthus inermis	3
Liquidamber orientalis	3
Magnolia grandiflora	9
Podocarpus gracilior	24
Pyrus kawakamii	4
Robina ambiqua 'Purple Robe'	6
Sequoia sempervirens 'Aptos Blue'	6
Ulmus parvifola	2

Parks continued

KILLDEER PARK	43
Acacia melanoxylon	1
Cupressus macrocarpa	3
Melaleuca quinquenervia	2
Metrosideros excelsus	1
Myoporum laetum	4
Pinus radiata	14
Pittosporum undulatum	1
Quercus ilex	11
Salix babylonica	3
Schinus terebinthifolius	1
Sequoia sempervirens	1
Sequoiadendron giganteum	1
LIBRARY-COMMUNITY CENTER	164
Alnus cordata	50
Crataegus laevigata	30
Fraxinus oxycarpa 'Raywood'	59
Koelreuteria bipinnata	15
Sequoia sempervirens 'Aptos Blue'	10
MARLIN PARK	22
Callistemon viminalis	1
Koelreuteria bipinnata	2
Pinus radiata	13
Salix babylonica	2
Sequoia sempervirens	4
PONPANO PARK	8
Pinus radiata	5
Quercus ilex	3
PORT ROYAL PARK	134
Alnus rhombifolia	24
Pinus radiata	18
Prunus blireiana	43
Pyrus calleryana 'Aristocrat'	45
Robinia ambiqua 'Idahoensis'	3
Salix babylonica	2
Schinus terebinthifolius	3

Parks continued

RECREATION CENTER	93
Acacia melanoxylon	10
Acer palmatum	1
Cedrus atlantica 'Glauca'	1
Cyathea cooperi	2
Eucalyptus lehmannii	2
Fraxinus uhdei	13
Magnolia grandiflora	2
Metrosideros excelsus	4
Myoporum laetum	13
Pinus radiata	10
Platanus acerifolia	9
Prunus blireiana	12
Shinus terebinthifolius	2
Shinus molle	5
Squoia sempervirens	3
Zelkova serrota	4
RYAN PARK	215
Alnus cordata	3
Calocedrus decurrens	1
Crataegus phaenopyrum	21
Eucalyptus sideroxylon	2
Lauris nobilis	3
Lyonothamnus floribundus	8
Magnolia grandiflora	1
Maytenus boaria	1
Melaleuca linarfolia	16
Melaleuca quinquinerva	3
Myoporum laetum	26
Pinus canariensis	39
Pinus halepensis	1
Pinus pinea	1
Pinus radiata	5
Pinus sylvestris	13
Quercus ilex	2
Robinia ambiqua 'Idahoensis'	2

Parks continued

RYAN PARK continued	
Salix babylonica	2
Salix matsudana 'Toruosa'	1
Schinus molle	8
Sequoiadendron gigantium	11
Sequoia sempervirens	8
Tristania conferta	1
Ulmus pulma	36
SEA CLOUD PARK	606
Acacia melanoxylon	1
Alnus rhombifolia	51
Eucalyptus camaldulensis	83
Eucalyptus cladocalyx	87
Fraxinus oxycarpa 'Raywood'	118
Melaluca quinquenervia	2
Metrosiderous excelsus	3
Pinus pinaster	36
Pinus pinea	1
Pinus radiata	173
Populus nigra 'Italica'	27
Salix babylonica	15
Schinus terebinthifolius	2
Sequoia sempervirens 'Aptos Blue'	5
Tristania conferta	2
SHAD PARK	28
Cupressus macrocarpa	2
Eucalyptus ficifolia	4
Eucalyptus polyanthemos	9
Lagerstroemia indica	5
Myoporum laetum	1
Pinus radiata	2
Salix babylonica	4
Sequoia sempervirens	1
SUNFISH PARK	8
Eucalyptus melliodora	3
Myoporum laetum	2
Platanus acerifolia	1
Pinus radiata	2

Parks continued

TURNSTONE PARK	28
Callistemon citrinus	2
Cupressus macrocarpa	3
Eucalyptus melliodora	1
Melaleuca quinquenervia	2
Myoporum laetum	1
Pinus pinea	1
Pinus ponderosa	1
Pinus radiata	6
Quercus ilex	6
Sequoia sempervirens	5

MEDIANS	TREES
LOCATION	TOTAL TREES 641
BALCLUTHA DRIVE	7
Arbutus 'Marina'	7
BEACH PARK BLVD	141
Alnus cordata	45
Maytenus boaria	4
Myoporum laetum	19
Pinus radiata	73
CHESS DRIVE	16
Platanus acerifolia	16
EDGEWATER BLVD	177
Acacia melanoxylon	60
Lagerstroemia indica	51
Pinus elderica	12
Pinus radiata	29
Pistacia chinensis	18
Pyrus calleryana 'Chantiler'	7
FOSTER CITY BLVD	104
Pistacia chinensis	10
Platanus acerifolia 'Yarwood'	45
Pyrus calleryana 'Chantiler'	45
Pyrus calleryana 'Aristocrat'	2
Pyrus calleryana 'Bradford'	2
HILLSDALE BLVD	139
Acacia melanonxylon	45
Celtis Australis	40
Chamaecyparis lawsoniana	5
Cupressus macrocarpa	5
Eucalyptus polyanthemos	8
Malus micromalus	32
Melaleuca quinquenervia	2

Medians continued

METRO CENTER BLVD	34
Acacia melanoxylon	17
Malus micromalus	17
POLYNESIA DRIVE	7
Arbutus 'Marina'	7
SHELL BLVD	50
Alnus cordata	20
Melaleuca quinquenervia	1
Pinus muricata	6
Pinus pinaster	15
Pyrus calleryana 'Bradford'	8
THIRD AVENUE	21
Acacia melanoxylon	2
Pinus pinea	19
VINTAGE PARK DRIVE	27
Acacia melanoxylon	2
Pinus pinea	3
Platanus acerifolia	22

CUL-DE-SACS	TREES

LOCATION	TOTAL TREES 317
ALTAIR TRIANGLE	3
Fraxinus uhdei	3
ARCTURUS CIRCLE	3
Pyrus calleryana 'Aristocrat'	3
AVOCET COURT	6
Cupressus macrocarpa	6
BAFFIN DRIVE	15
Alnus cordata	1
Pinus pinea	1
Pinus radiata	13
BLUEFISH COURT	12
Pinus radiata	10
Pinus thunbergiana	2
CURLEW COURT	5
Eucalyptus lehmannii	5
DUCK COURT	5
Cupressus macrocarpa	3
Pinus thunbergiana	2
FORESAIL COURT	8
Magnolia soulangiana	4
Pyrus kawakamii	4
KETCH COURT	5
Crataegus laevigata 'Double Pink'	2
Juniperus chinensis 'Torulosa'	3
KILLDEER COURT	5
Cupressus macrocarpa	5
LEO COURT	11
Acacia melanoxylon	1
Arbutus 'Marina'	1
Eucalyptus sideroxylon	3
Myoporum laetum	6
LOON COURT	4
Eucalyptus lehmannii	4

Cul-de-sacs continued

MAINSAIL COURT	7
Crataegus laevigata 'Double Red'	4
Pinus thunbergiana	3
MULLET COURT	14
Callistemon citrinus	7
Pinus radiata	4
Pinus thunbergiana	3
PELICAN COURT	4
Eucalyptus lehmannii	4
PLOVER COURT	4
Myoporum laetum	3
Pinus radiata	1
POLLUX COURT	6
Eucalyptus cladocalyx	2
Eucalyptus lehmannii	2
Maytenus boaria	2
PUFFIN COURT	2
Robinia ambigua "Idahoensis'	2
SANDPIPER COURT	7
Magnolia grandiflora	3
Pinus radiata	4
SHAD COURT	7
Pinus radiata	4
Pinus thunbergiana	3
SLOOP COURT	4
Pyrus calleryana 'Aristocrat'	2
Pyrus kawakamii	2
SPINNAKER COURT	5
Pistacia chinensis	2
Pyrus kawakamii	3
STAYSAIL COURT	5
Melaleuca linariifolia	1
Tristania laurina	4
STILT COURT	8
Crataegus phaenopyrum	6
Pyrus kawakamii	2

Cul-de-sacs continued

SUNFISH COURT	6
Pinus radiata	3
Pinus thunbergiana	3
TAURUS DRIVE	129
Eucalyptus sideroxylon	9
Myoporum laetum	110
Pinus radiata	10
TOPSAIL COURT	9
Aesculus carnea	5
Magnolia grandiflora	4
TRYSAIL COURT	8
Pyrus kawakamii	4
Schinus terebinthifolius	4
TURNSTONE COURT	6
Cedrus atlantica 'Aurea'	3
Cupressus macrocarpa	3
YAWL COURT	4
Pyrus calleryana 'Bradford'	2
Tristania laurina 'Elegant'	2

WALKWAYS	TREES
LOCATION	TOTAL TREES 84
PILGRIM WALKWAY	34
Cupressus macrocarpa	8
Eucalyptus lehmannii	6
Eucalyptus polyanthemos	6
Eucalyptus globus 'Compacta'	8
Geijera parviflora	6
PORT ROYAL PEDWAY	16
Acacia melanoxylon	1
Eucalyptus melliodora	4
Eucalyptus polyanthemos	1
Eucalyptus sideroxylon	6
Myoporum laetum	4
CONSTITUTION WALKWAY	34
Acacia salacina	1
Chamaecyparis lawsoniana	2
Cupressus macrocarpa	2
Eucalyptus lehmannii	14
Eucalyptus polyanthemos	3
Eucalyptus globulus 'Compacta'	12
Myoporum laetum	2

Entity	Total Trees
Parks	2,048
Cul-de-sacs	317
Medians	641
Walkways	84
GRAND TOTAL	**3,090**

EXISTING TREE PROBLEMS/SOLUTIONS

1. Cypress Canker

This disease (fungus) currently infests cypress trees in Killdeer, Turnstone, Shad, and Boothbay Parks. There is no known control for this fungus. It spreads rapidly in the Spring under wet weather conditions.

2. Excessive Leaf Litter

The following trees produce excessive, continuous leaf litter: Bushy Yate, Monterey Pine, and Myoporum. Heavy pruning every three years will help reduce the amount of leaf litter.

3. High Wind Damage

All high growing Eucalyptus trees are susceptible to high wind damage. Reducing heights of branches to strong laterals will help prevent branch failure.

4. Insect Infestations

Redgum Psyllid is currently infesting five varieties of Eucalyptus trees in Foster City. These varieties are Eucalyptus camaldulensis, caldocaylx, lehmannii, mellidora, and viminalis. The Psyllid will continue to weaken susceptible Eucalyptus trees. Over time, the smaller branches will become brittle and die and the main branches and trunk will be covered with waterspouts. Watersprouting of new stems occurs when the tree is severely stressed. It is the last line of defense for the tree to produce photosynthetic leafy material for survival. At this stage of decline, it is recommended that the tree be removed for public safety.

Watersprouting branches are weakly attached to trunks and limbs and will break out and strip away from the tree.

POSSIBLE FUTURE PROBLEMS

1. Overcrowding/Overplanting

The Monterey Pine trees on Beach Park Blvd. are planted too close together. Lack of light infiltration to the lower branches will result in the branches shutting down (dying). Branches whose leaves receive no sunlight are then sent a message to stop making new leaves for next year.

Sea Cloud Park has been overplanted with Monterey Pines and some tree removals will be necessary in the future to ensure the good health of all of the trees.

2. Dutch Elm Disease

The Siberian Elms at Ryan Park (the most valuable trees in our park system) are susceptible to Dutch Elm Disease. Dutch Elm Disease is most likely to enter Elms through dead twigs and branches left in the trees. It is very important to remove this dead material each year in the Spring after the trees have leafed out again. This task can only be accomplished by using a high-ranger.

3. Monterey Pine Pitch Canker

This is a fungus disease that first affects the tips of branches in Monterey Pines and then spreads throughout the tree. It is currently heavily infesting Monterey Pines along the central California coastline and is evident in the East Bay. There has only been one confirmed observation of this disease on a Monterey Pine located on Pilgrim Drive. Since Monterey Pines are our most prevalent trees, this disease must be watched closely in the future. Currently, there is no control for this fungus disease.

HortScript
University of California Cooperative Extension
June 1994
#6

Pitch Canker Disease

The authors are Andrew J. Storer, Postdoctoral Researcher, Thomas R. Gordon, Professor of Plant Pathology, Paul L. Dallara, Graduate Student, and David L. Wood, Professor of Entomology, UC Berkeley

Pitch canker disease is caused by *Fusarium subglutinans f.* sp. *pini*. This introduced fungal pathogen was first identified in Santa Cruz Co. in 1986, and has been responsible for widespread mortality of pines in central coastal California over the past 5 years. The pathogen currently infects twelve species of pines, and Douglas-fir.

Symptoms of the disease

The first symptom of pitch canker is usually wilting and dying branch tips with yellow or red needles which eventually drop from the tree (Figure 1). In the case of pines, resin exudation occurs around the point of infection. These infections are frequently associated with cone whorls.

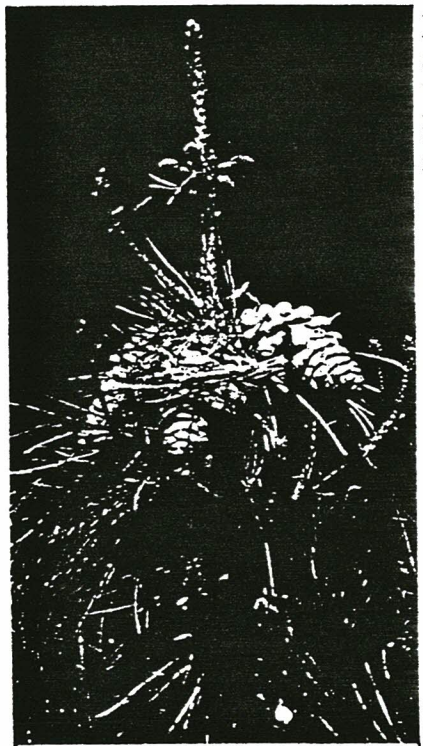

Figure 1. Branch tip infection

More advanced symptoms on the tree include resinous cankers on larger branches, the trunk (Figure 2) and on exposed roots. Trees with advanced stages of the disease have significant crown dieback due to large numbers of infected branch tips. The top of the tree, and ultimately the entire tree, may be killed. Bark beetles are closely associated with this mortality.

Figure 2. Canker on the bole of a tree

The general sequence of disease development is summarized in Figure 3. Symptoms can appear during any season, and the disease may not always progress through this generalized sequence. Positive identification of the pathogen requires laboratory isolation and culture of the fungus.

Species damaged by pitch canker

The pitch canker fungus is pathogenic to many conifer species in California: most widely infected are Monterey (*Pinus radiata*), Bishop (*P. muricata*) and shore (*P. contorta contorta*) pines in urban areas. Ponderosa pine (*P. ponderosa)* and Douglas-fir (*Pseudotsugae menziesii*) are important timber species and have also been

found to be infected in urban plantings. Coast redwood (*Sequoia sempervirens*), giant sequoia (*Sequoiadendron giganteum*), incense cedar (*Libocedrus decurrens*) and white fir (*Abies concolor*) are among the species which have been shown to be resistant to the pathogen in laboratory tests.

Geographic range of pitch canker

Most trees infected with the pitch canker pathogen are found in Santa Cruz, Monterey and Alameda counties, with localized infection cankers occurring in San Mateo, Santa Clara, Mendocino, Sonoma, Los Angeles, San Diego, and San Luis Obispo counties. Native trees in Monterey pine forests at Ano Nuevo point and on the Monterey peninsula have become infected.

Impact of the pathogen

In several areas of Santa Cruz and Alameda counties, trees are exhibiting advanced symptoms of this disease, and trees with extensive branch tip dieback and killed tops have been removed from highway rights-of-way and other urban settings. In southern California, with the exception of Santa Barbara Co., the disease is restricted to Christmas tree plantations, and the economic impact of the pathogen continues to increase.

Vectors of the pathogen

Propagules of the pitch canker pathogen have been isolated from many insect species, and some of these are implicated in the transmission of the fungus. Engraver beetles (*Ips paraconfusus, I. plastographus maritimus* and *I. mexicanus)* may vector the pathogen to larger branches and the bole of trees, and twig beetles (*Pityophthorus spp.*) and the Monterey pine cone beetle (*Conophthorus radiatae*) may vector the pathogen to smaller branches and cones. The pathogen has been isolated from other insects, including the dry twig and cone beetle (*Ernobius punctulatus*), the red turpentine beetle (*Dendroctonus valens*) and the Monterey pine weevil (*Pissodes radiatae*), but the role of these insects in vectoring the pathogen remains unclear.

Management of the pathogen

The removal of infected tips and dead tops from trees, and pesticide treatment of trees, are not effective in managing the disease. On trees from which all visible infections are removed, subsequent infections are likely to occur. Cut branches and trees should be destroyed so as to kill the insects which may be present. Effective treatments include debarking, chipping and burning. The movement of infected material through areas in which pitch canker is not currently known should be avoided, since insects emerging from this material may introduce the pathogen to trees in disease-free areas. Tree strains which are resistant to the pathogen are currently being studied, and long term management seems to be dependent on the development of these resistant strains.

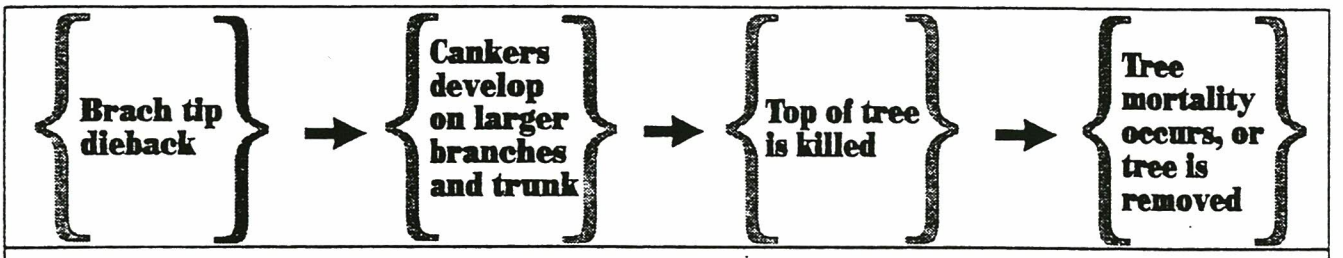

Figure 3. Generalized sequence of pitch canker symptom development

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Eucalyptus Redgum Lerp Psyllid

Integrated Pest Management for Home Gardeners and Professional Landscapers

The redgum lerp psyllid, *Glycaspis brimblecombei*, has recently been found infesting eucalyptus trees in Los Angeles and San Bernardino counties in southern California; in Alameda, Santa Clara, and San Francisco counties in northern California; and the San Joaquin Valley in central California. This psyllid is native to Australia and is expected to spread to most areas in California where susceptible species of eucalyptus are grown.

Identification

Psyllids are plant-juice sucking Homoptera in the insect family Psyllidae. During its nymphal (immature) stage, this type of psyllid forms a protective cover called a "lerp", which makes older nymphs look similar to armored scales. However, unlike scale coverings, the lerp is composed mostly of crystallized honeydew, the sugary water that homopteran insects excrete, and resemble small white, roundish caps on leaves that grow up to about 1/8 inch (3 mm) diameter and 1/12 inch (2 mm) tall (Fig. 1). The nymph underneath each lerp is yellow or brownish and looks similar to a wingless aphid (Fig. 2). Older nymphs stay beneath their lerp and generally don't move.

Adult lerp psyllids are slender insects that are about 1/8 inch (3 mm) long. Their bodies are light green with orangish and yellow blotches and they have clear wings that are usually held rooflike over their abdomen. The adults differ from other psyllids found in California in that they have relatively long forward projections (called genal cones) on each side of their head below their eyes (Fig. 3). Females lay tiny, yellowish, ovoid eggs singly or in scattered groups.

Life Cycle

As with other psyllids, redgum lerp psyllid develops through gradual metamorphosis, which includes the egg, several increasingly larger nymphal stages, and the adult. There is no pupal stage. Females prefer to lay their eggs on succulent leaves and young shoots, so population increases often follow the production of new plant growth. However, all psyllid life stages can occur on both new and mature foliage. Young nymphs can be observed excreting gelatinous honeydew from their rear end. Older nymphs are concealed underneath their lerp. In its native Australia the psyllid has 2 to 4 generations a year, and a similar number of generations would be expected in California. Development time from egg to adult varies from several weeks during warm weather to several months during prolonged cool temperatures. In mild coastal areas, all stages can be present throughout the year.

Damage

Psyllid nymphs and adults feed by sucking plant juices through their strawlike mouthparts. High populations of psyllids secrete copious amounts of honeydew. This clear sticky liquid fouls surfaces beneath heavily infested trees. A blackish sooty mold grows on the honeydew-covered surfaces. High psyllid populations can cause severe leaf drop, creating an annoying mess of sticky leaves. Honeydew and sooty mold are bothersome to people, but

probably don't have a serious adverse effect on tree health. However, extensive defoliation weakens trees and increases tree susceptibility to wood-boring pests such as longhorned beetles.

Only certain species of eucalyptus are attacked by redgum lerp psyllid. River red gum (*Eucalyptus camaldulensis*) is a primary host (hence the name redgum lerp psyllid) and sugar gum (*E. cladocalyx*) is heavily infested in some locations. The complete host plant range in California is not yet well known (*See* Cultural Controls).

Management

Relatively little is known about controlling this new pest. The species of eucalyptus and probably cultural practices are important in determining whether or not redgum lerp psyllid is a pest. Biological control is being investigated as a long-term solution. Eucalyptus are attacked by several other introduced insects, so before taking any control actions against the redgum lerp psyllid, pest managers should learn how their efforts may affect the control of these other introduced pests. Eucalyptus pests include longhorned borers (*See* the Eucalyptus Longhorned Borer Pest Note No. 26), leaf-feeding beetles, eucalyptus gall wasp, and at least five other species of psyllids. Certain of these are now under effective biological control, including the blue gum psyllid (*Ctenarytaina eucalypti*) and eucalyptus snout beetle or the gumtree weevil (*Gonipterus scutellatus*). Several parasites are being introduced to control eucalyptus longhorned borers (*Phoracantha semipunctata* and *P. recurva*) and the leaf-feeding Australian tortoise beetle (*Trachymela sloanei*). Inappropriate actions, such as spraying persistent, broad-spectrum insecticides, can harm natural enemies and might cause outbreaks of these other pests.

Biological Control. Redgum lerp psyllid in California is attacked by several natural enemies, but it's not currently known if these natural enemies are important in helping to control this pest. Known predators include two introduced lady beetles, *Chilocorus bipustulatus* and the multicolored Asian lady beetle (*Harmonia axyridis*), and minute pirate bugs (*Anthocoris* spp.). Other predators associated with the redgum lerp psyllid in California include spiders, mites, syrphid fly larvae, the lady beetles *Coccinella californica* and *Hippodamia convergens*, and the heteropteran *Zelus renardii*. Birds are major predators of lerp psyllids in Australia and have been observed feeding on redgum lerp psyllid in California.

Classical biological control for this pest is currently being investigated by the University of California, but it will be several years before the effectiveness of this approach is known. A classical biocontrol program involves studying what predators, parasites, and pathogens help to control redgum lerp psyllid in its native habitat. After identifying what natural enemies are expected to be effective, a quarantine screening process is conducted to determine if these natural enemies can be safely introduced in California. Classical biological control has been effective against several other psyllids, including acacia psyllid and blue gum psyllid and it provides partial control of the eugenia psyllid. Biological control is often influenced by pesticide use and cultural practices and effective biocontrol needs to be integrated with these other activities.

Cultural Control. Minimize tree stress by providing eucalyptus with proper cultural care and protecting trees from injury. Nitrogen levels in foliage may increase when eucalyptus are

stressed and increased foliar nitrogen increases reproduction and survival of psyllids. To minimize stress, consider providing trees with supplemental water during periods of prolonged drought, such as during summer and fall in much of California when rain is infrequent or nonexistent. Drought stress reportedly increases damage to trees from both lerp psyllids and eucalyptus longhorned borers. Psyllid outbreaks have also been reported to follow prolonged rainy conditions, possibly because excessively wet soil prevents roots from obtaining adequate oxygen, causing small roots to die.

When irrigating trees, apply water beneath the outer canopy, not near trunks. Avoid frequent, shallow watering that is often used for lawns. A general recommendation is to irrigate eucalyptus infrequently (possibly once a month during drought periods) but with sufficient amounts so that the water penetrates 1 to 2 feet deep into soil. This can be achieved by applying water slowly through drip emitters that run continuously for several days. The specific amount and frequency of water needed varies greatly depending on the site and tree species.

Avoid fertilizing susceptible eucalyptus. Use slow-release nutrient formulations if other plants near the drip line of eucalyptus require fertilization. Psyllid nymphs and egg-laying females prefer the abundant, succulent new shoot growth stimulated by excess nutrients that occur following the application of quick-release fertilizer formulations.

Consider pruning limbs that overhang surfaces where dripping honeydew is especially annoying. Except for dead or hazardous branches, which should be removed whenever they appear, prune eucalyptus only during December and January. Trees are usually less stressed then and adult eucalyptus longhorned borers, which are attracted to fresh tree wounds, are not active. Do not prune too much during one season. If extensive limb removal is planned, space the trimming over several years so that trees maintain adequate foliage to produce food and extensive portions of previously shaded bark are not suddenly exposed to direct sunlight, which can result in sunscald cankers.

Choose eucalyptus species that are well-adapted to the location, including tolerance to the prevailing moisture conditions. Although certain eucalyptus are highly drought-tolerant, other species are adapted to more moist conditions.

Planting resistant species can prevent this psyllid from being a problem. The redgum lerp psyllid attacks only eucalyptus, but the eucalyptus species it favors in California are not yet well known. Certain eucalyptus species are avoided by this psyllid. Eggs laid on certain other eucalyptus species are unable to complete their development and psyllid populations do not build to bothersome levels. The number of eucalyptus species attacked may decrease later if this pest is brought at least partly under biological control.

River red gum (*Eucalyptus camaldulensis*) is a primary host and sugar gum (*E. cladocalyx*) is heavily infested in some locations. Lemon gum (*Eucalyptus citriodora*), blue gum (*E. globulus*), *E. lehmannii*, *E. nicholii*, and *E. rudis* can also become infested in California. Other species that may be susceptible based on reports from Australia include: *Eucalyptus blakelyi*, *E. bridgesiana*, *E. dealbata*, *E. nitens*, and *E. tereticornis*. When selecting new or replacement species, also consider their susceptibility to other pests, such as eucalyptus longhorned borers (*See* the Eucalyptus Longhorned Borer Pest Note, No. 26).

Chemical Control. Pesticide effectiveness against this psyllid is not currently known. Foliar sprays generally are not recommended for residential areas or where people may be exposed to drift. There are no selective insecticides that kill only psyllids. It's difficult to spray large urban trees without pesticide drifting off-target. The lerp covering may provide psyllid nymphs with some protection from spray contact.

If honeydew is intolerable and foliar spraying is planned, consider using a mixture of insecticidal soap (potassium salts of fatty acids) and horticultural oil (an insecticide labeled narrow-range, superior, or supreme oil). These low-hazard insecticides can be combined together at one-half of the labeled rate or the full labeled rate (commonly 1 to 2% active ingredient each). Unlike many other insecticides, oil can kill psyllid eggs, in addition to other insect life stages. Insecticidal soap helps to wash-off honeydew and kill psyllids. Thorough foliar coverage is essential, so effective spraying may be limited to smaller trees. Soap or oil applications are likely to provide only temporary control and application may need to be repeated after about two weeks.

Certain systemic insecticides may control redgum lerp psyllid, but this has not been verified. Acephate implants (Orthene Acecaps) may be the only systemic available to homeowners for treating large trees. These implants are pesticide-containing plastic plugs that are pounded into holes drilled every few inches to encircle the trunk. It can be very difficult to drill holes and place these plugs at the proper depth so that insecticide is effectively absorbed and translocated to leaves. Proper implant depth varies in part depending on the tree species and trunk diameter.

Implanting or injecting trunks or roots causes undesirable wounds that can serve as entry points for plant pathogens. Wounding trees increases the likelihood that they will be attacked by boring insects, such eucalyptus longhorned borers. Do not implant or inject trees more than once a year.

Several insecticides having systemic action can be applied to trees by professional pest control operators. These include abamectin (Avid), azadirachtin (Azatin, Neemazad), and imidacloprid (Merit). Imidacloprid is labeled for application as a soil drench and for injection into soil beneath trees. This application method avoids the tree wounds that result from injecting or implanting trunks or roots. Imidacloprid may be effective if applied to soil during late winter to early spring or before rainfall or irrigation are expected to facilitate root absorbance of the material. However, no research data is available to verify the effectiveness of these materials against redgum lerp psyllid.

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Authors: Steve H. Dreistadt, Rosser W. Garrison, and Raymond J. Gill
Illustrations by Rosser W. Garrison

Biology and Management of the Redgum Lerp Psyllid, Glycaspis brimblecombei

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Historical Review: In June 1998, a new pest of eucalyptus was discovered in Los Angeles County on river red gum eucalyptus (Eucalyptus camaldulensis). The insect was subsequently identified as the red gum lerp psyllid (RLP), Glycaspis brimblecombei (Homoptera: Psyllidae), and was a new species record for California. RLP is endemic to Australia (the native continent for eucalyptus) and is widespread but generally of low densities on eucalyptus growing in the eastern areas of Australia. RLP spread quickly from the LA area and is currently found on eucalyptus growing in San Francisco Bay area in the north right through to San Diego in the south of the State.

Psyllid Biology: Psyllids are small insects that suck sap from plants. Female psyllids lay clusters of eggs on leaves from which hatch the nymphs, the immature stage of the psyllid. As nymphs feed on leaves they produce a watery sticky waste product called honeydew. Nymphs use honeydew secretions to form a protective cap called a 'lerp'. Nymphs feed and grow to adulthood under this cap of crystalline sugars. The lerp is the conspicuous white scale-like cone seen on infested eucalyptus leaves. When nymphal development is complete, winged adults leave the protective lerp and fly to new plants to mate, feed, and commence egg laying.

Host Plants: In addition to river red gum eucalyptus, RLP has been observed on Eucalyptus rudis (flooded gum), E. globulus (blue gum), E. diversicolor (Karri), E. sideroxylon (red ironbark), E. nicholii (narrow-leaved peppermint), E. lehmanii (bush yate). The complete host range of RLP in California is uncertain as are the species of eucalyptus in addition to river red gum that are most preferred for feeding and reproduction.

Feeding Damage: High populations of feeding psyllids secrete copious amounts of honeydew making leaves and sidewalks sticky. Leaves can turn black as a result of sooty molds growing on honeydew. Feeding damage can be severe enough to cause premature leaf drop and sticky fallen leaves can adhere to shoes, vehicles, clog swimming pool filters, and may rapidly increase amounts of flammable material beneath trees. Extensive defoliation and subsequent crown thinning may stress trees making them more vulnerable to attack by eucalyptus long horn beetles that can kill eucalyptus by boring into trunks and branches of weakened trees. Previous experiences with eucalyptus pests have shown that eucalyptus are hardy and may sustain 2-3 successive defoliations before dying. Trees appear to recover quickly when pest densities decline.

Management - Biological Control: Several species of natural enemies including birds, ladybugs, and lacewings have been observed eating RLP. However, these predators are probably ineffective at controlling RLP and releases of commercially available predators are not recommended. Specialist RLP biological control agents (e.g., small stingless parasitic wasps) imported from Australia may offer the best chance for long-term control of RLP by natural enemies. UC entomologists are currently searching for RLP parasites in Australia with the cooperation of Australian colleagues. Once located, parasites need to be checked for safety in quarantine before being released. Searching for, screening, safety

testing, mass rearing, and releasing natural enemies for RLP control is expected to take a minimum of 12-18 months.

Management - Cultural Control: Careful management of RLP infested trees may be important in reducing stress from defoliation. Experiences with other sucking insects has shown that excessive watering and fertilizing can exacerbate feeding damage and promote higher numbers of pests because of improved food supply. Trees should be watered during prolonged periods of drought and water should be slowly applied beneath the outer canopy and not near the trunk to saturate soil where feeder roots are located. Fertilization is not recommended. Pruning to remove infested leaves is not recommended, as RLP will rapidly colonize and kill young leaves that result from flushing following pruning. Pruning over summer may provide additional stress to trees making them more attractive to eucalyptus longhorn borers. Diversifying plantings of trees using several species of eucalyptus and other species of shade trees adapted to local environmental conditions will help mitigate future problems with exotic pests.

Management - Chemical Control: There a limited number of pesticides registered for use on eucalyptus and their efficacy against RLP is unknown at this time. Contact insecticides sprayed directly onto leaves may not be effective against RLP because of the protective lerp. In addition, adequate coverage is difficult to achieve on large trees and spray drift in residential areas could be problematic and should be avoided. Systemic insecticides (toxins that can move within the plant) may provide control but usually require specialized equipment to inject material into tree trunks. Insecticidal trunk injections can weaken trees and provide entrances for pathogens. Some systemic insecticides can also be applied as soil drenches but their effectiveness is also unknown. Work evaluating the effectiveness of systemic insecticides applied to the soil or injected into the trunk is currently underway.

Updates: For regular updates on RLP research by UC scientists check the following web-site:
http://www.cnr.berkeley.edu/biocon/dahlsten/rglp/RLP_Main.htm

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Barbara Schutz

From: Chronicle Feedback [chronfeedback@sfgate.com]
Sent: Thursday, April 06, 2000 6:51 PM
To: 'Barbara Schutz'
Subject: RE: Archives

Here's the article:

-ACCESS- 3085453
-PAPER- THE SAN FRANCISCO CHRONICLE
-DATE- Wed, 15 Sep 1999 -EDITION- FINAL
-SECTION- NEWS
-PAGE- A19
-COLUMN- BAY AREA FOCUS
-HEAD- Wasps to the Rescue / Predatory insect is hope for eucalyptus
-BYLINE- David Perlman, Chronicle Science Editor
-ILLUS- PHOTO (3), GRAPHIC
-CUTLINE- (1) Donald Dahlsten, UC Berkeley professor of entomology, looked through a microscope at tiny wasps in a tube with eucalyptus leaves. / Robin Weiner/The Chronicle, (2) A Psyllaephagus pilosus parasitoid was caught in the process of stinging a blue gum psyllid nymph, (3) Stanford's eucalyptus trees are being defoliated by a pest called the redgum lerp psyllid, which scientists will try to combat with a tiny wasp. / Eric Luse/The Chronicle, GRAPHIC: JOHN BLANCHARD/THE CHRONICLE
-LENGTH- 708
-SUBJECT- INSECTS: TREES: BAY AREA: DISEASE:
-NAME- Donald Dahlsten:
-TEXT-

The San Francisco Chronicle
September 15, 1999

WASPS TO THE RESCUE
NEWSPAPER ARTICLE

Scientists in Berkeley have imported a shipment of tiny wasps from Australia, hoping to combat hordes of even tinier insects that are threatening the lives of red gum eucalyptus trees throughout the Bay Area.

Already many of those trees have lost their leaves to the feeding habits of a creature known as the redgum lerp psyllid. The same tiny insects have been reported in 30 California counties, including Contra Costa.

But to Donald Dahlsten, one of the nation's leading advocates of biological control of unwanted pests, these barely visible creatures live out the adage known to entomologists that goes: "Great fleas have lesser fleas upon their backs to bite 'em, and little fleas have lesser fleas, and so ad infinitum."

Dahlsten, an entomologist at the University of California at Berkeley, has collected two batches of parasitic Australian wasps that feed uniquely on the redgum psyllids,

But the wasps -- barely the size of a pepper grain -- could be any one of three different species. And until Dahlsten and his colleagues have sorted out which one feeds on the redgum psyllids, they all will be locked securely in quarantine at the university's laboratory in Albany.

"We have no idea what damage the other wasp species might cause," Dhalsten said, "so we're not going to release any until we've sorted out the one that attacks the lerp psyllids and only the

lerps."

The nasty lerps at Stanford are already defoliating the red gums there for the second year in a row. They secrete a sticky kind of honeydew that messes up sidewalks and cars. Faculty members and students then track the stuff into classrooms and laboratories.

The insects feed ravenously on the sap and juices inside the trees, and as the trees dry the leaves drop off.

Some people consider the eucalyptus tree an ugly and unwanted invader that has blighted much of California's original landscape. The trees were, in fact, brought here from Australia in the 1850s, imported for parks and other landscapes, and have spread rapidly throughout California.

Though unwanted by many, the trees have their fans among landscape lovers.

"For us the eucalyptuses are very valuable, both for historical reasons -- we have a fabulous collection -- and for the ambience," said Carol Sweetapple, a Stanford horticultural analyst. "Imagine the hills behind Berkeley barren. That's what it would be like for us to lose those trees."

Although a few cycles of defoliation may still not kill the trees, Dahlsten is not sure just how long they can withstand the destructive insects.

"These are tough trees," Dahlsten said, "and they can withstand a lot of damaging infestations. But the question is how many times they can be defoliated before they die."

The barely visible wasps he has brought from Australia include three species of the genus Psyllaephagus. Together with UC quarantine officers Linda L. Schmidt and John W. Andrews Jr., he hopes to sort out the one parasitic species that feeds only on the lerp psyllids that infest the red gum trees.

The laboratory is growing in quarantine a dozen foot-high red gums whose leaves are already speckled with the tiny cases that the juvenile psyllids build around themselves. Then comes the job of sorting out the unique wasp species that will prey on the psyllids.

It will take from two months to a year before Dahlsten can decide that he and his colleagues have created colonies of the wasps that feed only on the redgum psyllids. Only then can he release the predators safely in areas where they are wanted.

Although chemical pesticides can be used to control the unwanted insects, Dahlsten estimates that it would cost $500 to inject each threatened tree with the chemicals, and even then, the injections may not do the job, he says. Biological control -- in this case mobilizing the right insect to kill off the unwanted ones -- should be the answer, he said.

But yet another problem might appear. No one knows whether the predatory wasps will do damage to other plants or trees, or whether the wasps, in turn, will fall prey to other predators.

"We're trying to unravel a great big complicated ecological puzzle," Dahlsten says, "and this one, with the psyllids and the wasps, is typical."