

Canada
PFRC
Inform. rept.
BC-X-126
1975

LIBRARY
FOREST RESEARCH CENTRE
4000 UNIVERSITY ROAD
VICTORIA B.C.

Mountain Pine Beetle Bibliography

L. Safranyik D.M. Shrimpton H.S. Whitney



Environment
Canada

Environnement
Canada

Forestry
Service

Service
des Forêts

4-20840
23467X

Mountain Pine Beetle

Bibliography

by

L. Safranyik, D.M. Shrimpton and H.S. Whitney

Canadian Forestry Service

Pacific Forest Research Centre

Victoria, B.C.

Report BC-X-126

Department of the Environment

August, 1975

FOREWORD

This bibliography is based principally upon files of the authors and of Dr. Henry Moeck. Additional references have been obtained from Biological Abstracts, Forestry Abstracts and the Review of Applied Entomology. This literature search was finished in April 1975.

Colleagues in laboratories throughout Western Canada and the United States have provided copies of file reports containing much valuable material; however, this bibliography has been restricted to reports that are readily available.

References have been separated into three categories, each arranged alphabetically by author; selected general references, theses and the main reference list. For completeness, reports have been retained in the main list in which the Mountain Pine Beetle is not the major subject. Included in both thesis list and general list are papers, covering aspects of the biology of the blue stain fungi, that relate to the beetle; also selected for the general list is material dealing principally with the host. References are indexed by both author and subject.

A special thanks is extended to Mrs. Lesley Manning who painstakingly and patiently assisted in the compilation of this bibliography.

D. M. Shrimpton
August 1975

TABLE OF CONTENTS

	Page
FOREWORD	i
TABLE OF CONTENTS.	ii
ABSTRACTiii
BIBLIOGRAPHY	1
AUTHOR INDEX	47
SUBJECT INDEX.	57

ABSTRACT

A total of 424 references dealing with the Mountain Pine Beetle (Dendroctonus ponderosae Hopk.) and its relationship to hosts and associated microorganisms are listed. References are indexed by both author and subject.

BIBLIOGRAPHY

1. Alexander, R.R. 1974. Silviculture of central and southern Rocky Mountain Forest: A summary of the status of our knowledge by timber types. USDA For. Serv. Res. Pap. RM-120: 36 pp.
2. Alexander, R.R. 1974. Silviculture of subalpine forests in the central and southern Rocky Mountains: The status of our knowledge. USDA For. Serv. Res. Pap. RM-121: 88 pp.
3. Alexander, R.R. 1975. Partial cutting in Old-Growth Lodgepole Pine. USDA For. Serv. Res. Pap. RM-136: 17 pp.
4. Amman, G.D. 1969. Mountain Pine beetle emergence in relation to the depth of Lodgepole Pine bark. USDA For. Serv. Res. Note INT-96: 7 pp.
5. Amman, G.D. 1970. Prey consumption and variations in larval biology of *Enoclerus sphegeus* (Coleoptera: Cleridae). Can. Ent. 102(11): 1374-1378.
6. Amman, G.D. 1971. Mountain Pine beetle brood production in relation to thickness of Lodgepole Pine phloem. J. Econ. Ent. 65(1): 138-140.
7. Amman, G.D. 1972. Prey consumption and development of *Thanasimus undatulus* a predator of the Mountain Pine beetle. Env. Ent. 1(4): 528-530.
8. Amman, G.D. 1972. Some factors affecting oviposition behavior of the mountain Pine beetle. Env. Ent. 1(6): 691-695.
9. Amman, G.D. 1973. Population changes of the mountain Pine beetle in relation to elevation. Env. Ent. 2(4): 541-547.
10. Amman, G.D. 1973. Insects affecting Lodgepole Pine productivity. In 'Management of Lodgepole Pine Ecosystems'. ed. D. Baumgartner. Wash. State Univ. Co-op. Ext. Serv. (I): 310-341.

11. Amman, G.D., and B.H. Baker. 1972. Mountain Pine beetle influence on Lodgepole Pine stand structure. *J. For.* 70(4): 204-209.
12. Amman, G.D., B.H. Baker, and L.E. Stipe. 1973. Lodgepole Pine losses to mountain Pine beetle related to elevation. USDA For. Serv. Res. Note INT-71.
13. Amman, G.D., and L.A. Rasmussen. 1969. Techniques for radiographing and the accuracy of the X-ray method for identifying and estimating numbers of the mountain Pine beetle. *J. Econ. Ent.* 62(3): 631-634.
14. Amman, G.D., and Lynn A. Rasmussen. 1974. A comparison of radiographic and bark-removal methods for sampling of mountain Pine beetle populations. USDA For. Serv. Res. Pap. INT-151: 11 pp.
15. Anderson, R.F. 1948. Host selection by the Pine Engraver. *J. Econ. Ent.* 41: 596-602.
16. Annand, P.N. 1947. Report of the Chief of the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration 19[45 -]46. USDA, Washington D.C. 63 pp.
17. Anonymous. 1914. Control work against forest insect depredations in the Hetch-Hetchy Watershed of the Yosemite National Park. *Ent. News.* XXV, (3).
18. Anonymous. 1926. Forest Insect depredations in the United States and Canada. *Timberman* 27: 178-184.
19. Anonymous. 1927. The relation of Insects to Slash Disposal. USDA Dept. Circ. 411: 12 pp.
20. Anonymous. 1931. Summary for 1930. USDA Bur. Ent. Insect Pest Surv. Bull. 10(10): 437-467.

21. Anonymous. 1939. Summary for 1938. USDA Bur. Ent. Insect Pest Surv. Bull. 18(10): 657-685.
22. Anonymous. 1940. Summary for 1939. USDA Bur. Ent. Insect Pest Surv. Bull. 19(10): 627-650.
23. Anonymous. 1941. Summary for 1940. USDA Bur. Ent. Insect Pest Surv. Bull. 20(10): 559-591.
24. Anonymous. 1942. Summary for 1941. USDA Bur. Ent. Insect Pest Surv. Bull. 21(10): 795-816.
25. Anonymous. 1943. Reports of research sub-committees, 1942. For. Chron. 19(2): 142.
26. Anonymous. 1950. Forest-Insect Investigations. B.C. Dept. Lands & Forests. For. Serv. Rept. 1949: 73.
27. Anonymous. 1951. Forest-Insect Investigations. B.C. Lands and Forests. For. Serv. Rept. 1950: 63.
28. Anonymous. 1955. Forest Insect Conditions in California - as revealed by Surveys during 1954. Forest Pest Control Action Council Report 1954: 6.
29. Anonymous. 1974. In pursuit of the bark beetle. Western Conservation J. 31(2): 42-45.
30. Baker, B.H., G.D. Amman, and G.C. Trostle. 1971. Does the mountain Pine beetle change hosts in mixed Lodgepole and Whitebark Pine stands? USDA For. Serv. Res. Note INT-151, 7 pp.
31. Beal, J.A. 1939. The Black Hills beetle, a serious enemy of Rocky Mountain Pines. USDA Farmers Bull. 1824: 20 pp.
32. Beal, J.A. 1943. Relation between tree growth and outbreaks of the Black Hills beetle. J. For. 41(5): 359-366.

33. Bedard, W.D. 1938. Control of the mountain Pine beetle by chemicals. J. For. 36(1): 35-40.
34. Bedard, W.D. 1966. A ground phloem medium for rearing immature bark beetles (Scolytidae). Ann. Ent. Soc. Amer. 59(5): 931-938.
35. Beeson, C.F.C. 1918. Forest insect conditions in India. Agric. J. India, Calcutta, Special Indian Service Congress Number. p. 114-124.
36. Berryman, A.A. 1973. Management of mountain Pine beetle populations in Lodgepole Pine ecosystems: A co-operative interdisciplinary research and development project. In 'Management of Lodgepole Pine ecosystems', ed. D. Baumgartner. Wash. State Univ. Co-op. Ext. Serv. (2): 627-650.
37. Blackman, M.W. 1931. The Black Hills beetle, (*Dendroctonus ponderosae* Hopk.). N.Y. State College of Forestry Tech. Publ. 36 4(4): 1-97.
38. Boldt, C.E. and J.L. Van Deusen. 1974. Silviculture of Ponderosa Pine in the Black Hills: The status of our knowledge. USDA For. Serv. Res. Pap. RM-124: 45 pp.
39. Boss, G.D., and T.O. Thatcher. 1970. Mites associated with *Ips* and *Dendroctonus* in Southern Rocky Mountains. USDA For. Serv. Res. Note RM-171: 1-7.
40. Boyce, J.C. 1923. The deterioration of felled Western Yellow Pine on insect-control projects. USDA Dept. Bull. 1140: 7 pp.
41. Brown, A.W.A. 1942. Annual Report of the Forest Insect Survey, 1941. Can. Dept. Agric. Div. Ent. For. Ins. Serv. Rept. 1941: 3-23.

42. Brown, A.W.A. 1943. Annual Report of the forest insect survey, 1942. Can. Dept. Agric. Div. Ent. For. Ins. Serv. Rept. 1942: 3-12.
43. Brown, G.S. 1953. Mountain Pine bark beetle study at Windermere Creek. Can. Dept. Agri., Div. For. Biol., Bi-mon. Prog. Rept. 9(4): 3-4.
44. Brown, G.S. 1954. A study of the Mountain Pine bark beetle, Windermere Creek, 1953. Can. Dept. Agric. For. Bio. Lab. Victoria, B.C. 18 pp.
45. Brunner, Josef. 1914. The Sequoia pitch moth, a menace to pine in Western Montana. USDA Bull. 111: 4.
46. Bucher, G.E. 1963. Non-sporulating bacterial pathogens. Insect Pathology, An advanced treatise Vol. 2: 117-147. Academic Press. ed. Edward A. Steinhaus.
47. Burke, H.E. 1919. Notes on a Cocoon-making Colydiid (Coleoptera). Proc. Ent. Soc. Wash. XXI 6: 123-124.
48. Bushing, R.W., and D.L. Wood. 1964. Rapid measurement of oleoresin exudation pressure in *Pinus ponderosa* Laws. Can. Ent. 96(3): 510-513.
49. Butterick, P.L. 1912. Notes on insect destruction of fire-killed timber in the Black Hills of South Dakota. J. Econ. Ent. 5(6): 456-464.
50. Cahill, D.B. 1960. The relationship of diameter to height of attack in Lodgepole Pine infested by mountain Pine beetle. USDA For. Serv. Res. Note INT-78: 3 pp.
51. Callaham, R.Z., and M. Shifrine. 1960. The yeasts associated with bark beetles. For. Sci. (6): 146-153.

52. Carlson, R.W., and W.E. Cole. 1965. A technique for sampling populations of the mountain Pine beetle. USFS Res. Pap. INT-20: 13 pp.
53. Caverhill, P.Z. 1922. Forestry Problems in British Columbia. J. For. 20: 48.
54. Caverhill, P.Z. 1925. Forest Entomology. B.C. Dept. Lands, For. Br. Ann. Rept. 1924: E16.
55. Cerezke, H.F. 1964. The morphology and functions of the reproductive systems of *Dendroctonus monticolae* Hopk. (Coleoptera: Scolytidae). Can. Ent. 96(3): 477-500.
56. Chamberlin, W.J. 1917. An annotated list of the Scolytid Beetles of Oregon. Can. Ent. 49(9): 321-328.
57. Chamberlin, W.J. 1920. Insect situation in the pine forest of Oregon. Timberman. 21 August.
58. Chamberlin, W.J. 1939. Bark and timber beetles of North America and Mexico. O.S.C.Co-op. Asso., Corvallis, Oregon. Litho. U.S.A. p. 155 & 156.
59. Chamberlin, W.J. 1958. The Scolytoidea of the Northwest. Oregon State Monographs Number 2. Oregon State College, Corvallis, pp. 71-72.
60. Chansler, J.F., and D.A. Pierce. 1966. Bark beetle mortality in trees injected with cacodylic acid (herbicide). J. Econ. Ent. 59(6): 1357-1359.
61. Chansler, J.F., D.B. Cahill, and R.E. Stevens. 1970. Cacodylic acid field tested for control of mountain Pine beetles in Ponderosa Pine. USDA For. Serv. Res. Note RM-161.

62. Clements, V.A. 1953. Possible means of reducing mountain Pine beetle attacks in young Sugar Pine. Calif. Forest and Range Exp. St. Note 89: 5 pp.
63. Cobb, F.W., Jr., and R.W. Stark. 1970. Decline and mortality of smog-injured Ponderosa Pine. J. For. 68(3): 147-149.
64. Cobb, F.W., Jr., D.L. Wood, R.W. Stark, and P.R. Miller. 1968. Photochemical oxidant injury and bark beetle (Coleoptera: Scolytidae) infestation of Ponderosa Pine. II. Effect of injury upon physical properties of oleoresin moisture content, and phloem thickness. Hilgardia 39(6): 127-134.
65. Cobb, F.W., Jr., D.L. Wood, R.W. Stark, and J.R. Parmeter, Jr. 1968. Photochemical oxidant injury and bark beetle (Coleoptera: Scolytidae) infestation of Ponderosa Pine. IV. Theory on the relationships between oxidant injury and bark beetle infestation. Hilgardia 39(6): 135-140.
66. Cole, W.E. 1962. The effects of intraspecific competition within mountain Pine beetle broods under lab conditions. USDA For. Serv. Res. Note INT-97: 4 pp.
67. Cole, W.E. 1967. Sampling biologically in forest insect populations. Ann. Ent. Soc. Amer. 60(4): 860-861.
68. Cole, W.E. 1970. The statistical and biological implications of sampling units for mountain Pine beetle populations in Lodgepole Pine. Res. Popul. Ecol. XII(2): 243-248.
69. Cole, W.E. 1973. Interaction between mountain Pine beetle and dynamics of Lodgepole Pine stands. USDA For. Serv. Res. Note INT-170: 6 pp.

70. Cole, W.E. 1973. Crowding effects among single-age larvae of the mountain Pine beetle, *Dendroctonus ponderosae* (Coleoptera: Scolytidae). *Env. Ent.* 2(2): 285-293.
71. Cole, W.E. 1974. Competing risks analysis in mountain Pine beetle dynamics. *Res. Popul. Ecol.* 15(2): 183-192.
72. Cole, W.E. 1975. Interpreting some mortality factor interactions within mountain Pine beetle broods. *Env. Ent.* IV(1): 99-102.
73. Cole, W.E., and Gene D. Amman. 1969. Mountain Pine beetle infestations in relation to Lodgepole Pine diameters. *USDA For. Serv. Res. Note INT-95: 7 pp.*
74. Cole, W.E., and R.F. Shepherd. 1967. The mountain pine beetle *Dendroctonus ponderosae* Hopk. In 'Important Forest Insects and Diseases of Mutual Concern to Canada, the U.S. and Mexico', ed. A.G. Davidson and R.M. Prentice. *Can. Dept. For. & Rur. Dev. Publ.* 1180: 12-15.
75. Cole, W.E., and C. Weening. 1967. A technique for inducing attacks and mating of the mountain Pine beetle, *Dendroctonus ponderosae* (=monticolae) (Coleoptera: Scolytidae). *Ann. Ent. Soc. Amer.* 60(4): 857-858.
76. Collis, D.G., and N.E. Alexander. 1966. Mountain Pine beetle damage to Western White Pine on Vancouver Island. *Pac. For. Res. Cen. C.F.S. Info. Rept.* BC-X-9.
77. Cottrell, C.B., and R.L. Fiddick. 1968. Appraisal of timber killed by some important insects in B.C. from 1961-1965 inclusive 1968. *For. Res. Lab. Info. Rept.* BC-X-26: 49 pp.

78. Cottrell, C.B., and R.L. Fiddick. 1972. Timber killed by insects in British Columbia 1966-1970. Pac. For. Res. Cen. C.F.S. Info. Rept. BC-X-68.
79. Craighead, F.C. 1925. The *Dendroctonus* Problem. J. For. 23(4): 340-354.
80. Craighead, F.C. 1928. Interrelation of tree-killing bark beetles (*Dendroctonus*) and blue stains. J. For. 26: 886-887.
81. Craighead, F.C. 1938. Research points the way in Forest Insect Control. J. For. 36(9): 905-908.
82. Craighead, F.C. 1942. The influence of insects on the development of forest protection and forest management. Smithsonian Ins. Rept. 1940-1941: 367-392.
83. Craighead, F.C., and W.C. Middleton. 1930. An annotated list of the important North American Forest insects. USDA Misc. Publ. 74: 4, 5.
84. Craighead, F.C., J.M. Miller, J.C. Evenden, and F.P. Keen. 1931. Control work against bark beetles in western forests and an appraisal of its results. J. For. 29: 1001-1018.
85. Craighead, F.C., S.A. Graham, J.E. Patterson, J.M. Miller, H.E. Burke, H.L. Person, F.P. Keen, J.C. Evenden, W.D. Edmundston. 1927. The relation of insects to slash disposal. USDA Circ. 411: 5-8.
86. Cushman, R.A. 1931. Three New Braconidae parasitic on Bark Beetles. J. Wash. Acad. Sci. XXI (13): 301-304.
87. Dahlsten, D.L., and S.G. Herman. 1965. Birds as predators of destructive forest insects. Calif. Agric. 19(9): 8-10.

88. Dahlsten, D.L., and F.M. Stephen. 1974. Natural enemies and insect associates of the mountain Pine beetle, *Dendroctonus ponderosae* (Coleoptera: Scolytidae) in Sugar Pine. Can. Ent. 106(11): 1211-1217.
89. De Leon, D. 1933. Notes on the Biology of *Meteorus hypophylloei* Cushman. (Hymenoptera: Braconidae). Bull. Brooklyn Ent. Soc. N.S. 28(1): 32-36.
90. De Leon, D. 1934. The Morphology of *Coeloides dendroctonii* Cush. (Hymenoptera: Braconidae). J. New York Ent. Soc. 42(3): 297-317.
91. De Leon, D. 1934. An annotated list of the parasites, predators, and other associated fauna of the mountain Pine beetle in Western White and Lodgepole Pine. Can. Ent., 66(3): 51-61.
92. De Leon, D. 1935. The biology of *Coeloides dendroctonii* Cushman, an important parasite of the mountain Pine beetle. Ann. Ent. Soc. of Amer. 28(4): 411-423.
93. De Leon, D. 1935. A study of *Medetera aldrichii* Wh., a predator of the mountain Pine beetle. Ent. Americana, 15: 60-90.
94. De Leon, D. 1939. The biology and control of the Black Hills Beetle (*Dendroctonus ponderosae* Hopk.). Summary of Studies in Colorado & Wyoming 1935-1938. U.S. Bur. Ent. & Plant. Quar., Div. For. Insect. Invest., Rocky Mtn. Conf. Ent. Rept. 15: 13.
95. De Leon, D., W.D. Bedard, and T.T. Terrell. 1934. Recent discoveries concerning the biology of the mountain Pine beetle and their effect on control in Western White Pine Stands. J. For. 32(4): 430-436.

96. Dolph, Robert E. Jr. 1971. Mountain pine beetle in the Pacific Northwest 1955-1966. USDA Misc. Publ. 23: 36 pp.
97. Eaton, C.B. 1941. Influence of the mountain Pine beetle on the composition of mixed pole stands of Ponderosa Pine and White Fir. J. For. 39(8): 710-713.
98. Evans, D. 1950. Important insects - British Columbia Coastal Forests. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1949: 105-109.
99. Evans, D., and E.D.A. Dyer. 1951. Important insects - British Columbia coastal forests. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1950: 107-111.
100. Evenden, J.C. 1925. The beetle beats the pine in a ten-year struggle for supremacy in the land of the Lodgepole. Amer. Forests and Forest Life 31: 593-595.
101. Evenden, J.C., W.D. Bedard, and G.R. Struble. 1943. The Mountain Pine beetle, an important enemy of Western Pines. USDA Circ. 664: 25 pp.
102. Evenden, J.C., and A.L. Gibson. 1940. A destructive infestation in Lodgepole Pine stands by the Mountain Pine beetle. J. For. 38(3): 271-275.
103. Farris, S.H. 1965. A preliminary study of mycangia in the bark beetles, *Dendroctonus ponderosae* Hopk., *Dendroctonus obesus* Mann., and *Dendroctonus pseudotsugae* Hopk. Can. Dept. For., For. Ent. and Path. Br., Bi-mon. Prog. Rept. 21(5): 3-4.
104. Foiles, M.W. 1972. Responses in a Western White Pine stand to commercial thinning methods. USDA For. Serv. Res. Note INT-159: 8 pp.

105. Furniss, M.M., and J.A. Schenk. 1969. Sustained natural infestation by the mountain Pine beetle in seven new *Pinus* and *Picea* hosts. *J. Econ. Ent.* 62(2): 518-519.
106. Gardiner, J.G. 1942. Division of Entomology, Forest Insect Investigations. Report of the Minister of Agriculture of the Dominion of Canada, 1942. p. 55.
107. Gardiner, J.G. 1946. Report of the Minister of Agriculture for the Dominion of Canada for the year ended March 31, 1946. 235 pp.
108. Geier, P.W., L.R. Clark, D.J. Anderson, and H.A. Nix. 1973. Insects: studies in population management. *Memoirs, Ecol. Soc. Australia* No. 1: 295 pp.
109. Gibson, A.L. 1931. 'Current Notes'. *J. Econ. Ent.* 24: 575.
110. Gibson, A.L. 1943. Penetrating Sprays to Control the Mountain Pine Beetle. *J. Econ. Ent.* 36(3): 396-398.
111. Gray, B., R.F. Billings, R.I. Gara, and R.L. Johnsey. 1972. On the emergence and initial flight behavior of the mountain Pine beetle *Dendroctonus ponderosae*, in Eastern Washington. *Z. Angew. Ent.* 71(3): 250-259.
112. Hall, D.G. 1937. New muscid flies (Diptera) in the United States National Museum. *Proc. U.S. Nat. Mus. Wash. D.C.* 84 (3011): 201-221.
113. Hamel, D.R., M.D. McGregor, and H.E. Meyer. 1974. Status of Mountain Pine Beetle on the Bitterroot National Forest, Montana and Idaho, 1974. *USDA For. Serv. Rept. NR-74-28*: 6 pp.
114. Hay, J.C. 1956. Experimental crossing of mountain Pine beetle with Black Hills beetle. *Ann. Ent. Soc. Amer.* 49(6): 567-571.

115. Heller, R.C. 1968. Previsual detection of Black Hills beetle infested trees by remote sensing techniques. Proc. N. Cent. Br. Amer. Ass. Econ. Ent. 23(1): 48.
116. Heller, R.C. 1968. Previsual detection of Ponderosa pine trees dying from bark beetle attack. Proc. 5th Symp. on Remote Sensing of Environ. Univ. Michigan, Ann Arbor, April 16-18, 1968: 387-434.
117. Heller, R.C., J.L. Bean, and F.B. Knight. 1959. Aerial surveys of Black Hills beetle infestations. USDA For. Serv. Sta. Pap. RM-46: 8 pp.
118. Hester, D.A. 1968. Treating Ponderosa Pine standing versus felling and treating for Black Hills beetle control. Proc. N. Cent. Br. Amer. Ass. Econ. Ent. 23(1): 47.
119. Hewitt, C.G. 1914. Report from the Division of Entomology for the year ending March 31, 1914. Dom. Can. Dept. Agric. Ann. Rept. 851-876.
120. Hewitt, C.G. 1917. Insect Behavior as a Factor in applied Entomology. J. Econ. Ent. 10(1): 81-94.
121. Hoffman, C.H., and E.P. Merkel. 1948. Fluctuations in insect populations associated with aerial applications of D.D.T. to forests. J. Econ. Ent. 41: 464-473.
122. Hopkins, A.D. 1899. Preliminary Report on the Insect Enemies of the Forests of the Northwest. USDA Div. Ent. Bull. 21(n.s.)
123. Hopkins, A.D. 1901. Some insect enemies of living trees. Proc. 22nd Ann. Meeting Soc. Prom. Agr. Sci. Denver, Colo. p. 67.

124. Hopkins, A.D. 1902. Insect enemies of the pine in the Black Hills Forest Reserve. USDA Div. of Ent. Bull. 37(n.s.): 21.
125. Hopkins, A.D. 1903. Forest-insect explorations in the summer of 1902. Can. Ent. 35: 59.
126. Hopkins, A.D. 1905. Notes on Scolytid larvae and their mouthparts. Proc. Ent. Soc. Wash. 7: 143-149.
127. Hopkins, A.D. 1905. The black hills beetle. USDA Bur. Ent. Bull. 56: 10.
128. Hopkins, A.D. 1906. Bark beetle depredations of some 50 years ago in the Pikes Peak Region of Colorado. Proc. Ent. Soc. Wash. 8: 5.
129. Hopkins, A.D. 1909. Insect Depredations in North American Forests and Practical Methods of Prevention and Control. USDA Bur. of Ent. Bull 58(5): 59, 76.
130. Hopkins, A.D. 1909. Practical information on the Scolytid beetles of North American Forests. I. Bark beetles of the genus *Dendroctonus*. USDA Bur. Ent. Bull. 83, Pt. I: 169 pp.
131. Hopkins, A.D. 1909. The genus *Dendroctonus*. USDA Bur. Ent. Tech. Serv. Bull. 17, Pt. 1: 164 pp.
132. Hopkins, A.D. 1910. Insects which kill forest trees. USDA Bur. of Ent. Circ. 125.
133. Hopkins, A.D. 1912. Insect damage to standing timber in the National Parks. USDA Bur. of Ent. Circ. 143.
134. Hopkins, A.D. 1915. Preliminary Classification of the Superfamily Scolytidea. USDA Bur. Ent. Tech. Serv. Bull. 17, Pt. 2: 211.

135. Hopkins, A.D. 1919. The Bioclimatic Law as applied to Entomological Research and Farm Practice. *Sci. Mon.* (June): 496-513.
136. Hopping, G.R. 1946. Control of the more injurious bark beetles of the Canadian Rocky Mountain Region. *Can. Dept. Agric., Div. Ent., Proc. Publ.* 49: 8 pp.
137. Hopping, G.R. 1951. Forest entomology in relation to silviculture in Canada. V. The Mountain Pine Beetle. *For. Chron.* 27: 26-29.
138. Hopping, G.R. 1951. Timber types in relation to insect outbreaks in the Canadian Rocky Mountains. *Ent. Soc. Ontario Rept.* 81: 72-75.
139. Hopping, G.R. 1961. Insects injurious to Lodgepole Pine in the Canadian Rocky Mountain region in Lodgepole Pine in Alberta. ed. L.A. Smithers. *Can. Dept. For. Bull.* 127: 77-87.
140. Hopping, G.R., and G. Beall. 1948. The relation of diameter of Lodgepole Pine to incidence of attack by the bark beetle *Dendroctonus monticolae* Hopkins. *For. Chron.* 24(2): 141-145.
141. Hopping, G.R., and W.G. Mathers. 1945. Observations on outbreaks and control of the mountain Pine beetle in the Lodgepole Pine stands of Western Canada. *For. Chron.* 11(2): 98-108.
142. Hopping, R. 1921. The control of bark beetle outbreaks in British Columbia. *Dom. Can. Dept. Agric., Ent. Br. Circ.* 15: 7, 11.
143. Hopping, R. 1922. Coniferous Hosts of the Ipsidae of the Pacific Coast and Rocky Mountain Regions. *Can. Ent.* 54(6): 128-134.
144. Hopping, R. 1924. Yellow Pine as a host in B.C. *Can. Ent.* 56(6): 125-128.
145. Hopping, R. 1933. The chief forest insect problems of the Pacific Coast of North America. *Proc. of the 5th Pac. Sci. Cong. Can.* 5: 3385-3386.

146. Houseweart, M.W., and N.D. Wygant. 1971. Contact toxicity of Lindane, Landrin and Gardona to the mountain Pine beetle. J. Econ. Ent. 64(6): 1575-1576.
147. Hughes, P.R. 1973. Effect of α -pinene exposure on trans-verbenol synthesis in *Dendroctonus ponderosae* Hopk. Die Naturwiss. 60(5): 261-262.
148. Hughes, P.R., and G.B. Pitman. 1970. A method for observing and recording the flight behavior of tethered bark beetles in response to chemical messengers. Contrib. Boyce Thompson Inst. 24(13): 329-336.
149. Jaenicke, A.J. 1921. The forest insect problems of the Pacific slope. J. Econ. Ent. 14(5): 447-450.
150. Johnson, P.C. 1949. Determining the bark-beetle hazard of pine stands in Northern California. J. For. 47(4): 277-284.
151. Johnson, P.C. 1966. Some causes of natural tree mortality in old growth Ponderosa Pine stands in Western Montana. USDA For. Serv. Res. Note INT-51.
152. Johnson, P.C. 1967. Distribution of bark beetle attacks on Ponderosa Pine trees in Montana. USDA For. Serv. Res. Note INT-62: 7 pp.
153. Johnson, P.C. 1972. Bark beetle risk in mature Ponderosa Pine forests in Western Montana. USDA For. Serv. Res. Pap. INT-119: 32 pp.
154. Johnson, P.C., and R.F. Schmitz. 1965. *Dendroctonus ponderosae* Hopk. (Coleoptera: Scolytidae) a pest of Western White and Ponderosa Pines in the northern Rocky Mountains. Intermountain For. & Range Exp. Stn. 4500-FS-INT-2202.

155. Jones, R.G., and W.A. Brindley. 1970. Tests of eight rearing media for the mountain Pine beetle, *Dendroctonus ponderosae* (Coleoptera: Scolytidae), from Lodgepole Pine. *Ann. Ent. Soc. Amer.* 63(1): 313-316.
156. Keen, F.P. 1928. Insect enemies of California pines and their control. Calif. State, Dept. of Nat. Resources, Div. For. Bull. 7: 1-111.
157. Keen, F.P. 1936. Relative susceptibility of Ponderosa Pines to bark beetle attack. *J. For.* 34: 919-927.
158. Keen, F.P. 1938. (Revised 1952). *Insect Enemies of Western Forests.* USDA Misc. Publ. 273: 1-200.
159. Keen, F.P. 1950. The influence of insects on Ponderosa Pine silviculture. *J. For.* 48(3): 186-188.
160. Keen, F.P. 1958. Progress in bark-beetle control through silviculture in the United States. *Proc. X Int. Congress Ent.* 4: 171-180.
161. Keen, F.P., and K.A. Salmon. 1942. Progress in pine beetle control through tree selection. *J. For.* 40: 854-858.
162. Khan, M.A. 1957. *Sphaerularia bombi* Duf. (Nematoda: Allantonematidae) infesting bumblebees and *Sphaerularia hastata* sp. Nov. infesting bark beetles in Canada. *Can. J. Zoo.* 35(4): 519-523.
163. Kinghorn, J.M. 1953. Chemical control of bark beetles. *Can. Dept. Agric. Div. For. Biol. Bi-mon. Prog. Rept.* 9(4): 4.
164. Kinghorn, J.M. 1955. Chemical control of the mountain Pine beetle and the Douglas-fir beetle. *J. Econ. Ent.* 48(5): 501-504.
165. Klein, W.H. 1973. Beetle-killed pine estimates. *Photogrammetric Engineering* 39(4): 385-388.

166. Knight, F.B. 1958. Methods of surveying infestations of the Black Hills beetle in Ponderosa Pine. For. Sci. 4(1): 35-41.
167. Knight, F.B. 1959. Partial life tables for the Black Hills beetle. J. Econ. Ent. 52(6): 1199-1202.
168. Knight, F.B. 1959. Measuring trends of Black Hills beetle infestations. USDA For. Serv. Res. Note RM-37: 6 pp.
169. Knight, F.B. 1960. Sequential sampling of Black Hills beetle populations. USDA For. Serv. Res. Note RM-48: 8 pp.
170. Knight, F.B., and F.M. Yasinsky. 1956. Incidence of trees infested by the Black Hills beetle. USDA For. Serv. Res. Note RM-21: 4 pp.
171. Kusch, D.S. 1967. An annotated check list of the common bark beetles found in Alberta with a field key to genera. Forest Research Lab., Calgary, Alta., Info. Rept. A-X-8.
172. Lanier, G.N., and D.L. Wood. 1968. Controlled mating, karyology, morphology, and sex-ratio in the *Dendroctonus ponderosae* complex. Ann. Ent. Soc. Amer. 61(2): 517-526.
173. Leech, H.B. 1944. Summary Report of Forest Survey, British Columbia & Western Alberta. Can. Dept. Agric. Div. Ent. For. Ins. Serv. Rept. 1943: 63.
174. Leech, H.B. 1945. Summary report of the Forest Insect Survey, British Columbia and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1944: 64.
175. Leech, H.B. 1946. British Columbia and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1945: 62.

176. Leech, H.B. 1947. British Columbia and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1946: 79-80.
177. Lyon, R.L. 1958. A useful secondary sex character in *Dendroctonus* bark beetles. Can. Ent. 90: 582-584.
178. Lyon, R.L. 1959. Toxicity of several residual - type insecticides to selected western bark beetles. J. Econ. Ent. 52(2): 323-327.
179. Lyon, R.L. 1965. Structure and toxicity of insecticide deposits for control of bark beetles. USDA Tech. Bull. 1343: 59 pp.
180. Lyon, R.L., and K.M. Swain. 1968. Field test of lindane against over-wintering broods of the western pine beetle. USFS Res. Note PSW-176: 4 pp.
181. MacKay, Margaret R. 1948. British Columbia and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Ann. Rept. 1947: 93.
182. MacKay, Margaret R. 1949. Province of British Columbia. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Ann. Rept. 1948: 114.
183. MacKay, Margaret R. 1950. Important insects - British Columbia Interior Forests. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Ann. Rept. 1949: 113-114, 121.
184. McCambridge, W.F. 1962. Sexing Black Hills beetles, *Dendroctonus ponderosae* Hopk. Ann. Ent. Soc. Amer. 55(6): 723-724.
185. McCambridge, W.F. 1964. Emergence period of Black Hills beetle from Ponderosa Pine in the central Rocky Mountains. USFS Res. Note RM-32: 4 pp.

186. McCambridge, W.F. 1967. Nature of induced attacks by the Black Hills beetle *Dendroctonus ponderosae*. Ann. Ent. Soc. Amer. 60(5): 920-928.
187. McCambridge, W.F. 1968. Attractions of Black Hills beetles to Ponderosa Pine in the Central Rocky Mountains some uses and limitations. Proc. N. Cent. Br. Ent. Soc. Amer. 23: 137-140.
188. McCambridge, W.F. 1969. Spermatozoa in unemerged female mountain Pine beetles, *Dendroctonus ponderosae* Hopkins. Proc. Ent. Soc. Ont. 100: 168-170.
189. McCambridge, W.F. 1969. Incidence of sperm in emerging female mountain Pine beetles. USDA For. Serv. Res. Note RM-137: 3 pp.
190. McCambridge, W.F. 1971. Temperature limits of flight of the mountain Pine beetle, *Dendroctonus ponderosae*. Ann. Ent. Soc. Amer. 64(2): 534-535.
191. McCambridge, W.F. 1972. Treatment height for mountain Pine beetles in Front Range Ponderosa Pine. USDA For. Serv. Res. Note RM-218: 2 pp.
192. McCambridge, W.F. 1974. Influence of low temperatures on attack, oviposition, and larval development of mountain Pine beetle, *Dendroctonus ponderosae* (Coleoptera: Scolytidae). Can. Ent. 106(9): 979-984.
193. McCambridge, W.F. 1974. Identifying Ponderosa Pine infested with Mountain Pine Beetles. USDA For. Serv. Res. Note RM-273: 2 pp.
194. McCambridge, W.F., and S.A. Mata, Jr. 1969. Flight muscle changes in Black Hills beetles, *Dendroctonus ponderosae* (Coleoptera: Scolytidae), during emergence and egg laying. Can. Ent. 101(5): 507-512.

195. McCambridge, W.F., and G.C. Trostle. 1972. The mountain pine beetle (*Dendroctonus ponderosae*). USDA For. Serv. For. Pest Leaflet 2: 6 pp.
196. McGhehey, J.H. 1968. Territorial behavior of bark beetle males. Can. Ent. 100(11): 1153.
197. McGhehey, J.H. 1969. Sex ratios of individual broods of the mountain Pine beetle. Bi-mon. Res. Notes 25(1): 2.
198. McGhehey, J.H. 1971. Female size and egg production of the mountain Pine beetle, *Dendroctonus ponderosae* Hopkins. Info. Rept. NOR-X-9. Edmonton.
199. McGregor, M.D. 1974. Status of mountain Pine beetle infestations Gallatin District, Gallatin National Forest, 1973. USDA For. Serv. - Nor. Reg. Rept. 74(17).
200. McGregor, M.D., W.E. Bousfield, R.C. Lood, and H.E. Meyer. 1974. Mountain Pine beetle impact survey. Drainage, Lolo National Forest, and state and private lands, Montana. USDA For. Serv. Nor. Reg. Ins. Dis. Rept. 74(22): 8 pp.
201. McGregor, M.D., D.R. Hamel, R.C. Lood, and H.E. Meyer. 1975. Status of Mountain Pine Beetle infestations Glacier National Park, 1974. USDA For. Serv. Rept. NR-75-10: 7 pp.
202. McGregor, M.D., D.R. Hamel, H.E. Meyer, and R.C. Lood. 1975. Evaluation of a Mountain Pine Beetle infestation, Calx-Tamarak Creek Drainage, Fisher River Ranger District, Kootenai National Forest Montana, 1974. USDA For. Serv. Rept. NR-75-2: 9 pp.
203. McGuffin, W.C. 1949. Alberta and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1948: 105.

204. McGuffin, W.C. 1950. Alberta and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1949: 100.
205. McGuffin, W.C. 1953. Forest Insect Survey-Alberta, Rocky Mountain National Parks, and Northwest Territories. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1952: 116.
206. McGuffin, W.C., and R.W. Reid. 1951. Alberta and Rocky Mountain National Parks. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1950: 99.
207. McNew, G.L. 1970. The Boyce Thompson Institute Program in Forest Entomology that led to the discovery of pheromones in Bark Beetles. Contrib. Boyce Thompson Inst. 24(13): 251-262.
208. Marlatt, C.L. 1928. Report 19(27-) 28 of the Entomologist. USDA Washington, D.C. 34 pp.
209. Massey, C.L. 1974. Biology and taxonomy of nematode parasites and associates of bark beetles in the United States. USDA Agric. Handbook No. 446.
210. Massey, C.L., R.D. Chisholm, and N.D. Wygant. 1952. (in part only, see 1953 Vol. 46: 601-604) Ethylene dibromide for control of Black Hills beetle. J. Econ. Ent. 45: 861-862.
211. Massey, C.L., R.D. Chisholm, and N.D. Wygant. 1953. (entire paper, only part when first published in 1952) Ethylene dibromide for control of Black Hills beetle. J. Econ. Ent. 46(4): 601-604.
212. Mata, S.A., Jr. 1972. Accuracy of determining mountain Pine beetle attacks in Ponderosa Pine utilizing pitch tubes, frass and entrance holes. USDA For. Serv. Res. Note RM-222: 2 pp.

213. Mathers, W.G. 1946. Forest insects of the season 1945 in British Columbia east of the coast mountains and in the Rocky Mountain National Parks. Can. Ins. Pest Rev. 24: 120-122.
214. Mathers, W.G. 1947. Tree injection for the control of bark beetles. Can. Dept. Agric. Div. Ent., Bi-mon. Prog. Rept. 3(5): 2-3.
215. Mathre, D.E. 1964. Survey of *Ceratocystis* spp. associated with bark beetles in California. Contrib. Boyce Thompson Inst. 22(7): 353-362.
216. Miller, J.M., and J.E. Patterson. 1927. Preliminary studies on the relation of fire injury to bark beetle attack in Western Yellow Pine. J. Agric. Res. 34(7): 597-613.
217. Miller, P.R., F.W. Cobb, Jr., and E. Zavarin. 1968. Photochemical oxidant-injury and bark beetle (Coleoptera: Scolytidae) infestation of Ponderosa Pine. III. Effect of injury upon oleoresin composition, phloem carbohydrates, and phloem pH. Hilgardia 39(6): 141-152.
218. Mogren, E.W. 1955. Silvical factors influencing resistance of Ponderosa Pine to Black Hills beetle attack. Proc. Soc. Amer. For. 50: 61-63.
219. Nelson, R.M., and J.A. Beal. 1929. Experiments with bluestain fungi in Southern Pines. Phytopath. 19: 1101-1106.
220. Newton, M., and H.A. Holt. 1971. Scolytid and Buprestid mortality in Ponderosa Pines injected with organic arsenicals. J. Econ. Ent. 64(4): 952-958.
221. Offalax, Ivan. 1943. "Bugs" For. Chron. 19: 186-189.

222. Orchard, C.D. 1952. Forest-Insect Investigations Forest-Insect Survey. B.C. Dept. Lands & Forests For. Serv. Rept. 1951: 83,85.
223. Osburn, V.R. 1962. Field test of lindane for bark beetle control. St. For. Notes, Calif. Div. For. No. 9: 6 pp.
224. Ostmark, H.E., and B.H. Wilford. 1956. Forest insect conditions in the central Rocky Mountains - 1955. USDA For. Serv. Sta. Pap. 22: 4,13,5.
225. Parker, D.L. 1973. Trend of a Mountain Pine beetle outbreak. J. For. 71(11): 698-700.
226. Parker, D.L., and D.W. Davis. 1971. Feeding habits of *Corticus substriatus* (Coleoptera: Tenebrionidae) associated with the mountain Pine beetle in Lodgepole Pine. Ann. Ent. Soc. Amer. 64(1): 293-294.
227. Patterson, J.E. 1927. The relation of Highway Slash to Infestations by the Western Pine Beetle in Standing Timber. USDA Tech. Bull. 3: 9 pp.
228. Patterson, J.E. 1929. The Pandora Moth, a periodic Pest of Western Pine Forests. USDA Tech. Bull. 137: 19 pp.
229. Patterson, J.E. 1930. Control of the mountain Pine beetle in Lodgepole Pine by the use of solar heat. USDA Tech. Bull. 195: 19 pp.
230. Payne, T.L., H.A. Moeck, C.D. Willson, R.N. Coulson, and W.J. Humphreys. 1973. Bark beetle olfaction - II. Antennal morphology of sixteen species of Scolytidae (Coleoptera). Int. J. Ins. Morphol. & Embryol. 2(3): 177-192.

231. Pearson, G.A. 1950. Management of Ponderosa Pine in the Southwest. USDA Agric. Mono. 6: 154.
232. Pitman, G.B. 1969. Pheromone response in Pine bark beetles: influence of host volatiles. Science 166: 905-906.
233. Pitman, G.B. 1971. Trans-verbenol and alpha-pinene: Their utility in manipulation of the mountain Pine beetle. J. Econ. Ent. 64(2): 426-430.
234. Pitman, G.B., and J.P. Vité. 1969. Aggregation behaviour of *Dendroctonus ponderosae* (Coleoptera: Scolytidae) in response to chemical messengers. Can. Ent. 101(2): 143-149.
235. Pitman, G.B., J.P. Vité, G.W. Kinzer, and A.F. Fentiman, Jr. 1968. Bark beetle attractants: trans-verbenol isolated from *Dendroctonus*. Nature 218(5137): 168-169.
236. Pitman, G.B., J.P. Vité, G.W. Kinzer, and A.F. Fentiman, Jr. 1969. Specificity of population aggregation pheromone in *Dendroctonus*. J. Ins. Physiol. 15(3): 363-366.
237. Powell, J.M. 1966. Distribution and outbreaks of *Dendroctonus ponderosae* Hopkins in Forests of Western Canada. For. Res. Lab., Calgary, Info. Rept. A-X-2: 19 pp.
238. Powell, J.M. 1967. A study of the habitat temperatures of the bark beetle *Dendroctonus ponderosae* Hopkins in Lodgepole Pine. Agric. Meteorol. 4(3): 189-201.
239. Powell, J.M. 1969. Historical study of the relation of major mountain Pine beetle outbreaks in Western Canada to seasonal weather. For. Res. Lab., Calgary Info. Rept. A-X-23: 11 pp.

240. Prebble, M.L., R.E. Balch, G.W. Barter, R.F. Morris, R.R. Lejeune, G.R. Hopping, H.A. Richmond, and J.M. Kinghorn. 1951. Forest entomology in relation to silviculture in Canada. V. The mountain Pine beetle. For. Chron. 27(1): 6-32.
241. Preston, J.F. 1925. Control of Bark Beetles on the National Forests. J. For. 23(1): 49-61.
242. Price, R. 1955. Forest Insect Research. Black Hills beetle active in New Mexico. USDA Rocky Mtn. For. Rge. Expt. Stn. Ann. Rept. 1954: 15.
243. Price, R. 1956. Forest Insect Research. Conditions in the central Rocky Mountains. USDA Rocky Mtn. For. Rge. Expt. Stn. Ann. Rept. 1955: 21.
244. Price, R. 1957. Forest Insect Research. USDA Rocky Mtn. For. Rge. Expt. Stn. Ann. Rept. 1956: 81,84,90,99.
245. Randall, A.P. 1952. Chemical control of bark beetles in Lodgepole Pine. Can. Dept. Agric., Div. For. Biol. Bi-mon. Prog. Rept. 8(1): 3-4.
246. Rasmussen, Lynn A. 1972. Attraction of mountain Pine beetles to small-diameter Lodgepole Pines baited with trans-verbenol and alpha-pinene. J. Econ. Ent. 65(5): 1396-1399.
247. Rasmussen, Lynn A. 1974. Flight and attack behavior of mountain Pine beetles in Lodgepole Pine of northern Utah and southern Idaho. USDA For. Serv. Res. Note INT-180.
248. Reid, R.W. 1958. Internal changes in the female mountain Pine beetle, *Dendroctonus monticolae* Hopk. associated with egg laying and flight. Can. Ent. 90(8): 464-468.

249. Reid, R.W. 1958. The behaviour of the mountain Pine beetle, *Dendroctonus monticolae* Hopk. during mating, egg laying, and gallery construction. Can. Ent. 90(9): 505-509.
250. Reid, R.W. 1958. Nematodes associated with the mountain Pine beetle. Bi-mon. Res. Notes 14(1): 3.
251. Reid, R.W. 1961. Moisture changes in Lodgepole Pine before and after attack by the mountain Pine beetle. For. Chron. 37(4): 368-375.
252. Reid, R.W. 1962. Biology of the mountain Pine beetle, *Dendroctonus monticolae* Hopkins in the east Kootenay region of British Columbia. I. Life cycle, brood development and flight periods. Can. Ent. 94(5): 531-538.
253. Reid, R.W. 1962. Biology of the mountain Pine beetle, *Dendroctonus monticolae* Hopkins in the east Kootenay region of British Columbia. II. Behaviour in the host, fecundity and internal changes in the female. Can. Ent. 94(6): 605-613.
254. Reid, R.W. 1963. Biology of the mountain Pine beetle, *Dendroctonus monticolae* Hopkins, in the East Kootenay region of British Columbia. III. Interaction between the beetle and its host, with emphasis on brood mortality and survival. Can. Ent. 95(3): 225-238.
255. Reid, R.W. 1969. The influence of humidity on incubating bark beetle eggs. Can. Ent. 101(2): 182-183.
256. Reid, R.W., and H.S. Gates. 1970. Effect of temperature and resin on hatch of eggs of the mountain Pine beetle (*Dendroctonus ponderosae*). Can. Ent. 102(5): 617-622.

257. Reid, R.W., and H.S. Gates. 1972. Relations between some physiological functions in Lodgepole Pine and resistance to the mountain Pine beetle. For. Res. Lab., Edmonton Info. Rept. NOR-X-15. 35 pp.
258. Reid, R.W., and D.M. Shrimpton. 1971. Resistant response of Lodgepole Pine to inoculation with *Europhium clavigerum* in different months and at different heights of the stem. Can. J. Bot. 49(3): 349-351.
259. Reid, R.W., and J.A. Watson. 1966. Sizes, distributions and numbers of vertical resin ducts in Lodgepole Pine. Can. J. Bot. 44: 519-525.
260. Reid, R.W., H.S. Whitney, and J.A. Watson. 1967. Reactions of Lodgepole Pine to attack by *Dendroctonus ponderosae* Hopkins and blue stain fungi. Can. J. Bot. 45(7): 1115-1126.
261. Renwick, J.A.A. 1970. Chemical aspects of bark beetle aggregation. Contrib. Boyce Thompson Inst. 24(13): 337-342.
262. Renwick, J.A.A., and J.P. Vité. 1970. Systems of Chemical Communication in *Dendroctonus*. Contrib. Boyce Thompson Inst. 24(13): 283-292.
263. Rice, R.E. 1969. Bionomics of *Enoclerus barri* (Coleoptera: Cleridae). Can. Ent. 101(4): 382-386.
264. Richerson, J.V., and J.H. Borden. 1972. Host finding behavior of *Coeloides brunneri* (Hymenoptera: Braconidae). Can. Ent. 104(8): 1235-1250.
265. Richmond, H.A. 1931. Annual report of investigations of *Dendroctonus monticolae* Hopk. in Yellow Pine and Lodgepole Pine stands, Aspen Grove, B.C., population and life history studies, damage and tree mortality, parasites and predators, host selection. Can. Dept. Agric., For. Ins. Invest. Vernon, B.C. Ann. Rept. 99 pp.

266. Richmond, H.A. 1933. Host selection studies of *Dendroctonus monticolae* Hopkins in southern B.C. For. Chron. 9(2): 60-61.
267. Richmond, H.A. 1934. Summary of season's work - Aspen Grove Project. For. Inst. Invest. Vernon, B.C. Ann. Rept.
268. Richmond, H.A. 1936. Studies on the mountain Pine beetle. Forest Entomology Laboratory, Vernon, B.C. Ann. Rept.
269. Richmond, H.A. 1947. Mountain Pine Beetle (*Dendroctonus monticolae*, Hopk.) - British Columbia. Can. Ins. Pest Rev. 25: 73.
270. Richmond, H.A. 1953. Forest-Insect Investigations Forest-Insect survey. B.C. Dept. Lands For., For. Serv. Ann. Rept. 1952: 86-89.
271. Robinson, Robena C. 1961. Blue stain of bark-beetle infested Lodgepole Pine. Can. Dept. For., For. Biol. Div. Bi-mon. Prog. Rept. 17(1): 3-4.
272. Robinson, Robena C. 1962. Blue stain fungi in Lodgepole Pine (*Pinus contorta* Dougl. var. *latifolia* Engelm.) infested by the mountain Pine beetle (*Dendroctonus ponderosae* Hopk.). Can. J. Bot. 40(4): 609-614.
273. Robinson-Jeffrey, Robena C., and R.W. Davidson. 1968. Three new *Europhium* species with *Verticicladiella* imperfect states on blue stained pine. Can. J. Bot. 46: 1523-1527.
274. Robinson-Jeffrey, Robena C., and A.H.H. Grinchenko. 1964. A new fungus in the genus *Ceratocystis* occurring on blue-stained Lodgepole Pine attacked by bark beetles. Can. J. Bot. 42(5): 527-532.

275. Roe, A.L., and G.D. Amman. 1970. The mountain Pine beetle in Lodgepole Pine forests. USDA For. Serv. Res. Pap. INT-71: 23 pp.
276. Ross, D.A. 1954. Interior forests. Can. Dept. Agric. For. Ins. Dis. Serv. Rept. 1953: 141-149.
277. Ross, D.A. 1965. Control of mountain Pine beetle, *Dendroctonus ponderosae* Hopk., brood in logs with lindane emulsion. Proc. Ent. Soc. B.C. 62: 8-10.
278. Ross, D.A., and P.A. Jones. 1951. Important insects - British Columbia Interior Forests. Can. Dept. Agric. Div. Ent. For. Ins. Surv. Rept. 1950: 111-123.
279. Ross, D.A., and P.A. Jones. 1952. Important insects - British Columbia Interior Forests. Can. Dept. Agric. For. Ins. Dis. Surv. Rept. 1951: 108-118.
280. Ross, D.A., and P.A. Jones. 1953. Important Insects - British Columbia Interior Forests. Can. Dept. Agric. For. Ins. Dis. Surv. Rept. 1952: 132-141.
281. Rudinsky, J.A. 1962. Factors affecting the population density of bark beetles. Ore. Agric. Exp. Sta. Tech. Pap. 1463: 7 pp.
282. Rudinsky, J.A., and R.R. Michael. 1973. Sound production in Scolytidae: Stridulation by female *Dendroctonus* beetles. J. Ins. Physiol. 19(3): 689-705.
283. Rudinsky, J.A., M.E. Morgan, L.M. Libbey, and T.B. Putnam. 1973. Anti-aggregative-rivalry pheromone of the Mountain Pine beetle, and a new arrestant of the Southern Pine beetle. Env. Ent. 3(1): 90-98.

284. Rumbold, Caroline T. 1931. Two blue-staining fungi associated with bark-beetle infestation of pines. *J. Agri. Res.* 18(10): 847-873.
285. Rumbold, C.T. 1941. A blue stain fungus, *Ceratostomella montium* n. sp., and some yeasts associated with two species of *Dendroctonus*. *J. Agric. Res.* 62: 589-601.
286. Rust, H.J. 1931. Natural aids to beetle control. *Timberman* 32(6).
287. Rust, H.J. 1933. Many bark beetles destroyed by predacious mites. *J. Econ. Ent.* 26: 733-744.
288. Rust, H.J. 1935. The role of predatory agents in the artificial control of the mountain Pine beetle. *J. Econ. Ent.* 28(4): 688-691.
289. Safranyik, L. 1971. Some characteristics of the spatial arrangement of attacks by the mountain Pine beetle, *Dendroctonus ponderosae* (Coleoptera: Scolytidae), on Lodgepole Pine. *Can. Ent.* 103(11): 1607-1625. (Appendix by C. Vithayasai)
290. Safranyik, L., and K. Graham. 1971. Edge-effect bias in the sampling of subcortical insects. *Can. Ent.* 103(2): 240-255.
291. Safranyik, L., and R. Jähren. 1970. Emergence patterns of the mountain Pine beetle from Lodgepole Pine. *Bi-mon. Res. Notes* 26(2): 11, 19.
292. Safranyik, L., and R. Jähren. 1970. Host characteristics, brood density and size of mountain Pine beetles emerging from Lodgepole Pine. *Bi-mon. Res. Notes* 26(4): 35-36.
293. Safranyik, L., D.M. Shrimpton, and H.S. Whitney. 1973. An Interpretation of the Interaction between Lodgepole Pine,

- the mountain Pine beetle and its associated blue stain fungi in western Canada. In 'Management of Lodgepole Pine ecosystems', ed. D. Baumgartner. Wash. State Univ. Co-op. Ext. Serv. (1): 406-428.
294. Safranyik, L., D.M. Shrimpton, and H.S. Whitney. 1974. Management of Lodgepole pine to reduce losses from the mountain Pine beetle. Can. For. Serv. For. Tech. Rept. 1: 26 pp.
295. Salman, K.A. 1933. Forest Insect of the Year, 1932. Mon. Bull. Dept. Agric. Calif. 22(2)(3): 131-137.
296. Salman, K.A. 1938. Recent experiments with penetrating oil sprays for the control of bark beetles. J. Econ. Ent. 31(1): 119-123.
297. Sand, N.H., and M.M. Bryan. 1947. Managing the small forest. USDA Farmers Bull. 1989: 28.
298. Sartwell, C. 1971. Thinning Ponderosa Pine to prevent outbreaks of mountain Pine beetle. In 'Precommercial thinning of Coastal and Intermountain Forests in the Pacific Northwest'. Wash. St. Univ. p. 41-52.
299. Sartwell, C., and R.E. Stevens. 1975. Mountain Pine Beetle in Ponderosa Pine: prospects for silvicultural control in second growth stands. J. For. 73(3): 136-140.
300. Schmid, J.M. 1967. Asilid predation on the Black Hills beetle *D. ponderosae*. Ent. Soc. Amer. Bull. Proj. Issue 13: 195.
301. Schmid, J.M. 1968. *Medetera aldrichii* Wh. predator of the Black Hills beetle. Proc. N. Cent. Br. Amer. Ass. Econ. Ent. 23(1): 46.

302. Schmid, J.M. 1969. *Laphria gilva* (Diptera: Asilidae), a predator of *Dendroctonus ponderosae* in the Black Hills of South Dakota. Ann. Ent. Soc. Amer. 62(6): 1237-1241.
303. Schmid, J.M. 1970. *Medetera aldrichii* (Diptera: Dolichopodidae) in the Black Hills. I. Emergence and behavior of the adults. Can. Ent. 102(6): 705-713.
304. Schmid, J.M. 1970. *Enoclerus sphegeus* (Coleoptera: Cleridae), a predator of *Dendroctonus ponderosae* (Coleoptera: Scolytidae) in the Black Hills. Can. Ent. 102(8): 969-977.
305. Schmid, J.M. 1971. *Medetara aldrichii* (Diptera: Dolichopodidae) in the Black Hills. II. Biology and densities of the immature stages. Can. Ent. 103(6): 848-853.
306. Schmid, J.M. 1972. A problem in the front range: Pine beetles. Colo. Outdoors 21(6): 37-39.
307. Schmid, J.M. 1972. Emergence, attack densities and seasonal trends of mountain Pine beetles (*Dendroctonus ponderosae*) in the Black Hills. USDA For. Serv. Res. Note RM-211: 7 pp.
308. Schoffer, G.A., and G.N. Lanier. 1970. A sexual character in pupae of *Dendroctonus* (Coleoptera: Scolytidae). Can. Ent. 102(11): 1487-1488.
309. Schonherr, J. 1971. The susceptibility of bark beetles to light of short wavelengths. Z. Angew. Ent. 68(3): 244-250.
310. Sharp, R.H., and R.E. Stevens. 1962. New techniques for spraying standing trees infested with bark beetles. J. For. 60(8): 548-550.

311. Shea, K.R. 1971. Disease and insect activity in relation to intensive culture of forests. Proc. XV Int. Union For. Res. Org. p. 109-118.
312. Shepherd, R.F. 1965. Distribution of attacks by *Dendroctonus ponderosae* Hopkins on *Pinus contorta* Dougl. var. *latifolia* Englm. Can. Ent. 97(2): 207-215.
313. Shepherd, R.F. 1966. Factors influencing the orientation and rates of activity of *Dendroctonus ponderosae* Hopkins (Coleoptera: Scolytidae). Can. Ent. 98(5): 507-518.
314. Shepherd, R.F., and J.A. Watson. 1959. Blue stain fungi associated with the mountain Pine beetle. Can. Dept. Agric. Bi-mon. Prog. Rept. 15(3): 2-3.
315. Shifrine, M., and H.J. Phaff. 1956. The association of yeasts with certain bark beetles. Mycologia XLVIII (1): 41-55.
316. Shrimpton, D.M. 1973. Extractives associated with the wound response of Lodgepole Pine attacked by the mountain Pine beetle and associated micro-organisms. Can. J. Bot. 51(3): 527-534.
317. Shrimpton, D.M. 1973. Age- and size-related response of Lodgepole Pine to inoculation with *Europhium clavigerum*. Can. J. Bot. 51(6): 1155-1160.
318. Shrimpton, D.M., and R.W. Reid. 1973. Change in resistance of Lodgepole Pine to mountain Pine beetle between 1965 and 1972. Can. J. For. Res. 3(3): 430-432.
319. Shrimpton, D.M., and J.A. Watson. 1971. Response of Lodgepole Pine seedlings to inoculation with *Europhium clavigerum*, a blue stain fungus. Can. J. Bot. 49: 373-375.

320. Shrimpton, D.M., and H.S. Whitney. 1968. Inhibition of growth of blue stain fungi by wood extractives. *Can. J. Bot.* 46: 757-761.
321. Silver, G.T., and D.A. Ross. 1955. Province of British Columbia Forest Insect Survey. *Can. Dept. Agric. For. Ins. Dis. Surv. Rept.* 1954: 115-127.
322. Silver, G.T., and D.A. Ross. 1956. Province of British Columbia Forest Insect Survey. *Can. Dept. Agric. For. Ins. Dis. Surv. Rept.* 1955: 92-101.
323. Smith, H.S. 1941. Racial segregation in Insect Populations and its Significance in applied Entomology. *J. Econ. Ent.* 34: 1-12.
324. Smith, R.H. 1963. Toxicity of pine resin vapours to three species of *Dendroctonus* bark beetles. *J. Econ. Ent.* 56(6): 827-831.
325. Smith, R.H. 1965. A physiological difference among beetles of *Dendroctonus ponderosae* Hopk. (= *D. monticolae* Hopk.). *Ann. Ent. Soc. Amer.* 58(4): 440-442.
326. Smith, R.H. 1970. Length of effectiveness of lindane against attacks by *Dendroctonus brevicomis* and *D. ponderosae* in California. *J. Econ. Ent.* 63(4): 1180-1181.
327. Smith, R.H. 1972. Xylem resin in the resistance of the Pinaceae to bark beetles. *USDA For. Serv. Res. Note PSW-1*: 7 pp.
328. Stage, A.R. 1973. Prognosis model for stand development. *USDA For. Ser. Res. Pap. INT-137*: 32 pp.
329. Stage, A.R. 1973. Forest Stand Prognosis in the presence of pests: developing the expectations. In 'Management of Lodgepole Pine ecosystems', ed. D. Baumgartner. *Wash. State Univ. Co-op. Ext. Serv. (1)*: 233-245.

330. Stark, R.W. 1968. Substances attractives chez les Scolytides.
Mitteilungen der Schweizerischen Entomologischen Gesellschaft.
XLI (1-4): 245-252.
331. Stark, R.W., and F.W. Cobb, Jr. 1969. Smog injury, root diseases
and bark beetle damage in Ponderosa Pine. Calif. Agric. 23(9):
13-15.
332. Stark, R.W., P.R. Miller, F.W. Cobb, Jr., D.L. Wood, and J.R. Parmeter,
Jr. 1968. Photochemical oxidant injury and Bark Beetle (Coleoptera:
Scolytidae) infestation of Ponderosa Pine. Hilgardia 39(6):
121-126.
333. Stark, R.W., P.R. Miller, F.W. Cobb, Jr., D.L. Wood, and J.R. Parmeter,
Jr. 1968. Photochemical oxidant injury and Bark Beetle (Coleoptera:
Scolytidae) infestation of Ponderosae Pine. I. Incidence of
bark beetle infestation in injured trees. Hilgardia 39(6):
121-126.
334. Steiner, G. 1932. Some nemic parasites and associates of the
mountain Pine beetle (*Dendroctonus monticolae*). J. Agric. Res.
45(7): 437-444.
335. Stevens, R.E. 1957. Ethylene dibromide emulsion spray for control
of the mountain Pine beetle in Lodgepole Pine. USDA For. Serv.
Res. Note 122: 4 pp.
336. Stevens, R.E., D.B. Cahill, C.K. Lister, and G.E. Metcalf. 1974.
Timing cacodylic acid treatments for control of mountain Pine
beetles in infested Ponderosa Pines. USDA For. Serv. Res. Note
RM-262: 4 pp.

337. Stevens, R.E., and J.A. Mitchell. 1970. Lindane spray effective against the mountain Pine beetle in the Rocky Mountains. USDA For. Serv. Res. Note RM-167: 3 pp.
338. Stevens, R.E., C.A. Myers, W.F. McCambridge, G.L. Domming, and J.G. Lant. 1974. Mountain Pine beetle in front range Ponderosa Pine: what it's doing and how to control it. USDA For. Serv. Gen. Tech. Rept. RM-7: 3 pp.
339. Strong, L.A. 1936. Report of the Chief of the Bureau of Entomology and Plant Quarantine, Wash., D.C. 122 pp.
340. Strong, L.A. 1939. Report of the Chief of the Bureau of Entomology and Plant Quarantine, 19 [38-] 39. USDA Washington, D.C. 117 pp.
341. Strong, L.A. 1940. Report of the Chief of the Bureau of Entomology and Plant Quarantine, 19 [39-] 40. USDA Washington, D.C. 128 pp.
342. Struble, G.R. 1942. Biology of two native Coleopterous predators of the mountain Pine beetle in Sugar Pine. Pan-Pacific Ent. 18(3): 97-107.
343. Struble, G.R. 1942. Laboratory propagation of two predators of the Mountain Pine Beetle. J. Econ. Ent. 35(6): 840-844.
344. Struble, G.R. 1965. Attack pattern of mountain Pine beetle in Sugar Pine stands. USDA For. Serv. Res. Note PSW -60: 1-7.
345. Struble, G.R., and L.H. Carpelan. 1941. External sex characters of two important native predators of the mountain Pine beetle in Sugar Pine (Coleoptera: Ostomatidae, Cleridae). Pan-Pacific Ent. 17(4): 153-156.
346. Struble, G.R., and P.C. Johnson. 1955. The mountain Pine beetle. USDA For. Pest Leaflet 2. 4 pp.

347. Sugden, B.A., and D.A. Ross. 1965. The mountain Pine beetle, *Dendroctonus ponderosae* Hopk., in Interior British Columbia. For. Ent. Lab., Vernon. Can. Dept. For. Rept.: 4 pp.
348. Swaine, J.M. 1913. The economic importance of Canadian Ipidae. (Scolytidae). Proc. Ent. Soc. B.C., Victoria. 3 (n.s.): 41-43.
349. Swaine, J.M. 1913. Notes on some forest insects of 1912. Ent. Soc. Ont. 43: 87-92.
350. Swaine, J.M. 1914. Forest Insect Conditions in British Columbia. Can. Dept. Agric. Ent. Bull. 7: 43 pp.
351. Swaine, J.M. 1917. Canadian Bark Beetles, descriptions of new species. Dom. of Can. Ent. Bull. 14(1).
352. Swaine, J.M. 1918. Canadian bark beetles. II. A preliminary classification, with an account of the habits, injuries and means of control. Can. Dept. Agric. Tech. Bull. 14(2): 65.
353. Swaine, J.M. 1920. The pine bark beetle outbreaks. Agric. Gaz. 7(8): 642-644.
354. Swaine, J.M. 1925. The factors determining the distribution of Canadian Bark beetles. Can. Ent. 57(11): 261-266.
355. Swaine, J.M. 1928. Progress in Forest insect control in Canada. Pulp & Paper Mag. of Canada. 500-502.
356. Swaine, J.M. 1933. The relation of insect activities to forest development as exemplified in the forests of Eastern North America. Science Agric. 14(1): 8-31.
357. Tackle, D. 1959. (Revised 1961). Silvics of Lodgepole Pine. USDA For. Serv. Misc. Publ. 19.

358. Taylor-Vinge, Mary. 1940. Studies in *Ceratostomella montium*.
Mycologia 32: 760-775.
359. Teillon, H.B., R. Hunt, B. Roettgering, and J. Pierce. 1973.
Western Pine beetle and other bark beetles: lindane emulsion
effective in California tests. J. Econ. Ent. 66(1): 208-211.
360. Thomas, J.B. 1967. A comparative study of gastric caeca in adult
and larval stages of bark beetles (Coleoptera: Scolytidae).
Proc. Ent. Soc. Ont. 97(1966): 71-90.
361. Thorne, G. 1935. Nemic parasites and associates of the Mountain
Pine beetle in Utah. J. Agric. Res. 51(2): 131-144.
362. Tripp, H.A., D.A. Ross, and J.A. Baranyay. 1974. British Columbia
Region. Can. Dept. Env. For. Ins. Dis. Surv. Ann. Rept. 1973.
363. Tunnock, S. 1970. A chronic infestation of mountain Pine beetles
in Lodgepole Pine in Glacier National Park, Montana. J. Ent.
Soc. B.C. 67: 23.
364. Twinn, C.R. 1932. A summary of insect conditions in Canada in 1930.
Ann. Rept. Que. Soc. Prot. Pl. 1930-32. 149-168.
365. Twinn, C.R. 1935. A summary of insect conditions in Canada in 1934.
Ent. Soc. Ontario Rept. 65: 123.
366. Twinn, C.R. 1938. A summary of the insect pest situation in Canada
in 1938. Ent. Soc. Ontario Rept. 69: 133.
367. Twinn, C.R. 1942. A summary of the more important crop pests in
Canada in 1941. Ent. Soc. Ontario Rept. 72: 55.
368. Twinn, C.R. 1943. A summary of the more important crop pests in
Canada in 1942. Ent. Soc. Ontario. Rept. 73: 70.

369. Twinn, C.R. 1943. A summary of the more important crop pests in Canada in 1942. *Can. Ins. Pest Rev.* 21: 8.
370. Vité, J.P. 1970. Pest management systems using synthetic pheromones. *Contrib. Boyce Thompson Inst.* 24(13): 343-350.
371. Vité, J.P., and G.B. Pitman. 1967. Concepts in Research on Bark Beetle Attraction and Manipulation. *Proc. XIV Intern. Union For. Res. Organ., Munich.* Section 24: 683-701.
372. Vité, J.P., and G.B. Pitman. 1968. Bark beetle aggregation: effects of feeding on the release of pheromones in *Dendroctonus* and *Ips*. *Nature* 218 (5137): 169-170.
373. Vité, J.P., and G.B. Pitman. 1969. Insect and host odors in the aggregation of the Western Pine beetle. *Can. Ent.* 101(2): 113-117.
374. Vité, J.P., and J.A. Renwick. 1970. Differential diagnosis and isolation of population attractants. *Contrib. Boyce Thompson Inst.* 24(13): 323-328.
375. Vité, J.P., and D.L. Wood. 1961. A study on the applicability of the measurement of oleoresin exudation pressure in determining susceptibility of second growth Ponderosa Pine to bark beetle infestation. *Contrib. Boyce Thompson Inst.* 21(2): 37-66.
376. Von Schrenk, H. 1903. The "blueing" and the "red rot" of the Western Yellow Pine with special reference to the Black Hills Forest Reserve. *USDA Bur. of Pl. Indust. Bull.* 36-40.
377. Watson, J.A. 1970. Rhythmic emergence patterns of the mountain Pine beetle *Dendroctonus ponderosae* Hopkins, (Coleoptera: Scolytidae). *Can. Ent.* 102(8): 1054-1056.

378. Watson, J.A. 1971. Survival and fecundity of *Dendroctonus ponderosae* (Coleoptera: Scolytidae) after laboratory storage. *Can. Ent.* 103(10): 1381-1385.
379. Wear, J.F. 1967. Aerial colour photos identify beetle-infested Lodgepole Pine. *For. Indust.* 94: 56-59.
380. Weaver, H. 1934. The development and control of pine beetle epidemics. *J. For.* 32: 100-103.
381. Whiteside, J.M. 1957. Forest insect conditions in the Pacific Northwest - 1956. USDA Pacific Northwest For. Range Expt. Sta. *For. Ins. Cond.* 1956: 2,13,31,43.
382. Whitney, H.S. 1971. Association of *Dendroctonus ponderosae* (Coleoptera: Scolytidae) with blue stain fungi and yeasts during brood development in Lodgepole Pine. *Can. Ent.* 103(11): 1495-1503.
383. Whitney, H.S., and R.A. Blauel. 1972. Spore dispersion in *Ceratocystis* spp. and *Europhium clavigerum* in conifer resin. *Mycologia* 64: 410-414.
384. Whitney, H.S., and S.H. Farris. 1970. Maxillary mycangium in the mountain Pine beetle. *Science* 167: 54-55.
385. Wickman, B.E., and R.L. Lyon. 1962. Experimental control of the mountain Pine beetle in Lodgepole Pine with lindane. *J. For.* 60(6): 395-399.
386. Wood, R.O. 1971. Annual District Reports Forest Insect and Disease Survey I-V. Pac. For. Res. Cen., Victoria. Info. Rept. BC-X-64.

387. Wood, S.L. 1963. A revision of the bark beetle genus *Dendroctonus* Erickson (Coleoptera: Scolytidae). Great Basin Naturalist 23: 1-117.
388. Wyman, L. 1924. Bark beetle epidemics and rainfall deficiency. USFS Ser. Bull. 8(40): 2,3.
389. Yasinski, F.M. 1956. Forest insect conditions in Arizona and New Mexico - 1955. USDA For. Serv. Res. Pap. 23: 2,5,7.
390. Yuill, J.S. 1941. Cold hardiness of two species of bark beetles in California Forests. J. Econ. Ent. 34(5): 702-709.

- G1. Berryman, A.A. 1971. Resistance of conifers to invasion by bark beetle-fungus associations. *Bioscience* 22(10): 598-602.
- G2. Berryman, A.A. 1974. Dynamics of bark beetle populations towards a general productivity model. *Env. Ent.* 3: 579-585.
- G3. Berryman, A.A., and L.V. Pienar. 1974. Simulation: a powerful method of investigating the dynamics and management of insect populations. *Env. Ent.* 3: 199-207.
- G4. Caird, R.W. 1935. Physiology of Pines infested with bark beetles. *Bot. Gaz.* 96: 709-733.
- G5. Felt, E.P. 1924. *Manual of Tree and Shrub Insects*. Chapter XIV. Bark beetles and ambrosia or timber beetles attacking conifers. Mountain Pine beetle p. 255. Black Hills beetle p. 256.
- G6. Franke-Grossman, Helene. 1963. Some new aspects of forest entomology. *Ann. Rev. Ent.* 8: 415.
- G7. Francke-Grosmann, H. 1967. Ectosymbiosis in wood-inhabiting insects. In 'Symbiosis' Vol. II. ed. S. Mark Henry. Academic Press, New York and London. p. 141-205.
- G8. Graham, K. 1967. Insect mutualism in trees and timber. *Ann. Rev. Ent.* 12: 105-126.
- G9. Griffin, H.D. 1966. The genus *Ceratocystis* in Ontario. *Can. J. Bot.* 46: 689-718.
- G10. Holtman, B.W. 1966. Blue stain - a note on its effect on the wood of home grown conifers and suggested methods of control. Great Britain For. Comm. Leaflet 53: 4 pp.
- G11. Kaarik, Aino. 1960. Growth and sporulation of *Ophiostoma* and some other blueing fungi on synthetic media. *Sym. Bot. Upsalienses* 16(3): 168 pp.

- G12. Knight, F.B. 1967. Evaluation of forest insect infestations. *Ann. Rev. Ent.* 12: 207-228.
- G13. Kotok, E.S. 1971. Lodgepole Pine. USDA American Woods FS-253.
- G14. Lindquist, E.E. 1969. Mites and the regulation of bark beetle populations. *Proc. 2nd Intern. Cong. Acarology.* 1967.
- G15. Rudinsky, J.A. 1962. Ecology of Scolytidae. *Ann. Rev. Ent.* 7: 327-348.
- G16. Stark, R.W. 1965. Recent trends in forest entomology. *Ann. Rev. Ent.* 10: 303-324.
- G17. Wear, J.F., R.B. Pope, and P.W. Orr. 1966. Aerial photographic techniques for estimating damage by insects in Western Forests. Pacific Northwest Forest and Range Exp. Sta. Portland, Oregon. 79 pp.
- G18. Weaver, Harold. 1943. Fire as an ecological and silvicultural factor in the Ponderosa Pine region of the Pacific slope. *J. For.* 41: 7-14.
- G19. Wygant, N.D. 1959. Forest Insects. Bark beetle control. *J. For.* 57(4): 243-289.
- T1. Blauel, R.A. 1967. Aspects of *Ceratocystis montia* pathology and ontogeny. M.A. thesis Univ. of Montana, Missoula, Mont.
- T2. Cochran, J.E. 1972. Predisposition of root infected ponderosa pine to attack by *Dendroctonus ponderosae*. M.S. Thesis, Univ. Wyo.
- T3. Cole, W.E. 1973. Responses of the mountain Pine beetle, *Dendroctonus ponderosae* Hopkins (Coleoptera: Scolytidae), to crowding during its immature stages. Ph.D. Thesis, North Carolina State Univ., Raleigh. *Diss. Abstr. Inter. B.* 33(7): 3117.

- T4. Farmer, L.J. 1965. The phloem-yeast complex during infestations of the mountain Pine beetle in Lodgepole Pine. Ph.D. Thesis, University of Utah. University microfilms, A xerox Co., Ann Arbor, Michigan.
- T5. Mathre, D.E. 1964. Studies on the pathogenicity to Ponderosa Pine of *Ceratocystis* spp. associated with bark beetles in California. Ph.D. Thesis, Univ. Microfilms Inc., University of Calif. Davis. Agric. Plant Path.
- T6. Mogren, E.W. 1955. A study of some aspects of susceptibility on Ponderosa Pine to attack by Black Hills beetle. Ph.D. Thesis published in microfilm, Univ. Microfilms, Ann Arbor Mich. Diss. Abs. 15(9): 1477.
- T7. Olchowecki, A. 1972. Taxonomy of the genus *Ceratocystis* in Manitoba. Ph.D. Thesis, Univ. of Manitoba, Dept. of Botany. 155 pp.
- T8. Peterman, R.M. 1974. Some aspects of the population dynamics of the mountain Pine beetle, *Dendroctonus ponderosae*, in Lodgepole Pine forests of British Columbia. Ph.D. Thesis, Dept. Zoology, U.B.C.
- T9. Reid, R.W. 1960. Studies of the biology of the mountain Pine beetle, *Dendroctonus monticolae* Hopk. (Coleoptera: Scolytidae). Ph.D. Thesis, Montana State College, Bozeman, Montana. 98 pp.
- T10. Richmond, H.A. 1935. A morphological study of the bark beetle *Dendroctonus monticolae* Hopk. M.Sc. Thesis. Faculty of Graduate Studies, McGill University, Montreal. 66 pp.
- T11. Safranyik, L. 1968. Development of a technique for sampling mountain Pine beetle populations in Lodgepole Pine. Ph.D. Thesis, Univ. of British Columbia, Vancouver, 195 pp.

- T12. Schmid, J.M. 1968. Three insect predators of *Dendroctonus ponderosae* Hopkins. Ph.D. Dissertation, Univ. Mich., Ann Arbor.
- T13. Shepherd, R.F. 1960. Distribution of the Black Hills beetle over the host tree and factors controlling the attraction and behavior of the adult. Ph.D. Thesis, U. Minnesota, Minneapolis, Minn. 82 pp.
- T14. Syed, A. 1972. Chemical determinants of tree susceptibility to mountain pine beetle (*Dendroctonus ponderosae* Hopkins). M. For. Thesis, U.B.C., 76 pp.
- T15. Wygant, N.D. 1940. Effects of low temperature on the Black Hills Beetle (*Dendroctonus ponderosae* Hopk.). Summary of a Ph.D. Thesis submitted to the New York State School of Forestry. On file at the USDA Rocky Mountain Forest and Range Experiment Stn., Fort Collins, Colorado. 57 pp.

AUTHOR INDEX

<u>Author</u>	<u>Publications</u>
Alexander, N.E.	76
Alexander, R.R.	1,2,3
Amman, G.D.	4,5,6,7,8,9,10,11,12,13,14,30,73,275
Anderson, D.J.	108
Anderson, R.F.	15
Annand, P.N.	16
Anonymous	17,18,19,20,21,22,23,24,25,26,27,28,29
Baker, B.H.	11,12,30
Balch, R.E.	240
Baranyay, J.A.	362
Barter, G.W.	240
Beal, J.A.	31,32,219
Beall, G.	140
Bean, J.L.	117
Bedard, W.D.	33,95,101
Bedard, William D.	34
Beeson, C.F.C.	35
Berryman, A.A.	G1,G2,G3,36
Billings, R.F.	111
Blackman, M.W.	37
Blauel, R.A.	T1,383
Boldt, C.E.	38
Borden, J.H.	264
Boss, G.D.	39
Bousfield, W.E.	200

Boyce, J.C.	40
Brindley, W.A.	155
Brown, A.W.A.	41,42
Brown, G.S.	43,44
Brunner, J.	45
Bryan, M.M.	297
Bucher, G.E.	46
Burke, H.E.	47,85
Bushing, R.W.	48
Butterick, P.L.	49
Cahill, D.B.	50,61,336
Caird, R.W.	G4
Callahan, R.Z.	51
Carlson, R.W.	52
Carpelan, L.H.	345
Caverhill, P.Z.	53,54
Cerezke, H.F.	55
Chamberlin, W.J.	56,57,58,59
Chansler, J.F.	60,61
Chisolm, R.D.	210,211
Clark, L.R.	108
Clements, V.A.	62
Cobb, F.W., Jr.	63,64,65,217,331,333
Cochran, J.E.	T2
Cole, W.E.	T3,52,66,67,68,69,70,71,72,73,74,75
Collis, D.G.	76
Cottrell, C.B.	77,78

Coulson, R.N.	230
Craighead, F.C.	79,80,81,82,83,84,85
Cushman, R.A.	86
Dahlsten, D.L.	87,88
Davidson, R.W.	273
Davis, D.W.	226
DeLeon, D.	89,90,91,92,93,94,95
Dolph, R.E., Jr.	96
Domming, G.L.	338
Dyer, E.D.A.	99
Eaton, C.B.	97
Edmundston, W.D.	85
Evans, D.	98,99
Evenden, J.C.	84,85,100,101,102
Farmer, L.J.	T4
Farris, S.H.	103,384
Felt, E.P.	G5
Fentiman, A.F.	235,236
Fiddick, R.L.	77,78
Foiles, M.W.	104
Franke-Grosmann, H.	G6,G7
Furniss, M.M.	105
Gara, R.I.	111
Gardiner, J.G.	106,107
Gates, H.S.	256,257
Geier, P.W.	108
Gibson, A.L.	102,109,110

Graham, K.	G8,290
Graham, S.A.	85
Gray, B.	111
Griffin, H.D.	G9
Grinchenko, A.H.H.	274
Hall, D.G.	112
Hamel, D.R.	113,201,202
Hay, J.C.	114
Heller, R.C.	115,116,117
Herman, S.G.	87
Hester, D.A.	118
Hewitt, C.G.	119,120
Hoffman, C.H.	121
Holt, H.A.	220
Holtman, B.W.	G10
Hopkins, A.D.	122,123,124,125,126,127,128,129,130,131, 132,133,134,135
Hopping, G.R.	136,137,138,139,140,141,240
Hopping, R.	142,143,144,145
Houseweart, M.W.	146
Hughes, P.R.	147,148
Humphreys, W.J.	230
Hunt, R.	359
Jaenicke, A.J.	149
Jahren, R.	291,292
Johnsey, R.L.	111
Johnson, P.C.	150,151,152,153,154,346

Jones, P.A.	278,279,280
Jones, R.G.	155
Kaarik, A.	G11
Keen, F.P.	84,85,156,157,158,159,160,161
Khan, M.A.	162
Kinghorn, J.M.	163,164,240
Kinzer, G.W.	235,236
Klein, W.H.	165
Knight, F.B.	G12,117,166,167,168,169,170
Kotok, E.S.	G13
Kusch, D.S.	171
Lanier, G.N.	172,308
Lant, J.G.	338
Leech, H.B.	173,174,175,176
Lejeune, R.R.	240
Libbey, L.M.	283
Lindquist, E.E.	G14
Lister, C.K.	336
Lood, R.C.	200,201,202
Lyon, R.L.	177,178,179,180,385
MacKay, M.R.	181,182,183
McCambridge, W.F.	184,185,186,187,188,189,190,191,192,193,194, 195,338
McGhehey, J.H.	196,197,198
McGregor, M.D.	113,199,200,201,202
McGuffin, W.C.	203,204,205,206
McNew, G.L.	207

Marlatt, C.L.	208
Massey, C.L.	209,210,211
Mata, S.A., Jr.	194,212
Mathers, W.G.	141,213,214
Mathre, D.E.	T5,215
Merkel, E.P.	121
Metcalf, G.E.	336
Meyer, H.E.	113,200,201,202
Micheal, R.R.	282
Middleton, W.C.	83
Miller, J.M.	84,85,216
Miller, P.R.	64,217,333
Mitchell, J.A.	337
Moeck, H.A.	230
Mogren, E.W.	T6,218
Morgan, M.E.	283
Morris, R.F.	240
Myers, C.A.	338
Nelson, R.M.	219
Newton, M.	220
Nix, H.A.	108
Offalax, I.	221
Olchowecki, A.	T7
Orchard, C.D.	222
Orr, P.W.	G17
Osburn, V.R.	223
Ostmark, H.E.	224

Parmeter, J.R., Jr.	65,333
Parker, D.L.	225,226
Patterson, J.E.	85,216,227,228,229
Payne, T.L.	230
Pearson, G.A.	231
Person, H.L.	85
Peterman, R.M.	T8
Phaff, H.J.	315
Pienar, L.V.	G3
Pierce, D.A.	60
Pierce, J.	359
Pitman, G.B.	148,232,233,234,235,236,371,372,373
Pope, R.B.	G17
Powell, J.M.	237,238,239
Prebble, M.L.	240
Preston, J.F.	241
Price, R.	242,243,244
Putnam, T.B.	283
Randall, A.P.	245
Rasmussen, L.A.	13,14,246,247
Reid, R.W.	T9,206,248,249,250,251,252,253,254,255, 256,257,258,259,260,318
Renwick, J.A.A.	261,262,374
Rice, R.E.	263
Richerson, J.V.	264
Richmond, H.A.	T10,240,265,266,267,268,269,270
Robinson, R.C.	271,272

Robinson-Jeffrey, R.C.	273,274
Roe, A.L.	275
Roettgering, B.	359
Ross, D.A.	276,277,278,279,280,321,322,347,362
Rudinsky, J.A.	G15,281,282,283
Rumbold, C.T.	284,285
Rust, H.J.	286,287,288
Safranyik, L.	T11,289,290,291,292,293,294
Salman, K.A.	161,295,296
Sand, N.H.	297
Sartwell, C.	298,299
Shenk, J.A.	105
Schmid, J.M.	T12,300,301,302,303,304,305,306,307
Schmitz, R.F.	154
Schoffer, G.A.	308
Schonherr, J.	309
Sharp, R.H.	310
Shea, K.R.	311
Shepherd, R.F.	T13,74,312,313,314
Shifrine, M.	51,315
Shrimpton, D.M.	258,293,294,316,317,318,319,320
Silver, G.T.	321,322
Smith, H.S.	323
Smith, R.H.	324,325,326,327
Stage, A.R.	328,329
Stark, R.W.	G16,63,64,65,330,331,333
Steiner, G.	334

Stephen, F.M.	88
Stevens, R.E.	61,299,310,335,336,337,338
Stipe, L.E.	12
Strong, L.A.	339,340,341
Struble, G.R.	101,342,343,344,345,346
Sudgen, B.A.	347
Swain, K.M.	180
Swaine, J.M.	348,349,350,351,352,353,354,355,356
Syed, A.	T14
Tackle, D.	357
Taylor-Vinge, M.	358
Teillon, H.B.	359
Terrell, T.T.	95
Thatcher, T.O.	39
Thomas, J.B.	360
Thorne, G.	361
Tripp, H.A.	362
Trostle, G.C.	30,195
Tunnock, S.	363
Twinn, C.R.	364,365,366,367,368,369
Van Deusen, J.L.	38
Vité, J.P.	234,235,236,262,370,371,372,373,374,375
Von Schrenk, H.	376
Watson, J.A.	259,260,314,319,377,378
Wear, J.F.	G17,379
Weaver, H.	G18,380
Weening, C.	75

Whiteside, J.M.	381
Whitney, H.S.	260,293,294,320,382,383,384
Wickman, B.E.	385
Wilford, B.H.	224
Willson, C.D.	230
Wood, D.L.	48,64,65,172,333,375
Wood, R.O.	386
Wood, S.L.	387
Wygant, N.D.	G19,T15,146,210,211
Wyman, L.	388
Yasinski, F.M.	170,389
Yuill, J.S.	390
Zavarin, E.	217

SUBJECT INDEX

<u>Subject</u>	<u>Publications</u>
adult	198,292,360
aerial-surveys	117
-photography	G17,165,379
aggregation	234,236,261,372,373
air pollutants	63,64,65,217,331,333
aldrin	see insecticides
anatomy	131,134,351,360,387
anti-aggregant	283
arsenic trioxide	see herbicides
Asilidae	see predators
associated insects	31,45,88,91,226,227,228
associated micro-organisms	
- blue stain fungi	G1,G10,G11,34,40,80,215,219,258,260,271, 272,273,274,284,285,293,314,317,319,320, 358,376,382,383,384
- <i>Ceratocystis</i>	G9,215,260,272,274,285,320,358,382,383, 384
- <i>Europhium</i>	257,258,260,272,273,317,319,320,382,383, 384
- general	G6,G7,G8,40,46,49,103,130,209
- non-staining fungi	G1
- yeasts	51,285,315,382
attack-behavior	140,186,192,234,247,248
-densities	307
-distribution	152,289,312,344
-period	95

attractants	
- methods of application	29
- pheromones	29,147,148,207,232,233,234,235,236,246, 261,262,283,330,370,371,372,373,374
- primary host	187,232,325,330,373
- trans-verbenol	147,233,235,246
bacterial pathogens	see bark beetle pathology
bark	4
bark beetle-mortality	60,61,71,72,220,324
-pathology	46
bark-removal	see control-peeling or sampling methods
behavior	120,207,249,253,352
benzene hexachloride	see insecticides
beta-naphthanol	see insecticides
biological control	see control, parasites or predators
biology	94,95,252,253,254,294,358
blue stain fungi	see associated micro-organisms
Braconidae	see parasites
brood-density	66,72,292
-mortality	254
-production	6,197,252,382
cacodylic acid	see herbicides
<i>Ceratocystis</i>	see micro-organisms
chemical-control	see control, insecticides, herbicides or attractants
-messengers	see anti-aggregant or attractants
chlordan	see insecticides

classification	see taxonomy
Cleridae	see predators
climate effects - on beetle	12,135,239,354
- on host	239
cold hardiness	390
Colydidae	see parasites
competition	66,70,71,72
consumption of m.p.b.	see predator effects
control - attractants	see attractants
- biological	288
- burning	G19,31,53,142
- chemical	110,118,121,163,164,178,179,180,210,211,214 223,245,277,296,310,335,336
- herbicides	see herbicides
- history of	84
- insecticides	see insecticides
- logging practices	G10,G19,31,40,53,84,142
- natural agents	G19,88,127,130,265,286
- peeling (bark-removal)	14,31,95
- recommendations	10,62,79,81,84,94,101,127,129,130,141,156, 191,195,241,275,306,338,346,352,355,380
- silvicultural practices	G18,1,2,3,38,104,137,159,160,161,218,299, 311,357
- theory of	241
Copper sulphate	see insecticides
creosote	see insecticides
crowding	see competition

damage	G5, G17, 9, 10, 11, 12, 17, 18, 33, 36, 43, 44, 49, 52, 53, 57, 69, 73, 74, 76, 77, 78, 79, 87, 97, 100, 101, 102, 113, 122, 123, 124, 128, 129, 132, 133, 139, 140, 145, 149, 154, 156, 158, 173, 174, 175, 176, 181, 182, 183, 198, 200, 202, 213, 237, 240, 247, 251, 257, 265, 275, 276, 306, 314, 318, 329, 331, 335, 338, 348, 353, 354, 356
DDT	see insecticides
depredations	see damage
detection	115, 116, 130, 165, 212, 241, 244, 294, 306, 346, 379
deterioration of timber	40, 49, 251, 376
diameter - related to outbreak	43, 44, 50, 73, 140, 186, 202, 246
dieldrin	see insecticides
diesel oil	see insecticides
dinitrocresol	see insecticides
diphenol	see insecticides
distribution	56, 57, 59, 74, 83, 84, 127, 130, 158, 195, 237, 239, 346, 354
Dolichopodidae	see predators
ecology	G15, G18, 11, 160, 275, 293, 311, 334, 357
eggs	255, 256
egg production	see oviposition
elevation	12, 275
emergence	4, 95, 111, 185, 189, 194, 291, 307, 377
Endrin	see insecticides
EPN	see insecticides
ethylene dibromide	see insecticides
ethylene dichloride	see insecticides
<i>Europhium</i>	see associated micro-organisms
Eurytomidae	see parasites

extractives	316,320
fecundity	253,378
fire	G18,49,216
flight	111,148,190,194,247,248,252
food supply	6,71
gallery construction	249
Gardona	see insecticides
gravity	313
height of attack	50,186,191,312
heptachlor	see insecticides
herbicides - arsenic trioxide	214
- cacodylic acid	60,61,220,336
- sodium methanearsenate	220
- tree injection	33,220
- 2,4-D	214
host	59,74,101,105,158,195,232,254,325,346
host - characteristics	G16,64,65,144,158,292
- pathology	G1,G10,40,219,251,260,314
- resistance	G1,G4,G16,63,207,218,257,258,260,316,317 318,319,320,324,327
- selection	15,30,64,143,265,266,275
humidity	255,313
induced attack	75,186
infestation history - Canada	18,26,27,41,42,43,44,54,77,78,98,99,106, 107,119,125,173,174,175,176,181,182,183, 203,204,205,206,213,222,239,267,268,269, 270,276,278,279,280,321,322,347,349,350, 353,362,363,364,365,366,367,368,369,386
- U.S.A.	16,17,18,20,21,22,23,24,25,28,83,96,109, 122,199,201,202,208,224,242,243,244,295, 339,340,341,381,389

infestation trend	201,202,225
insecticides - aldrin	163,164,245
- benzene hexachloride	G19
- beta-naphthanol	296
- chlordane	164,245
- copper sulphate	33
- creosote	296
- DDT	121,163,164,178,179,245
- dieldrin	163,164,178,179,245
- diesel oil	296
- dinitrocresol	178,179
- diphenol	110
- endrin	178,179
- EPN	178
- ethylene dibromide	G19,163,164,191,210,211,245,335
- ethylene dichloride	110
- Gardona	146
- heptachlor	163,164,178,179
- landrin	146
- lindane	146,163,164,178,179,180,223,245,277,326, 337,359,385
- mercuric chloride	33
- methods of application	110,118,163,164,179,191,310,337
- naphthalene	110,296
- orthene	110
- orthodichlorobenzene	164,245,296
- orthodinitrophenol	110

- paradichlorobenzene	296
- pentachlorophenol	110
- Pestox III	245
- potassium cyanide	33
- Schradan	164
- sodium arsenate	33
- sodium arsenite	33
- sodium flouride	33
- sodium flourosilicate	33
- sodium thiocyanate	33
- systox	164,245
- zinc chloride	33
interaction	
- with blue stain fungi	293
- with host	71,69,293
karyology	172
landrin	see insecticides
larvae	70,126,192,360
life - history	31,37,59,74,94,101,127,130,131,134,160,195,252, 294,306,346,387
- table	G12,71,167
light effects	309,313
Lindane	see insecticides
Lodgepole pine	see <i>Pinus contorta</i>
Lonchaeidae	see predators
losses	see damage
management recommendations	11,36,82,231,293,294,297,370

mating	see reproduction
mercuric chloride	see insecticides
mites	see predators
mistletoe	see host pathology
modeling	G2,G3,328,329
moisture content changes	251
morphology	31,55,58,59,126,131,134,172,177,184,230, 248,253,308,351,358,387
Muscidae	see predators
mutualism	G8
mycangium	103,384
naphthalene	see insecticides
natural enemies	see parasites, predators, or control - natural agents
Nematoda	see parasites
nomenclature	131,134,171
non-staining fungi	see associated micro-organisms
nutrition	see rearing media
oleoresin	64,217
oleoresin exudation pressure	48,375
olfaction	230
orientation	313
orthene	see insecticides
orthodichlorobenzene	see insecticides
Ostomatidae	see predators
outbreak-development	10,79,84,102,138,141,142,170,237,240,344, 380,388
-records	see infestation history

oviposition	8,192,194,198,248,249
paradichlorobenzene	see insecticides
parasites - Braconidae	86,88,89,90,91,92,264
- Colydididae	47
- Eurytomidae	88
- list of	88,91,346
- Nematoda	162,209,244,250,334,361
- Pteromalidae	88,91
- Toryimidae	88
Pestox III	see insecticides
pheromones	see attractants
phloem	4,6,10,64,202,217
photochemical oxidant injury	see air pollutants
physiology	G11,325
<i>Picea abies</i>	105
<i>Pinus albicaulis</i>	30,110
<i>Pinus banksiana</i>	105
<i>Pinus contorta</i>	G12,4,6,7,8,9,10,11,12,30,36,50,52,56,68, 69,73,75,79,83,84,87,91,100,102,105,110, 139,140,141,155,164,196,198,226,229,237, 238,245,246,247,251,254,256,257,258,259, 260,265,266,271,272,273,274,275,289,291, 292,293,294,310,312,313,314,316,317,318, 319,320,328,329,335,357,363,377,379,382,385
<i>Pinus lambertiana</i>	47,56,62,79,83,84,88,342,344,345
<i>Pinus monticola</i>	76,83,84,91,95,104,154
<i>Pinus nigra</i>	105
<i>Pinus ponderosa</i>	G18,39,48,53,56,61,63,64,65,83,84,97,116, 117,118,144,151,152,153,154,157,159,166, 185,187,191,193,216,217,218,220,231,265, 266,298,299,331,333,336,338,375,376

<i>Pinus resinosa</i>	105
<i>Pinus rigida</i>	105
<i>Pinus silvestris</i>	105
<i>Pinus strobus</i>	105
Ponderosa Pine	see <i>Pinus ponderosa</i>
population - density	281
- dynamics	G2,G3,G12,G14,9,36,68,71,121,160
- estimates	13,52,265
- management	G3,108,233,370
- segregation	323,371,374
- trends	G12,168,169,170,307
potassium cyanide	see insecticides
predators - Asilidae	300,302
- Cleridae	5,7,91,263,304,342,343,345
- Dolichopodidae	88,91,93,301,303,305
- effects of	5,7
- list of	88,91,288,346
- Lonchaeidae	88,91
- Mites	G12,G14,39,287
- Muscidae	112
- Tenebrionidae	91
- Trogositidae (Ostomatidae)	91,342,343,345
- Woodpeckers	87,88
- Xylophagidae	91
protection	82,129,328
Pteromalidae	see parasites

pupae	308
radiography	13,14
rainfall	388
rearing media - axenic	G11
- diet	34,155
red rot	376
remote sensing	115,116
reproduction	55,75,114,172,197,248,249
resin ducts	259
resin effects - on beetle	256,324,327
- on associated micro-organisms	320,383
resistance of host	see host resistance
risk rating	9,11,12,73,150,153,157,275
root rot	see host pathology
salvage logging	see control-logging
Sampling - methods	G12,14,52,168,169,290
- theory	G12,67,68
sanitation logging	see control-logging
Schradan	see insecticides
sexing methods	177,184,308
sex ratio	95,172,197
silvicultural practices	see control-silvicultural practices
slash	227
slash disposal	19,85
smog injury	see air pollutants
sodium arsenate	see insecticides

sodium arsenite	see insecticides
sodium flouride	see insecticides
sodium flourosilicate	see insecticides
sodium thiocyanate	see insecticides
sperm	188,189
spraying	see insecticides - methods of application
stand - composition	97,138,329
- development	69,328,356
- effects	1,2,3,38,100,102,113,149,200,231,275,311
- hazard	240,241,293,294
- structure	11,113
statistical methods	68
storage methods	378
stridulation	282
sugar pine	see <i>Pinus lambertiana</i>
survey methods	136,165,166,200,244
survival	378
symbiosis	G6, G7, G8, 34, 80, 382, 384
symptoms	G5, 31, 58, 59, 74, 101, 115, 116, 117, 127, 130, 158, 195, 212, 241, 294, 306, 346, 379, 387
systox	see insecticides
taxonomy	G9, 31, 58, 59, 114, 130, 131, 134, 158, 171, 325, 351, 352, 358, 387
temperature effects	71, 72, 190, 192, 229, 238, 256, 313, 390
Tenebrionidae	see predators
territorial behavior	196
thinning	104, 298
Toryimidae	see parasites

trans-verbenol	see attractants
tree-growth-related to outbreak	32,329
tree - injection	see herbicides
- mortality	151,265
- susceptibility	150,153,157,161,218,240,242,375
Trogositidae	see predators
2,4-D	see herbicides
Western White Pine	see <i>Pinus monticola</i>
Western Yellow Pine	see <i>Pinus ponderosa</i>
Whitebark Pine	see <i>Pinus albicaulis</i>
Woodpeckers	see predators
Xylophagidae	see predators
Yeasts	see associated micro-organisms
Yellow Pine	see <i>Pinus ponderosa</i>
zinc chloride	see insecticides