

Species of Alaska Scolytidae: Distribution, hosts, and historical review

MALCOLM M. FURNISS

UNIVERSITY OF IDAHO, MOSCOW, ID 83843.

EDWARD H. HOLSTEN

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, FOREST HEALTH
PROTECTION, ANCHORAGE, AK 99503

MARK E. SCHULTZ

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, FOREST HEALTH
PROTECTION, JUNEAU, AK 99508

ABSTRACT

The species of Scolytidae in Alaska have not been compiled in recent times although many of them are included in earlier broader works. The authors of these works are summarized in a brief history of forest entomologists in Alaska. Fifty-four species of Alaskan Scolytidae are listed (23 species in the subfamily Hylesininae and 31 in the subfamily Scolytinae) belonging to 24 genera (11 in Hylesininae and 13 in Scolytinae). They infest 15 species of trees and shrubs of which 10 are conifers (host to 48 species of Scolytidae) and 5 are angiosperms (host to 6 species of Scolytidae). Fifty species are bark beetles that inhabit phloem and four species are ambrosia beetles that live in sapwood. All are species native to Alaska.

Keywords: Bark beetles, Scolytidae, conifers, angiosperms, Alaska

INTRODUCTION

The biographic regions of Alaska reflect the great expanse of that state, extending over a wide range of latitude, longitude, and elevation. In broad terms, these regions are characterized by a relatively mild and moist coastal climate, particularly in the southeast and coastal south-central areas; an extensive drier, colder climate in interior and northern Alaska; and numerous mountain ranges that attain the highest elevation on the continent.

Except for willows (*Salix* spp.), the species of Alaskan trees are somewhat more diverse in the coastal environment. Because species of Scolytidae are host-specific to a marked degree, the extent of their diversity generally reflects that of woody plant species that are needed and available for their existence. Warmer climate also enhances scolytid diversity by exerting less selective pressure as is evident in tropical regions. Thus, more than half of the known Alaskan scolytid fauna occur in rather close proximity to the coast. Nonetheless, white spruce, *Picea glauca* (Moench) Voss, a tree that occurs widely in the interior, is host of more species of scolytids than any other tree species in Alaska (Table 1).

The species of Scolytidae in Alaska have not been compiled in recent times although many of them are included in the broader works of Bright (1976, 1981), and Wood (1982). The first record of Alaskan Scolytidae (12 species) was reported by C. G. Mannerheim in the period 1843-1853 (Hamilton 1894). Beckwith (1972) listed 17 species infesting spruce (*Picea* spp.), two of which have been placed in synonymy by Wood (1982). Werner and

Species of Scolytidae	<i>Chamaecyparis nootkatensis</i>	<i>Picea glauca</i>	<i>Picea x lutzii</i>	<i>Picea mariana</i>	<i>Picea sitchensis</i>	<i>Pinus contorta</i>	<i>Larix laricina</i>	<i>Thuja plicata</i>	<i>Tsuga heterophylla</i>	<i>Tsuga mertensiana</i>	<i>Alnus</i> sp.	<i>Betula papyrifera</i>	<i>Populus tremuloides</i>	<i>Salix ataxensis</i>	<i>Salix scouleriana</i>	<i>Salix</i> sp.
<i>Ips concinnus</i>					x											
<i>Ips perturbatus</i>		x														
<i>Ips pini</i>						x										
<i>Ips tridens</i>		x	x		x											
<i>Lymantria alaskanus</i>																
<i>Orthotomicus caelatus</i>		x			x	x										
<i>Pityophthorus bassetti</i>		x														
<i>Pityophthorus carinulatus</i> Sw.						x										
<i>Pityophthorus murrayanae</i>		x	x													
<i>Pityophthorus nitidulus</i>		x	x	x	x											
<i>Pityophthorus nitidus</i>		x	x													
<i>Pityophthorus opaculus</i>		x	x													
<i>Pityophthorus recens</i>			x													
<i>Pityophthorus tuberculatus</i>						x										
<i>Procyphalus mucronatus</i>													x			
<i>Procyphalus utahensis</i>															x	x
<i>Pseudips (=Ips) mexicanus</i>						x										
<i>Scolytus piceae</i>		x					x									
<i>Trypodendron betulae</i>												x				
<i>Trypodendron lineatum</i>		x			x			x								
<i>Trypodendron retusum</i>												x	x			
<i>Trypodendron rufitarsus</i>		x								x						
<i>Trypophloeus striatulus</i>															x	

HISTORY OF BARK BEETLE SURVEYS IN ALASKA

After Mannerheim's early work (Hamilton 1894), infestations of Alaskan bark beetles were reported only sporadically beginning in 1922 (Zogas and Holsten 2002). Forest entomologists were not directly involved until 1946 when Robert L. Furniss of the Portland, Oregon, Forest Insect Laboratory was requested by regional forester, B. Frank Heintzleman, to investigate dying Sitka spruce, *Picea sitchensis* (Bong.) Carr., on the Tongass and Chugach National Forests (Furniss 1946, 1948, 1950; Furniss and Jones 1946). William F. McCambridge was the first forest entomologist to be stationed in Alaska (Juneau, 1952-1956). He was replaced by George L. Downing; others have followed there to this time. Since 1976, Forest Service Alaska Region entomologists have also been stationed at Anchorage but mainly concerned with spruce beetle infestations on the Kenai Peninsula. Richard A. (Skeeter) Werner was stationed at the Institute of Northern Forestry at Fairbanks from 1974 until that facility closed in 1996. During that time, the Alaska State Division of Forestry hired entomologist Roger E. Burnside who is stationed at Anchorage.

MATERIALS AND METHODS

Records of Alaskan species of Scolytidae were obtained from specimens available to us, from reviewers credited in Acknowledgments, and from the literature, including reports listed by Zogas and Holsten (2002). Such reports are on file at USDA, Forest Service, Alaska Region, Anchorage. Sources of specimens, locality information, and host data were

primarily the Forest Service Alaska Region collections located at Anchorage and Juneau, and the senior author's collections. His specimens were collected during various studies and recreational visits since 1967 throughout all regions of the state where scolytids occur. Specimens are deposited at the USDA Forest Service, Alaska Region, in Anchorage and Juneau; in the W.F. Barr Entomological Museum, University of Idaho, Moscow, ID; Canadian National Collection of Insects, Arachnids and Nematodes (CNC), Ottawa; Brigham Young University, Provo, UT; Oregon State University, Corvallis, OR; and USDA, Agriculture Research Service, Beltsville, MD.

RESULTS AND DISCUSSION

Fifty-four species of Alaskan Scolytidae are listed here (23 species in the subfamily Hylesininae and 31 in the subfamily Scolytinae). They belong to 24 genera (11 in Hylesininae and 13 in Scolytinae). They infest 15 species of Alaskan trees and shrubs of which 10 are conifers (host to 48 species of Scolytidae) and five are angiosperms (host to six species of Scolytidae). Fifty species are bark beetles that inhabit phloem and four species are ambrosia beetles that live in sapwood. All are native to Alaska. Four species new to Alaska are: *Phloeotribus lecontei* Schedl, *Cryphalus pubescens* Hopk., *Pityophthorus recens* Bright, and *Trypodendron betulae* Sw.

The following list is ordered alphabetically within each subfamily. Distributions include place names that may be found on road maps and in Orth (1967). For some species such as the spruce beetle we have found it more expedient to describe the extent of their occurrence in general terms. Where relevant, a remark is inserted to call attention to some aspect of a record. Such is the case with *Lymanator alaskanus* Wood for which the host is unknown. In this way we hope to stimulate additional collecting and study. Also, selected references are provided where available.

Hylesininae

Alniphagus aspericollis (LeC.)

Distribution: Hollis, Prince of Wales Is.

Host: *Alnus* sp.

Carphoborus andersoni (Sw.)

Distribution: Bonanza Cr. (nr. Fairbanks), Copper Center, Fort Yukon, John R., Salmon R., Sheenjek R.

Host: *Picea glauca*.

Carphoborus carri Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), John R.

Host: *Picea glauca*.

Carphoborus intermedius Wood

Distribution: Bonanza Cr. (nr. Fairbanks).

Host: *Picea glauca*.

Dendroctonus punctatus LeC.

Distribution: Interior drainages. (Furniss 1995)

Host: In the base of living *Picea glauca*.

Dendroctonus rufipennis (Kirby)

Distribution: Throughout the distribution of its hosts. This is by far the most economically important scolytid in Alaska.

Hosts: *Picea sitchensis*, *P. glauca*, *P. × lutzii* and *P. mariana*.

Dendroctonus simplex LeC.

Distribution: Interior, throughout distribution of its host in the middle Yukon R. and in the Tanana R. drainage.

Host: *Larix laricina*.

Hylastes nigrinus (Mannerheim)

Distribution: Sitka Is.

Remarks: Holotype female in Helsinki Museum (Wood 1982), host not specified.

Hylurgops rugipennis rugipennis (Mannerheim)

Distribution: Farragut Bay, Ft. Yukon, Juneau, Kethikan, Kodiak Is., Loring, Sitka, Skagway.

Hosts: *Picea sitchensis*, *Pinus contorta*.

Hylurgops subcostulatus subcostulatus (Mannerheim)

Distribution: Kenai Penin.

Remarks: Holotype presumably lost (Wood 1982).

Phloeosinus cupressi (Hopk.)

Distribution: Chichagof Is., Juneau, Petersburg, Wrangell.

Host: *Chamaecyparis nootkatensis*.

Phloeosinus pini Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), Chichagof Is., Eagle, Fairbanks, John R.

Host: *Picea glauca*, *Pinus contorta*.

Phloeosinus punctatus LeConte

Distribution: Edna Bay, Hollis, Kosciusko Is., Petersburg.

Host: *Thuja plicata*.

Phloeotribus lecontei Schedl

Distribution: Sheenjok R., Bonanza Cr. (nr. Fairbanks).

Host: *Picea glauca*.

Remarks: New state record.

Phloeotribus piceae Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), Eagle R., Hope, John R., Summit L. (Kenai Penin.).

Host: *Picea glauca*.

Polygraphus convexifrons Wood

Distribution: Arviriaq, Bonanza Cr., John R., Matanuska, McKinley N.P., Noatak R., Quartz Cr. and Summit L. (Kenai Penin.), Walker L.

Hosts: *Picea glauca*, *P. x lutzii*.

Polygraphus rufipennis (Kby.)

Distribution: Anchorage, Bonanza Cr. (nr. Fairbanks), Bullfrog Is. (Yukon R.), Chandalar, Douglas, Dry Gulch and Cooper Landing (Kenai Penin.), Fairbanks, Ft. Yukon, Juneau, Klutina L., Homer, Hughes, John R., Kasilof, Kenai National Moose Range, Lawing (Kenai Lk.), McKinley, Mile 34 Seward Hwy., Montana Cr. (Mat-Su Valley), Moose Pass, Northway Jct., Russian R. (Kenai Penin.), Sheenjok R., Skilak L., Summit L. (Kenai Penin.), Talkeetna.

Hosts: *Picea glauca*, *P. x lutzii*, *P. mariana*, *P. sitchensis*, *Pinus contorta*.

Pseudohylesinus granulatus (LeConte)

Distribution: "Nauacin" (Wood 1982).

Host: Not specified, presumably *Tsuga heterophylla*.

Pseudohylesinus sericeus (Mannerheim)

Distribution: "Sitka" (Wood 1982).

Host: Not specified, presumably *Tsuga heterophylla*.

Pseudohylesinus sitchensis Sw.

Distribution: Kodiak Is., Juneau, Prince of Wales Is.

Host: *Picea sitchensis*.

Pseudohylesinus tsugae (Sw.)

Distribution: Chichagof Is., Dry Gulch (Kenai Penin.), Echo Cove (nr. Juneau),
Glacier Highway, Hollis, Juneau, Ketchikan.

Host: *Tsuga heterophylla*

Scierus annectens LeC.

Distribution: Bonanza Cr. (nr. Fairbanks), Bullfrog Is., Fairbanks, John R.,
Kasilof, Summit L. (Kenai Penin.), Klehini R., (N of Haines), Willow.

Host: *Picea glauca*

Scierus pubescens Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), Summit L. and Swanson R. road
(Kenai Penin.).

Host: *Picea glauca*

Xylechinus montanus Blackm.

Distribution: Bonanza Cr. (nr. Fairbanks), Swanson River road, Summit L. (Kenai
Penin.).

Host: *Picea glauca*.

Scolytinae*Cryphalus pubescens* Hopk.

Distribution: Iliamna L.

Host: *Picea glauca*.

Remarks: New state record.

Cryphalus ruficollis Hopk.

Distribution: Bonanza Cr. (nr. Fairbanks), Charley R., John R., Summit L. (Kenai
Penin.). Host: *Picea glauca*.

Crypturgus borealis Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), Charley R., Coleen R., Echo Cove (nr.
Juneau), Fairbanks, John R.

Hosts: *Picea glauca*, *P. sitchensis*.

Dolurgus pumilus (Mann.)

Distribution: Chichagof Is., Echo Cove and Gold Cr. (nr. Juneau), Hollis, Juneau,
Montana Cr. (SE AK), Naukati Bay, Sitka Island, Yakutat.

Hosts: *Picea sitchensis*, *Tsuga heterophylla*.

Dryocoetes affaber (Mann.)

Distribution: Arviriaq (nr. Noatak R.), Bonanza Cr., Coleen R., Cooper Landing,
Douglas, Dry Gulch (Kenai Penin.), Echo Cove (nr. Juneau), Fairbanks,
Ft. Yukon, Hollis, Homer, John R, Juneau, Kandik R., Kasilof, Kenai
National Moose Range, McKinley N.P., Mentasta, Mile 24, Mile 50,
Montana Cr. (Mat-Su Valley), Moose Pass, Naukati Bay, Noatak R.,
Northway Junction, Patterson, Russian R., Sheenjok R., Summit L.
(Kenai Penin.), Talkeetna, Venetie, Walker L., Yakutat.

Hosts: *Picea glauca*, *P. x lutzii*, *P. sitchensis*, *Pinus contorta*.

Dryocoetes autographus (Ratz.)

Distribution: Anchorage, Bonanza Ck. (nr. Fairbanks), Chandalar, Cooper
Landing and Dry Gulch (Kenai Penin.), Edna Bay, Glacier Bay, Hollis,
John R., Kandik R., Kenai National Moose Range, Ketchikan, M.34
Seward Hwy, Naukati Bay, Northway Junction, Patterson, Russian R.,
Summit L. and Sunrise (Kenai Penin.), Yakutat.

Hosts: *Picea glauca*, *P. sitchensis*, *Tsuga heterophylla*.

Dryocoetes caryi Hopk.

Distribution: Homer, Mile 34 Seward Hwy, Moose Pass and Russian R (Kenai Penin.).

Host: *Picea x lutzii*.

Ips borealis borealis Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), Cooper Landing and Dry Gulch (Kenai Penin.), John R., Kenai National Moose Range, Nanana Hwy., Summit L. (Kenai Penin.), Wasky (nr. Togiak L.).

Hosts: *Picea glauca*, *P. x lutzii*.

Ips concinnus (Mann.)

Distribution: Echo Cove (nr. Juneau), Edna Bay, Hollis, Homer, Hoonah, Juneau, Kodiak Is., Mile 20, Montana Cr. (nr. Juneau), Rogers Point, Seagull Creek, Granite Cr. (Kenai Penin.), Seward.

Host: *Picea sitchensis*, *P. x lutzii*.

Ips perturbatus (Eichh.)

Distribution: Arctic Village, Arviriaq (nr. Noatak R.), Bonanza Cr. (nr. Fairbanks), Chandalar, Circle City, Coleen R., Cooper Landing and Dry Gulch (Kenai Penin.), Fairbanks, Ft. Yukon, Hope, Hughes, John R., Kandik R., Kasilof, Kenai National Moose Range, Klutina L., Lawing (Kenai Penin.), Mentasta, McKinley River drainage (24 mi E of Lake Minchumina), Mile 50, Northway Jct., Noatak R., Pah R., Porcupine R., Richardson Highway, Russian R. (Kenai Penin.), Sheenjek R. Summit L. (Kenai Penin.), Venetie, Walker L.

Host: *Picea glauca*, *P. x lutzii*.

Ips pini (Say)

Distribution: Douglas Is., Ketchikan, Petersburg.

Host: *Pinus contorta*.

Ips tridens (Mann.)

Distribution: Bonanza Cr. (nr. Fairbanks), Cooper Landing and Dry Gulch (Kenai Penin.), Echo Cr. (nr. Juneau), Richardson Highway, Rodgers Point (Chichagof Is.), Seward, Cove (nr. Juneau), Fick Cove (Chichagof Is.), Hollis, Homer, Hood Bay, John R., Juneau, McKinley N.P., Mile 34 Seward Hwy., Montana Cr. (Mat-Su Valley), Moose Pass and Quartz Cr. (Kenai Penin.), Sheenjek R., Sitka Is., Summit L. and Sunrise (Kenai Penin.), Willow.

Hosts: *Picea glauca*, *P. x lutzii*, *P. sitchensis*.

Remark: Two subspecies, *I. tridens tridens* (Mann.) and *I. tridens engelmanni* Sw., occur in Alaska (Wood 1982); however, the distributions given therein appear to overlap and further collecting is needed to clarify this point. According to Wood (1982), females of the latter subspecies tend to have a more protuberant and generally more pubescent frons.

Lymantor alaskanus Wood

Distribution: Bonanza Creek, 42 km W of Fairbanks.

Hosts: Unknown

Remark: This species was described (Wood 1982) from 19 specimens collected 18-VII-1978 on a sticky trap baited with Ipsenol (pheromone of *Ips* spp.) and *alpha*-pinene (resin constituent). Its host is unknown. The other North American species, *L. decipiens* LeC., infests dead, dry, branches of living maple trees. Its gallery penetrates the sapwood and is associated with black stain (Wood 1982).

Orthotomicus caelatus (Eichh.)

Distribution: Bonanza Creek (nr. Fairbanks), Circle City, Douglas, John R., Juneau, Kandik R., McKinley River drainage (24 mi E of Lake Minchumina), Mile 7, Petersburg, Porcupine R.

Hosts: *Picea glauca*, *P. sitchensis*, *Pinus contorta*.

Pityophthorus bassetti Blkm.

Distribution: Bonanza Cr. (nr. Fairbanks), Fairbanks.

Host: *Picea glauca*.

Pityophthorus murrayanae murrayanae Blackm.

Distribution: Bonanza Cr. (nr. Fairbanks), Hope, Mile 295 Richardson Hwy., Sheenjok R., Summit L. (Kenai Penin.).

Hosts: *Picea glauca*, *P. x lutzii*.

Pityophthorus nitidulus (Mann.)

Distribution: Anchorage, Bonanza Cr. (nr. Fairbanks), Cooper Landing and Dry Gulch (Kenai Penin.), Eagle R., Hollis, Homer, Iliamna L., Juneau, Kenai National Moose Range, Kodiak Is., Lawing, Moose Pass, Quartz Cr. (Kenai Penin.), Seward, Skilak L., Summit L. (Kenai Penin.).

Hosts: *Picea glauca*, *P. x lutzii*, *P. mariana*, *P. sitchensis*.

Pityophthorus nitidus Sw.

Distribution: Bonanza Cr. (nr. Fairbanks), Fort Yukon, Hope, John R., Lawing (Kenai Penin.), Summit L. (Kenai Penin.).

Hosts: *Picea glauca*, *P. x lutzii*.

Pityophthorus opaculus LeC.

Distribution: Bonanza Creek (nr. Fairbanks), Fairbanks, Hope, John R., Summit L. (Kenai Penin.).

Hosts: *Picea glauca*, *P. x lutzii*.

Pityophthorus recens Bright

Distribution: Granite Cr. (Kenai Penin.).

Host: *Picea x lutzii*.

Remark: New state record. Hundreds of specimens were captured in funnel traps during field tests of *Ips perturbatus* pheromones.

Pityophthorus tuberculatus Eichh.

Distribution: Haines, Juneau, Skagway (Bright 1981).

Host: *Pinus contorta*.

Procryphalus mucronatus (LeConte)

Distribution: Hope.

Host: Unknown.

Procryphalus utahensis (Hopk.)

Distribution: Bonanza Creek (nr. Fairbanks), Galena.

Hosts: *Salix scouleriana*, *Salix* sp.

Pseudips (= *Ips*) *mexicanus* (Hopk.)

Distribution: Douglas Is., Juneau.

Host: *Pinus contorta*.

Remark: Cognato (2000) transferred *Ips mexicanus* to the new genus *Pseudips*.

Scolytus piceae (Sw.)

Distribution: Bonanza Cr. (nr. Fairbanks), Fairbanks, Ft. Yukon, John R., Northway Junction, Walker L.

Hosts: *Picea glauca*, *Larix laricina*.

Trypodendron betulae Sw.

Distribution: Anchorage, Chichagof Is., Fairbanks.

Host: *Alnus sinuata*, *Betula papyrifera*.

Remarks: New state record.

Trypodendron lineatum (Oliv.)

Distribution: Admiralty Is., Auke Bay, Bonanza Cr. (nr. Fairbanks), Chichagof Is., Cooper Landing, Cordova, Dry Gulch (Kenai Penin.), Edna Bay, Fairbanks, Hollis, Homer, John R., Kenai National Moose Range, Petersburg, Russian R. and Summit L. (Kenai Penin.), White Bay, Yakutat.

Hosts: *Picea glauca*, *P. sitchensis*, *Pinus contorta*, *Tsuga heterophylla*.

Trypodendron retusum (LeC.)

Distribution: Anchorage, Bonanza Cr. (nr. Fairbanks), Russian R., Summit L. and Sunrise (Kenai Penin.), Willow.

Hosts: *Betula papyrifera*, *Populus tremuloides*.

Trypodendron rufitarsus (Kby.)

Distribution: Russian R. (Kenai Penin.), Talkeetna, Sunrise (Kenai Penin.).

Hosts: *Picea glauca*, *Tsuga mertensiana*.

Trypophloeus striatulus (Mann.)

Distribution: Interior, coastal NW, N Slope; wherever its host occurs.

Host: *Salix alaxensis*.

Remarks: Collected at Shublik Spring, Canning River, Lat. N 69° 30', possibly the farthest north of any scolytid. A fungus, *Cytospora* sp. is universally present in infested stems indicating a possible symbiotic relationship. The same stem is infested by several generations of the beetle before killing it (Furniss 1997).

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