NEW RECORDS OF SCOLYTIDAE FROM WASHINGTON STATE

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Washington is a large state with seven physiographic provinces (Franklin and Dymess 1973), ranging from sea level (Puget Trough) to over 4450 m on Mount Rainier (southern Washington Cascades). Under the influence of moisture, temperature, and substrates, natural vegetation types range from coniferous forests through woodland to shrubsteppe. Along Washington’s western edge, the Coast Range and Olympic Mountains intercept the moisture-laden prevailing winds from the Pacific Ocean, helping to make the temperate forests of western Washington (and northern Oregon) the most dense in the world. They are composed almost exclusively of conifers and in that respect are also unique among temperate forests. Eastward lies the Cascade Range that contains Mount Rainier and other volcanic peaks. Mixed conifers prevail in these mountain ranges. Farther east is the Columbia Basin, largest and most arid of the provinces, occupying virtually the southeast quarter of the state, except for a bulge of the Blue Mountains extending northward from Oregon. Trees of this province are restricted mainly to water courses and urban areas. North of the Columbia Basin is the Okanogan Highlands province, bordering on British Columbia and Idaho, which provides a vegetational bridge to the more diverse northern Rocky Mountain flora.

The provinces of Washington vary greatly in their climate, resulting from complex interplay between maritime and continental air masses and the mountain ranges, particularly the Cascade Range that divides the state into eastern and western parts. For example, Quinault on the Pacific side of the Coast Range receives 337 cm of precipitation annually, whereas Yakima, in the rain shadow to the east of the Cascade Range, has only 20 cm. Average January and July temperatures for Seattle (Puget Trough) are 4.5° C and 18.7° C, whereas those for Yakima (Columbia Basin) are –2.5° C and 21.7° C.

The Scolytidae of Washington are host specific to varying degrees, and the extent of their diversity is related to the diversity of their woody host plants. Conifers are hosts of 87 species listed herein. A majority of these (81 species) are restricted to one or a few species of Pinaceae in the genera *Abies*, *Larix*, *Picea*, *Pinus*, *Pseudotsuga*, and *Tsuga*, while six species infest Cupressaceae (*Thuja*, *Chamaecyparis*, and *Juniperus*). The remaining 19 species infest angiosperms (*Populus*, *Salix*, *Alnus*, etc.). By their habits, Washington Scolytidae are characterized as true bark beetles, living in phloem (90 species); ambrosia beetles, living in xylem where they may feed entirely or partly on symbiotic fungi that they transmit (13 species), living in pine cones (*Conophthorus ponderosae* Hopkins), or living in the roots of red clover (*Hylastinus obscurus* [Marsham]).

Patterson and Hatch (1945) listed 73 species of Washington Scolytidae, adjusted to present-day synonymy. Wood (1971, 1982) lists

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Washington in the distribution of 82 species of Scolytidae; six additional species are listed by Wood and Bright (1992). We herein update those publications with 15 new state records collected by us or found in museum collections, and three species collected by M. A. Deyrup (personal communication). Similar lists have been published for Idaho (Furniss and Johnson 1987), Montana (Gast et al. 1989), and Oregon (Furniss et al. 1992).

Additional species of Scolytidae are likely to be collected in Washington in the future. They may include species known to occur in adjacent states or British Columbia, hosts of which occur in contiguous areas of Washington. Also, commerce from foreign countries entering Puget Sound and the Columbia River may bring exotic species accidentally. Species that infest xylem (ambrosia beetles) are especially well adapted to such transport. The establishment of ambrosia beetles, which typically are not very host-specific, is enhanced by the moderate climate and great diversity of native and exotic flora in the Seattle area. Indeed, it is probable that such introduced scolytids may have already gained a foothold there and have not yet been detected.

The following are abbreviations for repositories listed for specimens new to Washington:

**ABS** = Archbold Biological Station, Lake Placid, FL; **FS-R1** = Forest Service, USDA, Region 1, Missoula, MT; **PNW** = Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Corvallis, OR; **SLW** = S. L. Wood, Brigham Young University, Provo, UT; **WFBM** = W. F. Barr Entomological Museum, University of Idaho, Moscow, ID.

**Species New to Washington**

**Subfamily Hylesininae**

**Scierus annectens** LeConte

**Biology.**—Monogynous. Infests lower xylem and roots of felled Pinus contorta, often by entering a gallery of *Dendroctonus rufipennis* (Kirby). The parent gallery is 3–4 cm long, inclined diagonally across grain. One generation per year (Stewart 1965).


**Hylesinus californicus** (Swaine)

**Biology.**—Monogynous. Infests the bole and limbs of *Fraxinus* spp. Egg galleries are transverse and deeply engrave the wood. Overwintering beetles evidently form feeding tunnels in green bark of *Fraxinus* spp. (Wood 1982).


**Phloeotribus lecontei** Schedl

**Biology.**—Monogamous. Male constructs an entrance tunnel and the bases of two egg galleries that are then completed by the female. Egg galleries run obliquely across the grain of shaded-out branches in merchantable-size living trees. Adults and larvae may be present throughout the year; overwintering adults may occur in brood galleries, special hibernation or maturation tunnels, or newly formed parental galleries (Wood 1982).


**Carphoborus vandykei** Bruck

**Biology.**—Polygynous, unstudied. Members of the genus infest small, shaded-out branches of living trees or boles of small, suppressed,
unthrifty trees. Most species live in host tissue that is drier than is typical for bark beetles (Wood 1982).

**DISTRIBUTION AND NOTES.**—

**CANADA:** B.C.; USA: Calif., Ore.; **WASHINGTON:** Heritage Campground, Olympia, Thurston Co., 14-VII-1991, *Pseudotsuga menziesii*, M. M. Furniss and J. B. Johnson (approx. 200 WFBM). Infesting a 2.3-m-long, 6-cm-diameter, broken-off branch with red foliage. Also present was *Pseudohylesinus nebulosus* LeConte. Two to four egg galleries radiated from the central nuptial chamber, deeply etching the sapwood. Egg galleries each extended 2–5 cm, their length inversely dependent upon attack density. Eggs present, laid alternately on opposite sides (not opposite each other) in deep niches at a rate of 6 per cm and sealed with a reddish brown coating of frass. Hatched larvae fed in the phloem, not etching the wood. Some larval mines equaled or exceeded the length of egg galleries but most were shorter and very broad, apparently influenced by brood density. Kept at room temperature, adult brood pulverized the bark and deeply scored the xylem before emerging from very dry branch-wood one and one-half years later. The scored xylem had a powdery white appearance, perhaps due to presence of associated yeast. Carson, Skamania Co., 18-VII-1991, *Pseudotsuga menziesii*, M. M. Furniss and J. B. Johnson (approx. 100 WF BM). Infesting 1–21/2-cm-diameter branches of a 25-cm-diameter standing tree that had discolored foliage (dying). Galleries with parent beetles and larvae. Phloem very dry. Little Rock, Thurston Co., 30-IV-1975, *Pseudotsuga menziesii*, M. A. Deyrup (ABS). In a dead branch. Tahuya, Mason Co., 21-VI-1975, *Pseudotsuga menziesii*, M. A. and N. Deyrup (ABS). In a small, suppressed tree.

**Polygraphus rufipennis** (Kirby)

**BIOLOGY.**—Polymorous. Recorded commonly from *Picea* spp., especially *P. glauca* and *P. engelmannii*, rarely from other genera of Pinaceae. Occasionally kills small-diameter, suppressed trees, commonly occurs as a secondary species in trunks of felled or dying trees. Two to five egg galleries radiate from each nuptial chamber, most commonly two, each made by a different female. One generation per year (Hilton 1968).

**DISTRIBUTION AND NOTES.**—


**COMMENT.**—This common beetle is certain to occur throughout the range of *P. engelmannii* in the Cascade Range and Okanogan Highlands. The Pacific Co. record is likely to be in *P. sitchensis*; if so, it is a new host record.

**Subfamily Scolytinae**

**Crypturgus borealis** Swaine

**BIOLOGY.**—Monogamous. This smallest Washington scolytid enters galleries of other bark beetles in stems of conifers (*Abies, Picea, Pinus*). They then tunnel irregularly into the phloem. Apparently one generation per year, overwintering as adults in the brood galleries (Wood 1982).

**DISTRIBUTION AND NOTES.**—


**Pityogenes knechti** Swaine

**BIOLOGY.**—Polygynous. The egg gallery is stellate with 4 to 6 branches radiating from the
nuptial chamber. Overwintering stages include larvae, pupae, and adults (Alberta, Canada). One and a partial second generation occur per year at that latitude (Reid 1955).


*Ips mexicanus* (Hopkins)

**Biology.** — Polygynous. Not studied. Infests *Pinus* spp.; egg galleries curve outward from a central chamber (Wood 1982).


In a standing, dead tree.

*Ips perturbatus* (Eichhoff)

**Biology.** — Polygynous. Breeds abundantly in *Picea glauca* logging slash and in tops of trees killed by *Dendroctonus* beetles. Parental galleries have a tuning fork pattern with moderately long larval mines. One generation annually but two sets of egg galleries may be constructed by females in one season (Furniss and Carolin 1977).


*Ips plastographus plastographus* (LeConte)

**Biology.** — Polygynous. Usually infests upper side of fallen *Pinus contorta*, rarely *Pinus ponderosa*. Two or three longitudinal egg galleries radiate from each nuptial chamber. Mature larvae and young adults may bore 1 cm into wood prior to emerging (Wood 1982).


*Ips woodi* Thatchar

**Biology.** — Polygynous. Infests large limbs and boles of unthrifty or felled 5-needle *Pinus* spp. Egg galleries parallel, resembling a narrow tuning fork (Wood 1982).

**Distribution and Notes.** — **Canada:** Alta.; USA: Ariz., Ida., Mont., Nev., N.M., Ut., Wyo.; **Washington:** Tieton Ranger Station, Yakima Co., *Pinus albicaulis* (new host), 21-IX-55 to 12-VII-1956, P. W. Orr (26 PNW, 3 WFBM).

*Trypodendron betulae* Swaine

**Biology.** — Monogynous. Tunnels are constructed by females radially through bark into sapwood of *Betula* spp., rarely *Alnus* sp. The main tunnel branches at close intervals, left or right, in the same plane. Eggs are laid in niches oriented above and below the gallery. Larvae excavate short cradles in which they develop and feed on ambrosia fungus. Males are active in keeping the tunnels clean and aerated (Wood 1982).


*Trypophloeus striatulus* (Mannerheim)

**Biology.** — Monogynous. Unstudied, infests stems of *Salix scouleriana*, *Salix spp.*, *Alnus crispa*, and *A. rugosa*.

**Distribution and Notes.** — **Canada:** Newf., N.S., Que., Yukon; USA: Alas., Colo., Ida.,
New Records of Washington Scolytidae

Procryphalus mucronatus
(LeConte)

Biology.—Monogamous. Infests smooth, outer bark of stems of larger, dying, standing Populus tremuloides. Overwinter as larvae and adults; one and one-half to two generations per year (Petty 1977).

Distribution and Notes.—Canada: Alta., B.C.; USA: Alas., Colo., Ida., Mont., Nev., N.M., Ore., Ut.; Washington: Kamiak Butte, Whitman Co., 18-VI-1944, Populus tremuloides, M. M. Furniss and Jianlin Zhou (4 WFBM). Infesting a 30-cm-diameter recently dead tree that had no foliage. The bark was necrotic and had an almond odor. New attacks at a density of nine per dm occurred at 10-m-height, 11-cm-diameter. Galleries contained one to two parent beetles, eggs and first instar larvae.

Procryphalus utahensis
Hopkins

Biology.—Monogynous. Unstudied, infests stems of willows, particularly Salix scouleriana.


Pseudopityophthorus pubipennis
(LeConte)

Biology.—Monogynous. Infests bole and branches of Quercus spp. that are felled or recently dead. Galleries aligned horizontally across grain, averaging 5 cm long, closely spaced. Larval mines are mainly hidden in the phloem and oriented longitudinally.


Pityophthorus alpinensis
G. Hopping

Biology.—Polygynous. Infests broken branches and twigs of Larix lyallii, apparently one generation annually.

Distribution and Notes.—Canada: Alta.; USA: Ida., Mont.; Washington: Harts Pass, Okanogan Co., 11-VII-1991, Larix lyallii, M. M. Furniss and J. B. Johnson (3 WFBM). Cadavers collected from old galleries in dead branches 0.5-2.5-cm-diameter. Galleries were branched and variable in shape, each branch containing few (9-11) egg niches; larval mines short, broad, restricted to phloem; adult brood had scored the sapwood as if by feeding.

Pityophthorus grandis
Blackman

Biology.—Polygynous, unstudied. Infests shaded-out branches and young, standing Pinus ponderosa (Wood 1982).


Washington Scolytidae

Hylesininae

Hylastini

Scierus amecestus LeConte
Scierus pubescens Swaine
Hypharopus porosus (LeConte)
Hypharopus reticulatus Wood
Hypharopus rugipennis rugipennis (Mannerheim)
Hypharopus subcostatus subcostatus (Mannerheim)
Hylastes gracilis LeConte
Hylastes longicollis Swaine
Hylastes nodus LeConte
Hylastes nigrinus (Mannerheim)
Hylastes ruber Swaine

Hylesini

Hylastinus obscurus (Marsham)
Hylesinus californicus (Swaine)
Althaphus aspericollis (LeConte)
Althaphus hirsutus Scheld

Tominei

Pseudohylesinus dispar pullatus Blackman
Pseudohylesinus graminatus (LeConte)
Pseudohylesinus nebulosus nebulosus (LeConte)
Pseudohylesinus nobilis Swaine
Pseudohylesinus prisc Wood
Pseudohylesinus sericeus (Mannerheim)
Pseudohylesinus stichensis Swaine
Pseudohylesinus tsugae Swaine
Xylechinus montanus Blackman
Deudroctonus brevicomis LeConte
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