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# BARK BEETLES OF THE GENUS HYLASTES ERICHSON<sup>1</sup> IN NORTH AMERICA

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## INTRODUCTION

The genus *Hylastes* Erichson occurs throughout the continent of North America from Alaska to Central America and from the Atlantic coast to the Pacific coast. This publication is concerned with the forms found north of Mexico. Coniferous forests in every region of the United States contain one or several species of *Hylastes*. Most of the species of this genus favor the pines as hosts, but some spruces are also attacked, as well as Douglas fir and to a less extent the true firs.

The species of *Hylastes* are not so important economically as are the members of several other genera of bark beetles. They seldom or never cause the death of healthy large conifers by their unaided efforts. They are, however, often found in the bark of dying pine or spruce, where they may well be erroneously considered the cause of the tree's death. In the forests these beetles are most likely to be found in the bases and main roots of dying trees or in the stumps of cut trees. They also often attack the under surfaces of recently

<sup>1</sup> Order Coleoptera, family Scolytidae.

felled trees in situations where the bark is particularly moist. Some species show a decided preference for moist bark in which the sap has already begun to ferment.

Various species of the genus are attracted in great numbers to sawmills and to piled green lumber. Here they may be taken, not only in flight, but on the underside of freshly sawn boards and slabs, where they feed on the inner bark, in which they often attempt to breed. Newly emerged adults often feed upon the tender bark of young pines and spruces, and where a heavy beetle population occurs near a forest nursery or young plantation many trees may be killed by beetles girdling the bark or actually severing the stem at or below the root collar. In larger trees they are often found in roots several inches below the soil surface.

Taxonomically *Hylastes* presents many interesting problems. Some species exhibit a surprising degree of variation. In a number of the most abundant and widely distributed species, *porculus*, for example, this has led to the production of several synonyms. Moreover, in long series of little-known forms it is sometimes difficult to decide whether one is dealing with a single variable species or with several species.

## SYNONYMY OF HYLASTES ERICHSON

*Hylastes* Erichson, 1836, Arch. f. Naturgesch. 2: 47; Westwood, 1840, Introduction to Modern Classification of Insects, v. 2, p. 39; Perris, 1856, Soc. Ent. de France Ann. (3) 4: 223; Thomson, 1859, Skandinaviens Coleoptera 1: 146 (*Bostrichus ater* Payk. designated as genotype); Eichhoff, 1864, Berlin. Ent. Ztschr. 8: 23, 44, 46; Leconte, 1868, Amer. Ent. Soc. Trans. 2: 168, 174; Chapuis, 1869, Synop. Scolyt., p. 16 (extract from Soc. Roy. des Sci. de Liège Mém. (2) 3: 224, 1873); Leconte, 1876, Amer. Phil. Soc. Proc. 15: 387; Eichhoff, 1881, Europ. Borkenkäfer, pp. 35, 76; Bedel, 1888, Faune des Coléopt. Bassin de la Seine 6: 388 (as synonym of *Tomicus* Latr.); Reitter, 1895, Naturf. Ver. in Brünn, Verhandl. (1894) 33: 59; Blandford, 1896, Biol. Cent. Amer. Insecta-Coleopt. 4 (6): 143; Barbey, 1901, Scolyt. de l'Europe Cent., p. 41; Hopkins, 1915, U. S. Natl. Mus. Proc. 48: 122; Hopkins, 1915, U. S. Bur. Ent. Tech. Ser. Bul. 17: 221; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 77 (doubtfully referred to *Tomicus* Latr.); Munro, 1926, [Gt. Brit.] Forestry Comm. Bul. 8: 41, 54; Bruck, 1936, South. Calif. Acad. Sci. Bul. 35: 46.

*Tomicus* Latreille, 1802, Hist. Nat. Crustacés et Insectes 3: 203; Bedel, 1888, Faune des Coléopt. Bassin de la Seine 6: 388; Swaine, 1909, N. Y. State Mus. Bul. 134: 144; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 77.

*Hylurgus* Latreille, 1807, Genera Crustaceorum et Insectorum 2: 274; Zimmermann, 1868, Amer. Ent. Soc. Trans. 2: 149; Leconte, 1868, Amer. Ent. Soc. Trans. 2: 174 (as synonym of *Hylastes* Er.).

## DESCRIPTION OF THE GENUS

Body form cylindrical, ranging from moderately stout to slender; color reddish brown, piceous, or black; subopaque to shining; sculpture moderate to strong; pubescence usually scanty and inconspicuous. Head with a short, stout beak, approaching certain of the Cossoninae in this respect, grooved at each side for reception of antennal scape; antennal funicle 7-jointed, pedicel little larger than others, club rather small, oval, not flattened, distinctly annulated, with first segment comprising about half of club; eyes rather short ovate, the inner line entire. Pronotum longer than wide, narrower than elytra, moderately to very coarsely punctured, with surface between punctures varying from smooth and shining to opaque, occasionally with granules. Elytra with bases rather weakly arcuate, elevated, irregularly serrate; striae variably impressed, punctures moderate to coarse, often wider than interspaces.

Fore coxae narrowly separated; mesosternum not protuberant in front. Fore legs with third tarsal segment slightly widened and emarginate, not bilobed. Venter of abdomen horizontal, first and fifth sterna longer than others, fifth shorter in males and often flattened or grooved, and with special pubescence.

*Synonymy*.—The genus *Hylastes* was described by Erichson (1836) to include *Bostrichus ater* Payk. (1800) and several other species, among these a new species, *H. porculus* Er., from Pennsylvania. *H. ater* (Payk.) was the first species treated in the new genus, but Erichson did not cite it as the genotype. Westwood (1840) mentions *ater* as a typical species representing the genus *Hylastes*, but he does not definitely refer to it as the genotype. Thomson (1859), however, definitely fixes *B. ater* as the genotype.

The situation, however, is considerably complicated by doubts cast upon the validity of *Bostrichus ater*. There is some question as to whether *B. ater* Payk. (1800) is identical with either *Dermestes piniperda* L. (1758) or *B. piniperda* F. (1891), and as to whether the last two species are identical with each other but distinct from *ater*. Each of these three species has served as the basis for a different genus. *Bostrichus ater* Payk. has been designated as the type of *Hylastes* Er., *Bostrichus piniperda* F. as the type of *Tomicus* Latr. (1802), and *Dermestes piniperda* L. as the type of *Myelophilus* Eichh. (*Blastophagus* Eichh.). Several European writers believe *ater* Payk. to be identical with *piniperda* F. but distinct from *piniperda* L. If this should be proved true, *Tomicus* Latr. would replace *Hylastes* Er. On the other hand, other authorities consider *piniperda* L. and *piniperda* F. as identical and believe *ater* Payk. to be distinct and a valid species. If this interpretation is accepted, *Hylastes* Er. stands with *ater* Payk. as the type.

It would appear that the conclusions of both parties to this controversy are based on their opinions as to what the describer of each of the three species had before him, and not on facts which can now be definitely established. Since at present there seems to be no possibility of arriving at absolute proof in the matter, it seems wisest to continue the use of the generic name *Hylastes* Er., as this name is almost universally used by recent workers.

## KEY TO THE SPECIES OF *HYLASTES* ERICHSON IN NORTH AMERICA

1. Beak with distinct median carina, frontal rectangle longer than wide; discal interspaces of elytra nearly devoid of hairs, except in *ruber* Sw. and *longicollis* Sw.; male with last sternite grooved, impressed, or flattened in median line, often with special pubescence.----- 2
- Beak devoid of median carina, frontal rectangle not longer than wide in female; elytral interspaces distinctly hairy; male with last sternite not impressed or grooved and without special pubescence; slender hairy species, less than 3.0 mm. long----- 17
2. Body less than 3.0 times as long as wide; pronotum widest at or near middle (except in *scobinosus* Eichh.)----- 3
- Body more than 3.0 times as long as wide; pronotum widest in front of middle----- 12
3. Body very stout (2.5 to 2.65 times as long as wide), roughly sculptured; elytra with deep striae and strongly convex, very coarsely rugose interspaces; ninth interspace less strongly elevated behind than eighth; reddish brown in color----- 4

- Body moderately stout (2.78 to 2.95 times as long as wide), sculpture not so rough; elytral striae weakly to moderately impressed, interspaces flat to convex, moderately to finely rugose- or granulate-punctate; ninth interspace moderately to strongly elevated behind.----- 5
4. Pronotum nearly as wide as elytra, with sides strongly arcuate; striae punctures moderately coarse.-----*salebrosus* Eichhoff  
Pronotum distinctly narrower than elytra, with sides nearly straight and evenly narrowed on posterior two-thirds; striae punctures usually finer.-----*scobinosus* Eichhoff
5. Color red when mature; body moderately stout (2.8 times as long as wide); elytral interspaces wider than striae, flat on disk and sides, granulate; ninth interspace strongly elevated behind; last sternite of male flattened, not grooved.-----*ruber* Swaine  
Color piceous to black when mature; body more slender except in *canadensis*, n. sp., and *subopacus*, n. sp.; elytral interspaces weakly to moderately convex, granulate or rugose; last sternite of male impressed and pubescent in median line.----- 6
6. Elytral interspaces convex on disk; ninth interspace moderately strongly elevated behind.----- 7  
Elytral interspaces moderately convex on disk; ninth interspace only weakly elevated behind.----- 11
7. Pronotum stout, very slightly narrower than elytra, with sides evenly arcuate; surface subopaque, rather finely, very closely punctured; elytral interspaces equal to or wider than striae; declivital pubescence abundant and scalelike; New Mexico.-----*subopacus*, new species  
Pronotum distinctly narrower than elytra, with sides not evenly arcuate; surface shining, moderately to coarsely punctured; elytral interspaces narrower than striae (except in *yukonis* Fall); declivital pubescence usually scanty, scalelike or hairlike.----- 8
8. Pronotum much narrower than elytra; punctures of moderate size and very close; sutural interspaces wider and elevated on elytral declivity.-----*webbi*, new species  
Pronotum slightly narrower than elytra; punctures coarse, moderately close; sutural interspaces slightly narrowed on elytral declivity.----- 9
9. Frons with median carina sharply elevated, often extending well above the strong transverse impression; median line of pronotum strongly developed; sutural interspaces of elytra not elevated on declivity; Eastern States.-----*porculus* Erichson  
Frons with median carina usually confined to epistoma; transverse impression moderate, often forming a pitlike depression in median line; median line of pronotum weakly developed or lacking; sutural interspaces of elytra elevated on declivity; Western States.----- 10
10. Median carina of frons poorly developed; sculpture rather coarse; elytra with striae punctures rather coarse; striae as wide as or wider than interspaces.-----*nigrinus* Mannerheim  
Median carina of frons sharply elevated; sculpture notably finer; elytra with striae punctures rather small; striae not so wide as interspaces.-----*yukonis* Fall
11. Pronotum much narrower than elytra, only slightly wider at middle; surface shining; punctures moderate, irregular in size on disk, strongly granulate at sides; elytra shining, interspaces strongly granulate; Colorado, New Mexico.-----*asper* Swaine  
Pronotum nearly as wide as elytra, distinctly wider just behind middle; surface subopaque; punctures small and not so close on disk, only feebly granulate at sides; elytra subopaque, interspaces very feebly granulate; Manitoba, Canada.-----*canadensis*, new species
12. Body 4.6 to 6.5 mm. long, subopaque to feebly shining; sculpture moderate to coarse; pronotum with median line narrow, elevated; first elytral striae notably deeper and wider than others.----- 13  
Body less than 4.5 mm. long, moderately to brightly shining; sculpture rather fine; pronotum with median line narrow and scarcely elevated, often lacking; first elytral striae not notably deeper and wider than others (except in *nitidus* Sw.)----- 14

13. Body 5.0 to 6.5 mm. long and more slender (3.16 times as long as wide); sculpture rather coarse; pronotum coarsely punctured, its sides straight and diverging on posterior two-thirds, broadly rounded in front----- *macer* Leconte  
 Body 4.6 to 5.2 mm. long and less slender (3.05 times as long as wide); sculpture finer; pronotum with moderate punctures, its sides arcuate, moderately rounded in front----- *longus* Leconte
14. Brightly shining; sculpture fine; pronotum with median line nearly lacking; frons very finely punctured, not granulate, shining; epistoma strongly impressed----- 15  
 Moderately shining; sculpture moderate or very coarse; pronotum with median line narrow and weakly elevated; frons granulate-punctate, moderately shining or opaque; epistoma moderately impressed----- 16
15. Body 4.0 mm. or more long; punctures of pronotum and elytra moderate; pronotum considerably narrower than elytra----- *nitidus* Swaine  
 Body about 3.0 mm. long; punctures of pronotum and elytra rather fine; pronotum only slightly narrower than elytra--- *fulgidus*, new species
16. Pronotum 1.19 times as long as wide, slightly narrower than elytra; punctures moderate in size; elytral interspaces equal to striae in width, convex, finely rugose-granulate; striae punctures moderate in size, circular; pubescence scanty on disk, abundant on declivity  
*gracilis* Leconte  
 Pronotum slender (1.28 times as long as wide), much narrower than elytra; punctures very coarse, close; elytral interspaces narrower than striae on disk, nearly flat, finely granulate; striae punctures very coarse, elongate quadrate; pubescence abundant on disk, longer and more conspicuous on declivity----- *longicollis* Swaine
17. Beak with a shining median sulcus; pronotum granulate-punctate, widest in front of middle, its sides straight on posterior two-thirds; elytra narrowly rounded behind, with interspaces convex, finely granulate; Southeastern States----- *exilis* Chapuis  
 Beak devoid of median sulcus; disk of pronotum punctate, not granulate----- 18
18. Pronotum nearly as wide as elytra, usually widest near base, its sides parallel or gradually converging on posterior two-thirds; elytra narrowly rounded behind, surface usually subopaque; interspaces narrower than coarsely punctured striae; Eastern States-- *tenuis* Eichhoff  
 Pronotum usually widest at or in front of middle; elytra variously rounded behind, surface shining; interspaces on disk as wide as or wider than striae, except in *minutus*, n. sp.----- 19
19. Pronotum with sides diverging or sinuate on posterior two-thirds, side margin subacute behind; punctures fine and close; elytra with striae rather weakly impressed, striae punctures rather small; interspaces finely granulate; Western States----- 20  
 Pronotum with sides arcuate, side margin not acute behind; punctures rather coarse, moderately close; elytral striae moderately deeply impressed, punctures moderately coarse and not so close; interspaces strongly convex behind, roughly sculptured; Florida  
*pusillus*, new species
20. Frons shining, densely, minutely punctured; pronotum slender (1.3 times as long as wide), sides sinuate on posterior two-thirds; elytra with striae punctures rather fine; interspaces wider than striae; Arizona, New Mexico----- *parvus*, new species  
 Frons subopaque, finely, densely granulate-punctate; pronotum 1.2 times as long as wide, sides straight and feebly diverging on posterior two-thirds; elytra with striae punctures of moderate size; interspaces narrower than striae; Western States. *minutus*, new species

## HYLASTES SALEBROSUS Eichhoff

*Hylastes salebrosus* Eichhoff, 1868, Berlin. Ent. Ztschr. 12: 146; Leconte, 1868. Amer. Ent. Soc. Trans. 2: 177; Leconte, 1876, Amer. Phil. Soc. Proc. 15: 389 (as synonym of *porculus* Er.); Blandford, 1898, Ent. News 9: 5 (as synonym of *scabripennis* Zimm.); Swaine, 1909, N. Y. State Mus. Bul. 134: 146; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 77.

*Hylurgus scabripennis* Zimmermann, 1868, Amer. Ent. Soc. Trans. 2: 149; Leconte, in Zimmermann, 1868, Amer. Ent. Soc. Trans. 2: 149 (as synonym of *Hylastes porculus* Er.).

*Hylastes scabripennis* (Zimm.) Leconte, 1876, Amer. Phil. Soc. Proc. 15: 389 (as synonym of *porculus* Er.); Eichhoff and Schwarz, 1896, U. S. Natl. Mus. Proc. 18: 606, 607 (as synonym of *salebrosus* Eichh.); Blandford, 1898, Ent. News 9: 5.

*Female*.—Dark reddish brown, about 4.6 mm. long, about 2.51 times as long as wide.

Frons rather broad between the eyes, frontal rectangle<sup>2</sup> about 1.05 times as long as wide; epistomal margin darker in color, liplike; epistomal lobe broad, rather short, the end broadly emarginate, broadly impressed or excavate in middle line; epistoma light reddish brown, rather deeply and widely impressed at each side of the sharply elevated median carina, which extends from the epistomal margin to the moderately developed, arcuate, transverse impression; surface subopaque below, feebly shining above, moderately punctate and strongly granulate below, more coarsely punctate above, with the granules coarser and partly replaced by rugae; hairs fine, short, and inconspicuous, coarser and longer on epistoma. Eye moderately granulate, short ovate, about 2.0 times as long as wide, widest above, inner margin entire. Antenna with first segment of club subequal in length to the others united.

Pronotum about 1.04 times as long as wide, widest slightly behind middle, posterior outline nearly straight, posterior angles rounded, sides strongly arcuate for three-fourths of their length, then slightly constricted to meet the rather broadly rounded front margin; surface subopaque to moderately shining, with punctures moderately coarse, rather shallow, and not close on disk, closer and smaller on anterior fourth; median line impunctate, weakly elevated on posterior two-thirds; disk subglabrous, with very short, fine hairs at sides and behind.

Elytra slightly wider than pronotum (63:54), about 1.6 times as long as wide, widest near base with sides nearly straight and subparallel (slightly tapering) on anterior two-thirds, arcuately narrowed on posterior third, moderately narrowly rounded behind; surface moderately shining; striae distinctly impressed, the first two more strongly so, the punctures moderately coarse, separated by slightly less than their own diameters; interspaces slightly wider, strongly convex, more strongly so behind, strongly rugose-asperate, with a few small punctures, the rugae seldom bridging the striae except near base; disk appearing subglabrous, but with a few short, very fine hairs, coarser, longer, and somewhat more conspicuous on sides and declivity.

Anterior face of mesosternum precipitous, not protuberant; first abdominal sternite subequal to succeeding three combined, with fifth slightly shorter, ascending posteriorly, surface convex, nearly semicircularly rounded behind.

*Male*.—Similar to female; pronotum almost exactly as wide as long, nearly as wide as elytra, with sides strongly arcuate, slightly more closely punctured; elytra more strongly sculptured; last abdominal sternite more broadly rounded behind, ventral surface slightly flattened and very feebly broadly impressed in median line, with hairs larger than at sides and directed posterolaterally from middle.

*Remarks*.—The foregoing descriptions were prepared largely from two cotypes, a male and a female, donated by Eichhoff and now in the United States National Museum. In addition the writer has studied about a hundred specimens of *salebrosus*. Most of these originated in Virginia, North Carolina, and South Carolina, but a few came from Georgia, Florida, and Texas. A number of the specimens were taken at sawmills, where they had been attracted to freshly sawn lumber, but a few were obtained in their burrows in longleaf pine, shortleaf pine, loblolly pine, and in spruce.

<sup>2</sup>The width of the frontal rectangle is the distance between the inner margins of the eyes. Its length is the distance between a line connecting the upper margins of the eyes and a line parallel to it and touching the tips of the epistomal lobe.



Although the rather long series shows considerable variation, it is by no means so great as in *porculus* and no greater than in several other species of the genus.

*Synonymy*.—The type of *scabripennis* Zimm., in the Leconte collection at Harvard University, was also studied and compared directly with Eichhoff's cotypes of *salebrosus*. This comparison showed only small differences, not of specific significance.

Blandford (1898) agreed with Eichhoff and Schwarz (1896) that the two species are identical, but asserted the priority of Zimmermann's name on the basis of a statement on the original wrapper of the Berliner Entomologische Zeitung that pages 177 to 312 were not published until March 1869. Apparently he was in error as to the pagination of the description in question, for it appears on page 146. In any event, proof of Eichhoff's priority is found in Zimmerman's own paper, for on page 149 he refers to Eichhoff's description of *tenuis* which appeared in the same article immediately following that of *salebrosus*.

The assertion of Leconte (1868, 1876) that *scabripennis* Zimm. is a synonym of *porculus* Er. is certainly based on a misinterpretation of Erichson's description of the latter, as has been pointed out by Eichhoff and Schwarz (1896).

## HYLASTES SCOBINOSUS Eichhoff

*Hylastes scobinosus* Eichhoff, 1868, Berlin. Ent. Ztschr. 12: 146; Chapuis, 1869, Synop. Scolyt., p. 17 (extract from Soc. Roy. des Sci. de Liège Mém. (2) 3: 225, 1873); Leconte, 1876, Amer. Phil. Soc. Proc. 15: 389 (as synonym of *cavernosus* Zimm.); Eichhoff and Schwarz, 1896, U. S. Natl. Mus. Proc. 18: 606, 607; Swaine, 1909, N. Y. State Mus. Bul. 134: 147; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78.

*Female*.—Dark reddish brown, shining, 4.77 mm. long, about 2.6 times as long as wide; similar to *salebrosus* but with the pronotum widest near posterior margin.

Frons rather broad between eyes, frontal rectangle almost exactly as wide as long; epistomal margin darker in color, somewhat liplike, with median lobe rather short, with distal edge broadly emarginate and broadly impressed or excavate in median area; epistoma reddish brown, rather widely and deeply impressed at each side of the elevated median carina, which extends to the rather weakly developed arcuate transverse impression; surface feebly shining to subopaque, strongly granulate-punctate below, with punctures larger and interspaces rugose-granulate above; hairs fine, short, inconspicuous except on epistoma. Eye moderately granulate, short ovate, about twice as long as wide, widest above, inner margin entire. Antenna with first segment comprising about half of club.

Pronotum about 1.05 times as long as wide, but appearing more slender; posterior outline nearly straight, posterior angles rounded; widest near posterior margin, with sides nearly straight and gradually converging on posterior five-sixths of length, then moderately constricted to meet the broadly rounded anterior margin; surface brightly shining, with moderately small, deep, moderately spaced punctures, smaller, closer, and deeper than in *salebrosus*, smaller anteriorly; median impunctate line feebly elevated on posterior two-thirds; disk subglabrous with inconspicuous short, fine hairs at sides and base.

Elytra wider than pronotum (64:55), about 1.62 times as long as wide, widest near base, with sides nearly straight and slightly tapering on anterior two-thirds, then arcuately narrowed and narrowly rounded behind; surface moderately shining; striae moderately impressed, more weakly than in *salebrosus*, and narrower, with punctures moderate in size, shallow, sometimes separated by more than own diameters; interspaces wider than striae, convex, more strongly behind, rugose-asperate, with rugae near base often bridging striae between punctures;

narrower on declivity and with asperities more prominent; disk subglabrous, but with more numerous, short, fine, rather inconspicuous hairs on sides and declivity.

Mesosternum with anterior face precipitous between the middle legs; first and last abdominal sternites subequal, and each about as long as middle three combined; last sternite ascending posteriorly, convex in section, rather narrowly rounded behind, roughly, rather finely punctured.

*Male*.—Very similar to female, but with the pronotum slightly more slender (about 1.12 times as long as wide); last abdominal sternite somewhat more broadly rounded behind; ventral surface not impressed or ornamented with longer hairs in median line.

*Remarks*.—The foregoing description of the female was prepared from one of the two cotypes before Eichhoff (Eichhoff and Schwarz 1896, p. 607) when the original description was drawn up. The present writer also studied 11 additional specimens taken at several localities in North Carolina and South Carolina and at Call, Tex. The host, when indicated, was longleaf pine (*Pinus palustris* Miller) and "pine."

As Eichhoff points out, *scobinosus* is closely allied to *salebrosus*, the two species being distinguished by him by the radically different shape of the pronotum. A reading of the foregoing descriptions will indicate that other differences exist, although these are usually small. The short series of *scobinosus* shows comparatively little variation. Some of the specimens were taken from newly sawn lumber to which they, together with *salebrosus*, had been attracted; others were taken in pine bark unaccompanied by the latter.

### HYLASTES RUBER Swaine

*Hylastes ruber* Swaine, 1915, *Canad. Ent.* 47: 367; Swaine, 1918, *Canada Dept. Agr. Ent. Branch Bul.* 14 (2): 78, 79.

*Female*.—Bright reddish brown, moderately shining, 4.4 mm. to 5.7 mm. long, about 2.9 times as long as wide.

Frons distinctly convex, with the usual arcuate transverse impression scarcely indicated; only moderately wide between the eyes, frontal rectangle about 1.17 times as long as wide; epistomal margin liplike, darker in color, epistomal lobe wide, concave at middle, distal end emarginate; epistoma lighter in color, moderately deeply and widely impressed at each side of the median carina, which is fine and acute on epistoma, slightly higher, rougher, and coarser above, ending opposite middle of eyes; surface shining, closely, moderately, rather roughly, subrugosely punctured, much more finely and closely on lower frons; pubescence short, fine, and inconspicuous. Eye rather long oval, about 2.3 times as long as wide, definitely more slender than in allied species, only slightly wider above, rather finely granulate; inner line entire. Antenna with first segment of club slightly longer than the others combined.

Pronotum about 1.07 times as long as wide, widest slightly behind middle; posterior outline weakly arcuate; posterior angles rounded; sides distinctly arcuate, then moderately constricted to meet the rather broadly rounded anterior margin; surface shining, punctures of moderate size, rather close, very shallow on disk, smaller and denser in front, smaller, closer, and slightly rugose at sides; median line somewhat elevated, wider in middle half.

Elytra definitely wider than pronotum, almost exactly twice as long as wide; base truncate, with margin slightly elevated and rather feebly dentate; lateral angles rounded; sides subparallel for three-fourths of their length, then arcuately narrowed and feebly constricted, with the extreme apex very broadly rounded; surface moderately shining; striae scarcely impressed on disk, moderately so behind; punctures moderately coarse, very closely placed, only slightly smaller near base; interspaces slightly wider than striae, nearly flat on disk and sides, moderately convex behind and on declivity, moderately rugose-granulate on disk; rugae often bridging striae in basal half. Declivity arcuate, sloping; interspaces distinctly convex, confusedly granulate-asperate; distinctly compressed at each side near apex, just above the strongly convex ninth interspace. Pubescence yellowish red, short, fine, appressed, but little coarser and longer on declivity but more visible owing to angle of vision.

Last sternite moderately convex, rather narrowly rounded behind, rather closely, shallowly, moderately finely punctured, with fine, short, appressed hairs.

*Male*.—Similar in sculpture but slightly stouter, about 2.7 times as long as wide; last abdominal sternite shorter, more broadly rounded behind, slightly flattened in median area but not grooved; pubescence not especially developed, only slightly longer than in female.

*Remarks*.—The writer has studied 31 specimens from London Hill, Kokanee Mountain, and Kaslo, British Columbia; Easton and Buckeye, Wash., Hood River, Oreg., and Columbia Falls and Kalispell, Mont. None were taken from the host tree. Swaine's type series were taken from Douglas fir at Golden and Creighton Valley, British Columbia.

The specimens show little variation as compared with other species of the genus. The specimens studied agree very closely with the description except that the elytral striae are not "very narrow" and the stria punctures are not "small" but moderately coarse.

### *HYLASTES SUBOPACUS*, new species

*Male*.—Piceous brown, almost black, subopaque to feebly shining, 4.6 mm. long, about 2.78 times as long as wide; allied to *nigrinus*.

Frons moderately broad between eyes, frontal rectangle about 1.14 times as long as wide; nearly black except epistoma, which is reddish brown, with epistomal margin piceous, liplike, with epistomal lobe broad and short, broadly emarginate in middle; epistoma deeply and broadly impressed at each side, divided by the median carina, which is moderately elevated below, becoming feebly elevated above and ending in the arcuate transverse impression, which is very weak at sides but distinctly and broadly impressed in median area; rather finely, densely punctured, not granulate except at sides of disk near eyes; hairs fine and short, longer, more conspicuous, and directed downward on epistoma. Eye about twice as long as wide, notably wider above, inner margin entire. Antenna with first segment of club nearly equal to others combined.

Pronotum narrower than elytra, 1.1 times as long as wide, widest at middle; posterior outline feebly arcuate; posterior angles rounded; sides evenly, rather strongly arcuate, not appreciably constricted anteriorly, broadly rounded in front; surface subopaque, with rather fine, close, shallow punctures, much smaller and shallower than in *nigrinus*; surface of interspaces finely reticulate; punctures much finer and denser in front and at sides, finely granulate at sides; median line on posterior two-thirds feebly elevated, impunctate; hairs on disk fine and very short, scarcely extending beyond rim of puncture, slightly longer at sides and much larger near posterior border.

Elytra slightly wider than pronotum, about 1.8 times as long as wide; sides nearly straight and subparallel on anterior three-fourths, then gradually narrowed but with the apex very broadly rounded; striae strongly impressed, with punctures close, moderately coarse, and deep, smaller on declivity; interspaces wider than striae, convex, densely granulate-punctate, with slightly coarser granules, usually uniseriate but sometimes slightly irregular on declivital interspaces; ninth interspace moderately convex behind, not so strongly as in *nigrinus*; pubescence of short, fine hairs on disk, more abundant and mostly scalelike on declivity, more abundant than in *nigrinus*.

Last abdominal sternite broadly rounded, subtruncate behind, rather roughly, moderately finely, and closely punctured, with short, fine hairs; posterior median area impressed, more finely and closely punctured, with abundant, finer, and much longer, yellowish hairs.

*Type locality*.—Capitan Mountains, N. Mex.

*Additional localities*.—Brighton, Utah; Colorado.

*Host*.—Unknown.

*Holotype and three paratypes*.—U. S. National Museum No. 54032.

*Remarks*.—The holotype and one paratype were collected in the Capitan Mountains, N. Mex., July 17, 1907, by J. L. Webb; one

paratype, a male, Brighton, Utah, 7-18, Hubbard and Schwarz; one male paratype bears the single label "Col."

No female has been seen.

### HYLASTES WEBBI, new species

*Female*.—Dark reddish brown, 5.04 mm. long, about 2.85 times as long as wide.

Frons broad between the eyes, frontal rectangle 1.05 times as long as wide; dark reddish brown above, light brownish red below and on epistoma, with epistomal margin piceous, thickened, and liplike, its median lobe short, wide, and weakly emarginate at end; epistoma moderately deeply and broadly impressed at each side, divided by the median carina, which is rather wide, low, and coriaceous below, finer and sharper above, ending in the moderately deep and wide, arcuate transverse impression; surface subopaque, finely, closely, rather shallowly punctured, subgranulate; hairs fine, short, recumbent, inconspicuous, slightly longer and directed downward on epistoma, with a group of two much longer hairs, symmetrically placed at each side of epistomal lobe. Eye finely granulate, about twice as long as wide, widest above, inner margin entire. Antenna with first joint of club slightly longer than other three combined.

Pronotum distinctly narrower than elytra, about 1.19 times as long as wide, widest at or slightly behind middle; posterior outline feebly arcuate, posterior angles rounded, sides moderately, almost evenly arcuate, but very feebly constricted in anterior fourth, rather broadly rounded in front; surface shining; punctures moderately coarse, close, often in small irregular lines of from two to eight punctures with the intervening partitions lacking or very fine and low, the interstices elsewhere wider, higher, and brightly shining; punctures closer and much smaller in front; sides densely and finely asperate-punctate; median line moderately narrow, slightly elevated, lacking on anterior fourth; hairs minute, scarcely extending beyond rim of punctures on disk, slightly larger on sides and behind.

Elytra distinctly wider than pronotum, about 1.92 times as long as wide; sides subparallel on anterior two-thirds, then gradually narrowed, with the apex narrowly rounded; surface moderately shining; striae moderately impressed on disk, more strongly on sides and declivity; punctures coarse, moderately close, slightly less so than in *nigrinus*; interspaces slightly narrower than striae, rather strongly convex, more strongly on sides and declivity, finely, confusedly punctured and confusedly, moderately granulate; disk appearing glabrous, but with a few minute, irregularly arranged hairs, more abundant, coarser, and longer on declivity, and to a less extent on sides. Declivity sloping, interspaces more strongly convex, first and third somewhat more strongly elevated, granules slightly coarser than on disk, not uniseriate; ninth interspace wide, moderately elevated behind.

Last sternite of abdomen moderately rounded, strongly convex near base, less so toward tip; punctures of moderate size, finer, closer, and rougher near apex; hairs minute, appressed, inconspicuous.

*Male*.—Similar to female in size and proportions, slightly more coarsely punctured; last abdominal sternite shorter, very broadly rounded, subtruncate behind, moderately punctured near base, finely and densely at tip, impressed in median line behind, and ornamented with longer and more numerous hairs in groove.

*Type locality*.—Elmore, S. Dak.

*Additional locality*.—KalisPELL, Mont.

*Host*.—Not definitely known, probably *Pinus ponderosa* Laws.

*Holotype, allotype, and four paratypes*.—U. S. National Museum No. 54033.

### HYLASTES PORCULUS Erichson

*Hylastes porculus* Erichson, 1836, Arch. f. Naturgesch. 2: 49; Leconte, 1868, Amer. Ent. Soc. Trans. 2: 174 (*scabripennis* Zimm. as synonym); Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388, 389; Schwarz, 1878, Amer. Phil. Soc.

- Proc. 17: 469; Hubbard and Schwarz, 1878, Amer. Phil. Soc. Proc. 17: 643; Schwarz, 1888, Ent. Soc. Wash. Proc. 1: 80; Packard, 1890, U. S. Ent. Comn. Rpt. 5, p. 724; Eichhoff and Schwarz, 1896, U. S. Natl. Mus. Proc. 18: 606; Hopkins, 1899, W. Va. Agr. Expt. Sta. Bul. 56: 448; Smith, 1900, Insects of New Jersey, p. 365; Skinner, 1905, Ent. News 16: 248; Felt, 1906, N. Y. State Mus. Mem. 8, v. 2, p. 752; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78, 79; Leonard et al., 1928, N. Y. (Cornell) Agr. Expt. Sta. Mem. 101: 517; Eggers, 1934, Ent. Nachrichtenbl. 8: 25-26.
- Tomicus porculus* Erichson, Swaine, 1909, N. Y. State Mus. Bul. 134: 145.
- Hylastes carbonarius* Fitch, 1857, Noxious Insects of New York, 4th Rpt., p. 44; Leconte, 1876, Amer. Phil. Soc. Proc. 15: 389 (as synonym of *porculus* Er.); Eichhoff and Schwarz, 1896, U. S. Natl. Mus. Proc. 18: 607 (as synonym of *porculus* Er.).
- Hylastes granosus* Chapuis, 1869, Synop. Scolyt., p. 17 (extract from Soc. Roy. des Sci. de Liège Mém. (2) 3: 225, 1873); Leconte, 1876, Amer. Phil. Soc. Proc. 15: 389 (as synonym of *porculus* Er.); Eichhoff and Schwarz, 1896, U. S. Natl. Mus. Proc. 18: 606, 607 (as synonym of *porculus* Er.).
- Hylurgus cavernosus* Zimmermann, 1868, Amer. Ent. Soc. Trans. 2: 149; Eichhoff and Schwarz, 1896, U. S. Natl. Mus. Proc. 18: 606, 607 (as synonym of *Hylastes porculus* Er.).
- Hylastes cavernosus* Zimmermann, Leconte, 1868, Amer. Ent. Soc. Trans. 2: 174; Hubbard and Schwarz, 1878, Amer. Phil. Soc. Proc. 17: 643.
- Hylastes scaber* Swaine, 1917-18, Canada Dept. Agr. Ent. Branch Bul. 14 (1): 18; (2): 77; Eggers, 1934, Ent. Nachrichtenbl. 8: 25.
- Hylastes swaini* Eggers, 1934, Ent. Nachrichtenbl. 8: 25-26.

*Female*.—Very dark reddish brown to black, 3.9 to 5.3 mm. long, about 2.85 to 2.9 times as long as wide.

Frons rather broad between eyes, frontal rectangle about 1.04 times as long as wide, nearly black throughout; epistoma deeply and broadly impressed at each side, epistomal margin concolorous, liplike as usual, with median epistomal lobe moderately broad and very short; median carina distinctly elevated, broader below, sharper above, ending in the arcuate transverse impression, which is moderately deep and wide across the middle, less so at sides; surface moderately shining, finely, densely, rather roughly punctured, granulate in part; hairs short and fine, longer and coarser and directed orad on epistoma. Eye finely granulate, about 2.1 times as long as wide, distinctly wider above; inner line entire. Antenna with first joint of club as long as others combined.

Pronotum slightly narrower than elytra, about 1.17 times as long as wide, widest near middle (but somewhat variable), posterior outline weakly arcuate, posterior angles rounded, sides moderately, nearly evenly arcuate (often variable), feebly constricted just behind the rather broadly arcuate anterior margin; surface feebly to moderately shining, moderately closely, coarsely, and deeply, but somewhat irregularly, punctured, much more finely and densely in front, asperate-punctate at sides; median line on posterior two-thirds feebly elevated, impunctate; disk glabrous, with short, very inconspicuous hairs at sides and behind.

Elytra wider than pronotum, nearly twice (1.8 to 1.9) as long as wide; widest near base, with sides subparallel for two-thirds of their length, then arcuately converging and moderately narrowly rounded behind; striae moderately impressed, wide, with first one often wider and more deeply impressed than others, causing disk to appear slightly flattened; punctures deep, very coarse, often subquadrate, smaller anteriorly and on the sides, separated by less than own diameters; interspaces narrower than striae, second one wider than others, varying from weakly punctured and scarcely rugose to granulate punctate on disk, narrower, more convex, and more distinctly asperate or granulate behind on disk and especially on declivity; disk subglabrous, sides and especially declivity with rather numerous short hairs, none of them flattened or scalelike. First and fifth abdominal sternites each nearly as long as other three combined; last sternite slightly ascending posteriorly, narrowly rounded behind, moderately coarsely punctured, with hairs short, fine, and inconspicuous.

*Male*.—Often shorter and slightly stouter, with striae punctures somewhat coarser and interspaces narrower; elytra narrowed on posterior third as in female but with caudal end more broadly rounded or even subtruncate; last abdominal sternite more broadly rounded behind, with a wide, shallow groove bearing longer, yellowish hairs in median line on posterior half.

*Remarks.*—In preparing the foregoing descriptions a series of over 150 specimens from diverse localities were studied. In connection with the characterization of the female, the type of *carbonarius* was used along with other specimens, and a cotype of *granosus*, originally from Eichhoff's collection, was used in preparing the male description. In connection with the descriptions a specimen identified by Eichhoff and presumably compared with Erichson's type was also used.

Specimens studied by the writer are from various species of pine, and came from Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Michigan, Minnesota, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Alabama, and Texas. The species also occurs sparingly in the eastern provinces of Canada.

The specimens studied show a rather remarkable range of variation both in size and sculpture, and specimens showing the extremes, if considered alone, might well be placed as distinct species, as indeed they have been. Nearly every short series from Maine to Texas shows much of this variation. Specimens that agree excellently with Swaine's description of *scaber* are present in series from Warrensburg, N. Y., the Washington, D. C., area, North Carolina, and Call, Tex. However, other specimens, taken in the same burrows at the same time, agree with the average specimens of *porculus* or may even approach the structure of *swainei*.

The synonymy of *porculus* is rather complicated. In 1868 Leconte (Zimmermann, p. 149) suggested that *H. carbonarius* Fitch (1857) and *Hylurgus scabripennis* Zimm. (1868) are the same species and that both names are synonyms of *H. porculus* Er. (1836). Later, in 1876 (p. 389), Leconte stated that *Hylastes carbonarius* Fitch, *H. granosus* Chap. (1869), and *Hylurgus scabripennis* Zimm. are definitely, and that *Hylastes salebrosus* Eichhoff (1868) is doubtfully, synonymous with *H. porculus*.

To settle the question definitely Eichhoff and Schwarz (1896) collaborated by an exchange of specimens to establish the identity of a number of American scolytid species described by Erichson, Chapuis, and Eichhoff in Europe and by Fitch, Zimmermann, and Leconte in America. Their decision is that *carbonarius* Fitch, *cavernosus* Zimm., and *granosus* Chap. are synonyms of *porculus* Er., and that *salebrosus* Eichh. and *scabripennis* Zimm. are synonymous but are distinct from *porculus* Er.

This synonymy has been generally accepted by later authorities, and the present writer confirms it after a careful study of the type of *carbonarius*, a cotype of *granosus*, and a specimen compared with the type of *porculus* by Eichhoff.

*Hylastes scaber* Swaine (1917) should also be added to the synonymy of *porculus*, as has been pointed out by Eggers (1934). *H. swainei* Eggers is also almost certainly another variation of *porculus*, representing the opposite extreme from *scaber*. Although the writer has not seen type material, he has studied 10 specimens from Lake Itasca, Minn., one of the type localities, of which several specimens show the *swainei* characters while the rest are either of the typical *porculus* sculpture or intermediates. Furthermore, specimens from Vermont (Brattleboro), Massachusetts (Petersham), and West Virginia (several localities) show the *swainei* structure, but in

all cases occur in lot series with several or many intermediate or typical specimens. Intermediates between the two extremes represented by *scaber* and *swainei* are to be found in any large series collected at any locality from Maine to Texas. The writer has little hesitation in placing *swainei* as a synonym of *porculus*.

### HYLASTES NIGRINUS (Mannerheim)

*Hylurgus nigrinus* Mannerheim, 1852, Moskov. Obshch. Isp. Prirody, Otd. Biol. Bül. (Soc. Nat. de Moscou, Sect. Biol. Bul.) 25: 356.

*Hylastes nigrinus* Leconte, 1868, Amer. Ent. Soc. Trans. 2: 174; Chapuis, 1869, Synop. Scolyt., p. 18 (extract from Soc. Roy. des Sci. de Liège Mém. (2) 3: 226; Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388; Hamilton, 1894, Amer. Ent. Soc. Trans. 21: 36; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78, 79.

*Female*.—Dark piceous brown to black, 4.1 to 4.9 mm. long, about 2.96 times as long as wide.

Frons moderately narrow between eyes, frontal rectangle about 1.13 times as long as wide, nearly black, with epistoma slightly lighter; epistoma broadly and deeply impressed at each side; median carina usually confined to epistoma but occasionally extending nearly to central pit; epistomal margin nearly black, liplike, median lobe short, moderately broad, broadly excavated, with free end emarginate; arcuate transverse impression moderate at sides, deepest in middle line, often forming a pitlike depression; surface subopaque, moderately finely, densely, somewhat roughly punctured, feebly granulate at sides. Eye rather finely granulate, less than twice as long as wide, much wider above. Antenna with first joint of club as long as others combined.

Pronotum slightly but distinctly narrower than elytra, about 1.12 times as long as wide, widest just in front of middle; posterior outline feebly bisinuate; posterior angles only slightly rounded, sides nearly straight behind and diverging slightly to about middle, then arcuately narrowed to broadly rounded front margin; surface feebly shining to subopaque, with moderately coarse, close, deep punctures, somewhat irregular in size (closer than and not so coarse as in *porculus*), distinctly smaller and denser in front and somewhat smaller, closer, and rougher (subgranulate) at sides; median line narrow, weakly elevated, sometimes nearly lacking.

Elytra wider than pronotum, about 1.9 times as long as wide; sides nearly straight and subparallel on anterior two-thirds, then gradually, arcuately narrowed to the narrow but broadly rounded apex; striae and interspaces subequal in width; striae moderately impressed, more deeply so behind on disk and on declivity; punctures coarse, deep, and close, smaller on sides and declivity; interspaces moderately convex on disk, strongly convex on declivity, nearly flat on sides, rugosely granulate-punctate on disk and sides, more strongly granulate on declivity; ninth interspace strongly elevated behind; pubescence short, fine, sparse on disk, mostly wide and scalelike and more abundant on declivity. Last abdominal sternite convex, moderately rounded behind, rather coarsely and roughly punctured, with rather short, fine hairs.

*Male*.—Similar to female in size and proportions, but more coarsely sculptured; last sternite of abdomen shorter, more broadly rounded, subtruncate behind, broadly impressed in median line, with finer, denser punctures and longer, yellowish hairs in impression.

*Remarks*.—The series studied, consisting of more than 100 specimens, shows considerable variation, not only in size and sculpture but in the shape and width of the pronotum and the apex of the elytra. However, there is by no means so much variation as in the closely allied eastern species, *porculus*. Series from various localities contain specimens that have the pronota notably narrower, with the widest point near the bases and the sides feebly arcuate.

*Hylastes nigrinus* is distributed from Alaska to California and eastward to Idaho. It is very common in Washington and Oregon. Host records include Douglas fir, true firs, spruce, pine, and western hemlock.



## HYLASTES YUKONIS Fall

*Hylastes yukonis* Fall, 1926, Pan-Pacific Ent. 2: 207-208.

"Strikingly similar in size, form and general appearance to *H. nigrinus*, from which it seems to differ constantly in its somewhat less coarse sculpture both above and beneath. In *nigrinus* the punctures of the discal striae of the elytra are notably coarse, the intervals not appreciably wider than the striae. In the present species the stria punctures are evidently smaller, the intervals between the striae always distinctly wider than the punctures themselves. The sides of the prothorax are slightly more rounded than in *nigrinus*, and the rostral carina is always sharply defined and entire. In my series of *nigrinus* the rostral carina is never so well developed as in *yukonis* and not infrequently is nearly or quite obsolete except for the short distance where it crosses the apical convexity. Length, 4.3 to 5.6 mm.; width, 1.55 to 1.58 mm. Dimensions of type,  $1.7 \times 4.6$  mm.; of prothorax,  $1.5 \times 1.3$  mm.

"Described from six examples taken in flight at White Horse (June 21, 1924), and Dawson (June 24, 1924), Yukon Territory. The type is a male from White Horse.

"In the male the last ventral is apically concave and furnished with a brush of yellowish erect hairs as in the allied species. Notwithstanding the rugose sculpture the integuments of the upper surface are polished and shining throughout, without trace of alutaceous sculpture. *Nigrinus* is a little duller though not visibly alutaceous; the nearly allied *macer*, on the other hand, has the surface between the punctures distinctly alutaceous."

The present writer has seen no specimen of *yukonis*, but he has studied specimens of *nigrinus* from several localities in Canada which approach it in structure.

## HYLASTES ASPER Swaine

*Hylastes asper* Swaine, 1917-18, Canada Dept. Agr. Ent. Branch Bul. 14 (1): 19-20; (2): 77.

*Female*.—Very dark reddish brown, almost black, 4.5 mm. long, about 2.9 times as long as wide.

Frons moderately narrow between eyes, frontal rectangle about 1.12 times as long as wide, dark reddish brown, with epistoma lighter reddish brown and its margin piceous; epistoma rather deeply, moderately broadly impressed at each side, median carina narrow and sharp below, wider above, ending at margin of central pit; epistomal margin piceous black, liplike; median lobe wide, rather short, broadly, deeply impressed in median line, with free end emarginate; arcuate transverse impression rather weak, except in center, where it forms a subcircular pitlike depression as in *nigrinus*; surface moderately shining, very densely and finely granulate-punctate, vertex subopaque and very finely punctured; hairs fine, short, inconspicuous except on epistoma, where they are larger and directed orad. Eye finely granulate, about 2.3 times as long as wide, much wider above, inner line entire. Antenna with first segment of club distinctly longer than others combined.

Pronotum distinctly narrower than elytra, about 1.14 times as long as wide, slightly wider near middle, posterior outline feebly arcuate, posterior angles scarcely rounded, sides subparallel behind, feebly arcuate to widest point, then more strongly, arcuately narrowed, very broadly rounded in front; surface shining, punctures moderate in size, very close on disk, granulate-punctate on sides, much smaller and denser, subgranulate in front; median line distinctly elevated, moderately narrow, hairs on disk minute, scarcely visible, somewhat longer but still short on sides and behind.

Elytra distinctly wider than pronotum (54:44), about 1.9 times as long as wide, sides nearly straight and subparallel on anterior two-thirds, then gradually, arcuately narrowed to the moderately rounded apex; striae moderately narrow, moderately impressed on disk, more strongly so on declivity, less strongly so on sides; punctures rather small, closely placed, smaller on sides and declivity; interspaces notably wider, moderately convex on disk, strongly



convex on declivity, nearly flat on sides, rugose-granulate on disk, with granules becoming larger and uniseriate on declivity; ninth interspace scarcely elevated; vestiture sparse, fine, inconspicuous, and hairlike on disk and sides, much more abundant on declivity, scalelike except for a row of small hairs in middle of each interspace. Last sternite of abdomen nearly equal in length to the sum of the three preceding ones, convex, broadly rounded behind, moderately finely and closely punctured, with rather sparse, fine, short, appressed hairs.

*Male*.—Slightly stouter, sculpture similar; last abdominal sternite shorter, more broadly rounded behind, with punctures rougher, somewhat larger at base and sides, much closer and finer in the median broad impression on the posterior half; vestiture at base and sides sparse, fine, short and appressed, much coarser, longer, abundant, and suberect in impression.

*Remarks*.—This species was described from Colorado, only the female being represented in Swaine's description. The writer has carefully studied specimens from Pikes Peak, Colo., and Santa Blanca Mountains, N. Mex. The host when recorded is *Picea engelmannii* Engelm. or "pine."

### *HYLASTES CANADENSIS*, new species

*Female*.—Reddish brown, 4.4 mm. long, about 2.82 times as long as wide.

Frons moderately narrow between eyes, frontal rectangle about 1.1 times as long as wide, reddish brown with epistomal margin piceous; epistoma moderately impressed at each side; epistomal margin liplike, median lobe wide and short, broadly and deeply impressed in median line, with free end emarginate; median carina very fine, feebly elevated, faint but traceable as far as arcuate transverse impression, which is weak at sides but moderately developed in median area; surface subopaque, finely, very closely punctured, finely granulate near eyes at each side; vertex very finely and densely punctured, opaque. Eye finely granulate, not quite twice as long as wide, widest above; inner line entire. Antenna with first segment of club longer than other three combined.

Pronotum slightly narrower than elytra, about 1.13 times as long as wide, widest just behind middle; posterior outline weakly arcuate, posterior angles slightly rounded, sides almost evenly, moderately strongly arcuate from base to broadly rounded anterior margin, very feebly constricted in anterior third; surface subopaque, finely reticulate, punctures of moderate size, moderately close, often forming small irregular lines of two to five punctures with intervening partitions narrower and low; smaller and much closer in front, somewhat smaller and rather weakly asperate at sides; median line rather narrow, feebly elevated, subopaque on posterior three-fifths.

Elytra wider than pronotum, about 1.81 times as long as wide; sides subparallel on anterior two-thirds, then gradually, arcuately narrowed to the narrowly rounded apex; surface subopaque; striae moderately impressed on disk, more strongly on declivity, punctures moderately coarse, close, rather shallow; interspaces slightly wider than striae, second interspace much wider, moderately convex on disk, more strongly convex on declivity, weakly rugose and finely punctured on disk, becoming definitely granulate on declivity; ninth interspace only slightly elevated behind; vestiture very minute, appearing glabrous on disk, more abundant, longer, and coarser on declivity. Last abdominal sternite rather narrowly rounded behind; punctures moderate, not close; hairs small, appressed.

*Male*.—Similar to female in proportions and sculpture; last abdominal sternite slightly shorter, subtruncate behind, with punctures similar to those of female on base and sides, broadly impressed behind, more finely, densely punctured, and ornamented with much longer, slender hairs.

*Type locality*.—Aweme, Manitoba.

*Host*.—Unknown.

*Holotype, allotype, and one paratype*.—U. S. National Museum No. 54034.

Holotype, allotype, and one paratype bear the label "Aweme, Man., Can., V-26-09, T. Criddle, Collector; Geo. M. Greene Collection."

## HYLASTES MACER Leconte

*Hylastes macer* Leconte, 1868, Amer. Ent. Soc. Trans. 2: 175; Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388; Schwarz, 1894, Insect Life 7: 255; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78, 79.

*Female*.—Piceous brown to black, 5.0 to 6.5 mm. long, about 3.16 times as long as wide.

Frons moderately narrow between eyes, frontal rectangle about 1.13 times as long as wide, piceous brown with epistomal margin black; epistoma moderately deeply and widely impressed at each side, divided by a fine, rather low median carina which ends above in an arcuate transverse impression; epistomal margin darker, thickened, and liplike, median lobe wide, very short, entire middle half impressed, free end rather shallowly emarginate; surface subopaque, finely, very densely granulate-punctate; vestiture coarser, longer, and more visible than usual, longer on epistoma. Eye nearly twice as long as wide, widest above; inner margin entire. Antenna with first segment of club almost exactly as long as other three combined.

Pronotum distinctly narrower than elytra, about 1.27 times as long as wide; posterior outline rather weakly arcuate, posterior angles rather strongly rounded, sides on posterior half nearly straight and feebly divergent to widest point just anterior to middle, then more strongly, arcuately narrowed to meet the broadly rounded front margin; surface feebly shining or subopaque, rather deeply, moderately coarsely, and closely punctured on disk, much more finely so in front, weakly granulate and somewhat more finely punctured on sides; median line narrow, elevated, shining on posterior two-thirds.

Elytra distinctly wider than pronotum, slightly more than twice as long as wide; sides subparallel and nearly straight on nearly three-fourths of their length, then gradually narrowed to apex, which is very broadly, often subtruncately rounded; surface subopaque; striae weakly impressed anteriorly on disk and sides, more strongly so posteriorly and on declivity, first and second more strongly so throughout; punctures rather coarse, moderately close, separated by slightly less than own diameters; interspaces wider than striae, ranging from feebly convex at base to strongly convex on declivity, surface finely reticulate, rather weakly rugose, finely punctured on disk, becoming distinctly rugose and uniseriately granulate on declivity; disk subglabrous, declivital interspaces with a middle row of short, fine hairs, and with rather narrow, appressed scales at each side; ninth interspace only moderately elevated. Last abdominal sternite moderately narrow behind, strongly convex, slightly flattened posteriorly; punctures deep, moderately coarse, and close; hairs rather short, fine, appressed.

*Male*.—Similar to female in proportions and sculpture; last abdominal sternite shorter and more broadly rounded behind than in female, with a broad, posterior, median impression, with the punctures there fine and dense, giving rise to fine, rather long, cinereous hairs.

*Remarks*.—Both Leconte's cotypes of *macer* are males, one from California and the second from Nebraska. The Nebraska specimen shows certain small differences and may possibly represent another closely allied species. Three other specimens in the Leconte collection are females from California.

The writer has studied numerous specimens of this species from California, Oregon, and Washington, as well as short series from Idaho, Montana, South Dakota, Nebraska, Colorado, New Mexico, and Arizona. They show only minor differences, which are not considered sufficient for their separation. The hosts are *Picea engelmannii* Engelm., *Pinus ponderosa* Laws., and *P. lambertiana* Dougl.

## HYLASTES LONGUS Leconte

*Hylastes longus* Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388, 389; Fall and Cockerell, 1907, Amer. Ent. Soc. Trans. 33: 218; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78.

*Description of type*.—Dark reddish brown, 4.63 mm. long, about 3.05 times as long as wide; similar to *macer* Lec., but smaller and not quite so slender.

Frons moderately narrow between eyes, slightly narrower than in *macer*, piceous, with epistoma slightly lighter and reddish; epistoma broadly, moderately deeply impressed, bisected by the distinctly elevated, rather sharp median carina, which becomes weaker above and ends in the arcuate transverse impression; epistomal margin piceous, thickened and liplike; median lobe wide, short, with middle half impressed and distal end broadly, moderately shallowly emarginate; arcuate transverse impression rather weakly developed, deeper in median area; surface subopaque, densely, finely granulate-punctate; vestiture not quite so conspicuous as in *macer*, longer on epistoma. Eye rather finely granulate, about twice as long as wide, considerably wider above. Antenna with first segment of club about equal in length to others combined.

Pronotum narrower than elytra, about 1.18 times as long as wide, widest slightly in front of middle; posterior outline weakly arcuate; posterior angles rounded; sides nearly straight and slightly diverging on posterior half, then gradually, arcuately narrowed, more strongly so than in *macer*, moderately rounded in front; surface feebly shining; punctures close and moderately coarse, finer than in *macer*, somewhat smaller, and much closer at sides, granulate, very fine and dense in front; median line smooth, slightly elevated, ending in anterior third.

Elytra distinctly wider than pronotum (53:45), slightly more than twice as long as wide; sides nearly straight and subparallel on more than the anterior two-thirds, rather narrowly rounded behind; surface feebly shining to subopaque; striae impressed, the first one more strongly, and all strongly impressed behind and on declivity, with moderately coarse, circular punctures separated by slightly less than their own diameters, finer on declivity and sides; interspaces distinctly wider than striae, nearly flat and finely rugose-punctate anteriorly on disk, convex and with small granules on declivity; ninth interspace not strongly elevated; discal interspaces nearly devoid of hairs, declivity with a middle row of short, fine hairs in each interspace and with numerous short, narrow scales.

*Remarks.*—The type specimen in the Leconte collection, from which the description was prepared, was taken in Colorado. In addition, the writer has studied several other specimens from Colorado and New Mexico, collected by Hubbard and Schwarz, and by Wickham, and five specimens reared from *Pinus ponderosa* Laws. from Estes Park, Colo., at the Fort Collins laboratory of the Bureau of Entomology and Plant Quarantine.

### *HYLASTES NITIDUS* Swaine

*Hylastes nitidus* Swaine, 1917-18, Canada Dept. Agr. Ent. Branch Bul. 14 (1): 19; (2): 78.

*Female.*—Dark reddish brown to black, 4.0 mm. long, scarcely more than three times as long as wide; of the size and proportions of *gracilis* Lec., but with scales on declivital interspaces of female.

Frons broad between eyes, frontal rectangle almost exactly as broad as long, piceous, with epistoma somewhat lighter; epistomal margin piceous; epistoma broadly, rather deeply impressed at each side, bisected by a rather low, blunt carina, lower and fainter above where it ends in an arcuate transverse impression; epistomal margin piceous, thickened, and liplike; median lobe rather wide, moderately short, deeply and widely impressed in middle half, with distal end rather shallowly emarginate; arcuate transverse impression rather shallow, little deeper in median area; surface moderately shining, finely, closely punctured above and in epistomal impression, minutely punctured just below arcuate transverse impression; vestiture very fine and short, appearing glabrous, longer and more conspicuous on epistoma. Eye finely granulate, twice as long as wide, narrower above than usual; inner line not emarginate. Antenna with first joint of club distinctly longer than the others combined.

Pronotum distinctly narrower than elytra, about 1.25 times as long as wide, weakly arcuate behind; posterior angles rounded, sides nearly straight and

very feebly diverging to widest point just in front of middle, then moderately, arcuately narrowed to the rather broadly rounded front margin; surface brightly shining; punctures moderate in size and spacing, rather shallow, much closer and feebly roughened at sides, much smaller and closer in front; median line narrow, feebly elevated, visible only in middle third.

Elytra about 1.96 times as long as wide, bases nearly straight, sides subparallel, very faintly arcuate on anterior two-thirds, then gradually, arcuately narrowed to the narrowly rounded apex; surface brightly shining on disk, subshining on declivity; striae moderately impressed on disk, more strongly so behind, first striae wider and deeper than others; punctures moderately coarse, deep, moderately close; interspaces wider than striae, moderately convex, more strongly so behind, finely rugose-punctate, densely finely granulate on base and declivity, with a uniseriate row of coarser granules on each declivital interspace; disk appearing glabrous but with a few very minute hairs; declivity with rather numerous reclining hairs and narrow scales; first and third interspaces slightly more strongly elevated, ninth interspace not strongly elevated behind. Last abdominal sternite convex, narrowly rounded behind, closely, deeply, and roughly punctured.

The type is from Las Vegas, N. Mex.

*Remarks.*—Two specimens in the United States National Museum have been identified as belonging to this species. Both are from the type locality. They run very close to one variation of *gracilis*, of which the Museum has many specimens from the same locality, and may possibly represent one variant of this extremely variable species. However, *nitidus* is believed to be distinct from *gracilis* by the character of the vestiture on the elytral declivity and by other differences. *Hylastes vastans*, described by Chapuis (1869) from Mexico and recorded by Blandford (1896) from two localities in Mexico and one in Guatemala, may well be the same as *nitidus*, but the description of the former is indefinite.

### HYLASTES FULGIDUS, new species

*Female.*—Very dark reddish brown, 3.08 mm. long, scarcely more than three times as long as wide; closely allied to *nitidus* Sw. and *gracilis* Lec. but considerably smaller than either.

Frons strongly convex above, broad between eyes, frontal rectangle 1.03 times as long as wide, piceous throughout; epistoma scarcely lighter, broadly and deeply impressed; median carina rather faint, usually visible only on epistoma but sometimes traceable as an impunctate, smooth, narrow area as far as the arcuate transverse impression; epistomal margin somewhat thickened and lip-like; median lobe wide and short, free end emarginate, outer face excavated on more than middle half; arcuate transverse impression rather feebly developed, strongest in median area; surface brightly shining, closely, very finely punctured, not granulate, but more roughly punctured on lower half. Eye finely granulate, ovate, wider above, not quite twice as long as wide, inner margin entire. Antenna with first segment of antennal club not so long as others combined.

Pronotum slightly narrower than elytra, about 1.2 times as long as wide, very slightly widest just in front of middle; posterior outline feebly arcuate; posterior angles rounded; sides nearly straight, very feebly arcuate and very slightly diverging on posterior part, then somewhat more strongly, arcuately narrowed to the broadly rounded front margin; surface very brightly shining; punctures rather small, deep, moderately close, with interspaces brightly polished, sides somewhat more finely and roughly punctured, much more finely and closely so in front; median line narrow, feebly elevated on middle three-fifths.

Elytra slightly wider than pronotum, about 1.9 times as long as wide; bases nearly straight; sides subparallel, very slightly tapering for two-thirds of their length, then regularly arcuate to the narrowly rounded apex; surface shining; striae impressed, more strongly so behind, first and second more strongly than others; punctures of moderate size, deep, moderately close; interspaces wider

than striae, somewhat convex, more strongly so behind and especially on declivity, brightly shining, finely rugose and very finely granulate. Declivity with the striae narrower and deeper; interspaces more strongly convex, each with a middle row of small granules, from each of which arises a small, inconspicuous hair; surface masked and rendered opaque by a moderately dense covering of moderately narrow, appressed scales. Last abdominal sternite longer than preceding two combined, moderately broadly rounded behind; surface convex, deeply, moderately finely, and closely punctured, with fine, inconspicuous hairs.

*Male*.—Very similar to female, differing principally in structure of last sternite, which is somewhat shorter, more broadly rounded behind, broadly, very feebly impressed in median area behind, with slightly longer hairs.

*Type locality*.—Las Vegas Hot Springs, N. Mex.

*Additional localities*.—Pinal Mountains, Ariz.; Gallup, N. Mex.

*Host*.—Unknown.

*Holotype, allotype, and nine paratypes*.—U. S. National Museum No. 54035.

Type, allotype, and seven paratypes bear the data "Las Vegas H. S., N. M.; Barber and Schwarz, Coll."; one paratype, "Gallup, N. M., Coll. Wickham"; one paratype, "Pinal Mts., Arizona, Wickham."

*Remarks*.—This species is allied to both *gracilis* and *nitidus*. It is readily separated from *nitidus* by its smaller size, finer sculpture, and proportionally wider pronotum. From *gracilis* it is distinguished by the more shining surface, the finer pronotal punctures, the narrower elytral apex, the strongly impressed first elytral striae, and the absence of granules on the frons.

### *HYLASTES GRACILIS* Leconte

*Hylastes gracilis* Leconte, 1868, Amer. Ent. Soc. Trans. 2: 174; Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388; Hopkins, 1899, W. Va. Agr. Expt. Sta. Bul. 56: 449 (as synonym of *tenuis* Zimm.); Fall and Cockerell, 1907, Amer. Ent. Soc. Trans. 33: 218; Swaine, 1909, N. Y. State Mus. Bul. 134: 147 (as synonym of *tenuis* Eich.); Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78.

*Female*, cotype.—Dark reddish brown, with elytra slightly lighter, 3.91 mm. long, about 3.04 times as long as wide.

Frons moderately broad between eyes; frontal rectangle about 1.1 times as long as wide, reddish brown with epistomal margin light piceous; epistoma broadly, moderately deeply impressed at each side of the fine, rather faint median carina, which extends from epistomal margin to arcuate transverse impression; epistomal margin thickened and liplike, its median lobe moderately broad, short, with free end emarginate and anterior face broadly impressed on middle half; arcuate transverse impression wide but rather shallow; surface moderately shining, finely, very densely punctured, somewhat granulate below; hairs fine, short, moderately numerous, not conspicuous. Eye finely granulate, not quite twice as long as wide, much wider above; inner margin entire. Antenna with first segment about as long as others combined.

Pronotum slightly but distinctly narrower than elytra, about 1.19 times as long as wide, slightly widest just in front of middle; base feebly arcuate; posterior angles rounded; sides nearly straight and subparallel on posterior two-thirds, then gently, arcuately narrowed to the moderately rounded front margin; surface moderately shining; punctures of moderate size, depth, and spacing, much finer and closer in front, densely granulate-punctate at sides; median lines usually narrow, scarcely elevated, often indistinct; vestiture short, fine, inconspicuous, disk often appearing glabrous.

Elytra distinctly wider than pronotum (45:38), almost exactly twice (2.02) as long as wide; sides nearly straight and subparallel for about two-thirds of their length, then arcuately narrowed, with extreme apex rather broadly rounded; surface rather weakly shining; striae moderately impressed, with the first but

little stronger, punctures moderate on disk, smaller on sides and declivity, moderately close; interspaces approximately equal in width to striae, weakly convex on disk, more strongly so on declivity, finely rugose-punctate, becoming uniseriately granulate on declivity; ninth interspace not more strongly convex; vestiture of disk consisting of short, fine hairs, longer, coarser, and more abundant on declivity, but not scalelike. Last abdominal sternite broadly rounded behind, strongly convex, moderately closely and roughly punctured, with fine, short hairs.

*Male*, cotype.—Similar, but with the vestiture of elytral declivity mostly flattened and scalelike; last sternite distinctly grooved, with the hairs here more numerous and longer, parted in middle and directed obliquely backward.

*Remarks*.—Leconte's series of *gracilis* in the Museum of Comparative Zoology, Harvard University, consists of six specimens in all, the first two being designated as "types." These cotypes are from "Tahoe Valley, Cal." No. 1, a female, and No. 2, a male, were used in preparing the foregoing descriptions.

*Hylastes gracilis* is a very widely distributed species, for the writer has studied specimens from California, Oregon, Washington, Idaho, South Dakota, Colorado, New Mexico, Arizona, and Indiana. It is possible that the specimens from Lafayette, Ind., were imported in western lumber. Host records furnished by D. De Leon from field notes are *Pinus lambertiana* Dougl., *P. ponderosa* Laws., *P. edulis* Engelm., and "white fir" (*Abies concolor* Lindl. and Gord.). Most of the specimens were taken in flight, feeding on slabs about a saw-mill, or on the surface of logs.

This species is an extremely variable one. Specimens chosen from series taken at various localities in the rather wide range of the group differ somewhat from the type. If considered by themselves, these might well be classed as distinct species. However, any series of 10 or more specimens from any locality shows a considerable portion of the range of variation shown by the entire collection from all localities. A short series of 7 specimens from the Lake Tahoe-Placerville district of California shows the same tendency. A series of 3 specimens from Lafayette, Ind., differs from the type scarcely more than do some specimens taken only a few miles from the type locality near Lake Tahoe.

The variations shown by *gracilis* have to do with the size of the body and the shape of the pronotum and, to a lesser degree, of the elytra, and with differences in the sculpture of the frons, pronotum, and elytra. The length ranges from 3.4 to 4.5 mm. In the type the pronotum is widest in front of the middle, but specimens from the type locality and elsewhere may be widest near the base with the sides evenly, very gently, arcuately narrowed to the anterior margin. Variations in the elytral shape have to do principally with the shape of the apical third. Variations in sculpture are shown as differences in the degree of development rather than in the presence or absence of certain structures.

The greatest variations are shown in series of specimens from New Mexico and Arizona. Specimens from this region have been studied which measure up to 4.5 mm. in length, with the punctures somewhat coarser throughout, the median line of pronotum wider, the elytral striae deeper, and the discal interspaces more convex and more strongly rugose. These specimens seem to agree very well with the rather general description of *vastans* Chapuis, but they occur in series that contain not only typical specimens of *gracilis* but also specimens showing all gradations between the two extremes.

*HYLASTES LONGICOLLIS* Swaine

*Hylastes longicollis* Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 78, 79-80.

*Female*.—Dark reddish brown, 3.9 mm. long, about 3.1 times as long as wide; allied to *gracilis* but readily distinguished by the much narrower pronotum and the very coarse punctures on both the pronotum and the elytral striae.

Frons rather narrow between the eyes, frontal rectangle about 1.2 times as long as wide, piceous, slightly lighter below middle; epistoma depressed, weakly impressed at each side; epistomal margin somewhat thickened, piceous, its median lobe broad and very short, with the free end shallowly emarginate and anterior face broadly impressed on middle half; transverse frontal impression only slightly arcuate, moderately, rather indefinitely impressed; median carina nearly lacking on epistoma, finely and sharply elevated, ending in transverse impression; surface opaque to subopaque, densely, moderately finely granulate-punctate (not so finely as in *gracilis*), with rather abundant, stout, clavate hairs, little longer on epistoma. Eye finely granulate, more than twice as long as wide (narrower than in *gracilis*), slightly wider above; inner margin entire. Antenna with first segment of club distinctly longer than others combined.

Pronotum about 1.28 times as long as wide, much narrower than elytra, slightly widest just in front of middle; posterior outline weakly arcuate; posterior angles rounded; sides behind diverging slightly to widest point, then convergently arcuate to the broadly rounded front margin; disk with the narrow interstices brightly shining between the coarse, dense, rather deep punctures on disk; punctures denser and rougher at sides and much smaller and denser in front; median line distinctly elevated, shining, moderately wide; vestiture moderately fine on disk, but distinctly visible and better developed than in *gracilis*, much coarser at sides and behind.

Elytra much wider than pronotum (44:35), about 2.09 times as long as wide; sides straight and subparallel for nearly three-fourths of their length, then strongly narrowed with the extreme tip moderately rounded; striae moderately impressed, first more strongly so; punctures coarse, deep, very close, quadrate, smaller at sides; interspaces on disk narrower than striae, nearly flat, finely punctate, and confusedly granulate; vestiture very evident, consisting of rather fine hairs of moderate length on disk, coarser, stouter, and more numerous on declivity; ninth interspace moderately strongly convex behind. Last abdominal sternite moderately convex, with dense, rather rough punctures of moderate size, moderately broadly rounded behind.

*Male*.—Similar in general characters; with last sternite slightly shorter and somewhat more broadly rounded behind; surface slightly flattened behind, with no special development of hairs.

*Remarks*.—Swaine's type came from Atlanta, Idaho, without record as to host. The writer has studied specimens from Lake Tahoe, Placer, Summerdale, Sequoia National Park, Tulare County, and Ventura County, Calif.; Hood River, Oreg.; Columbia Falls, Mont.; and Black Hills, S. Dak. No definite host records are available; one specimen was taken flying to felled ponderosa pine.

*HYLASTES EXILIS* Chapuis

*Hylastes exilis* Chapuis, 1869, Synop. Scolyt., p. 20 (extract from Soc. Roy. des Sci. de Liège Mém. (2) 3: 228, 1873); Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388, 389; Schwarz, 1878, Amer. Phil. Soc. Proc. 17: 469; Swaine, 1909, N. Y. State Mus. Bul. 134: 145; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 79; Blackman, 1922, Miss. Agr. Expt. Sta. Tech. Bul. 11: 64.

*Female*.—Dark reddish brown to piceous, 2.88 mm. long, about 2.97 times as long as wide, with the frons longitudinally sulcate below and pronotum distinctly granulate-punctate throughout.

Frons very wide between eyes, frontal rectangle 0.93 as long as wide, piceous, with epistoma slightly reddish and epistomal margin piceous; epistoma broadly, not deeply, impressed at each side, elevated but not carinate in middle fourth; epistomal margin somewhat thickened and liplike, its median lobe rather broad, very short, broadly, shallowly emarginate at free end, impressed in middle

half; transverse impression broad, moderately deep, scarcely arcuate; with a median, longitudinal, smooth, shining sulcus from epistoma to transverse impression; surface subopaque, finely, very densely granulate-punctate; hairs very fine, short, erect, inconspicuous except on epistoma. Eye short ovate, notably wider above, less than twice as long as wide, finely granulate. Antenna with first segment of club longer than the other three combined.

Pronotum slightly narrower than elytra, about 1.14 times as long as wide, widest just in front of middle; posterior outline feebly arcuate, posterior angles slightly rounded, sides behind nearly straight and subparallel, but very feebly diverging to the widest point, then arcuately narrowed to very broadly rounded front margin; surface moderately shining, with very close punctures of moderate size (smaller than in either *tenuis* or *pusillus*), often confluent, distinctly granulate throughout, punctures much finer in front and toward sides; sides densely, rather finely granulate-punctate; side margin not subacute behind; median line rather broad, distinctly elevated; hairs short, fine, erect, scarcely seen except in profile.

Elytra distinctly wider than pronotum ( $3\frac{1}{2}$ :30), about 1.94 times as long as wide; sides subparallel on anterior two-thirds, narrowly rounded behind; surface feebly shining; striae moderately impressed; punctures close, deep, moderately coarse; interspaces equal to or wider than striae, finely and densely granulate-punctate, narrower and more convex toward and on declivity; vestiture consisting of numerous rather short, fine hairs, more numerous and larger on declivity. Last abdominal sternite rather narrowly rounded behind, finely, rather closely, somewhat roughly punctured.

*Male*.—Usually slightly smaller and wider, with pronotum nearly as wide as elytra; last abdominal sternite shorter, not grooved.

*Remarks*.—Specimens of *exilis* from Texarkana and McNeil, Ark., were compared with the type from the Brussels Museum by J. M. Swaine, and found to be identical. In addition eight specimens from Texas, Mississippi, Florida, North Carolina, and the District of Columbia, and one without locality label were studied by the writer. The host is not definitely known, but specimens have been taken flying to down pine. All specimens were taken singly and were not associated with *tenuis* in the field.

This species apparently had not been correctly identified in American collections until Doctor Swaine compared a number of short series of eastern species with Chapuis' type. Leconte's collection apparently contains no true *exilis*, the specimen so labeled being a variant of *tenuis*.

## HYLASTES TENUIS Eichhoff

*Hylastes tenuis* Eichhoff, 1868, Berlin. Ent. Ztschr. 12: 147; Zimmermann, 1868, Amer. Ent. Trans. 2: 149; Chapuis, 1869, Synop. Scolyt., p. 19 (extract from Soc. Roy. des Sci. de Liège Mém. (2) 3: 227); Leconte, 1876, Amer. Phil. Soc. Proc. 15: 388, 389; Schwarz, 1878, Amer. Phil. Soc. Proc. 17: 469; Schwarz, 1888, Ent. Soc. Wash. Proc. 1: 80; Hamilton, 1895, Amer. Ent. Soc. Trans. 22: 346, 378; Hopkins, 1899, W. Va. Agr. Expt. Sta. Bul. 56: 345, 449; Swaine, 1909, N. Y. State Mus. Bul. 134: 147; Swaine, 1918, Canada Dept. Agr. Ent. Branch Bul. 14 (2): 79.

*Hylastes criticus* Eichhoff, 1868, Berlin. Ent. Ztschr. 12: 147.

*Female*.—Dark reddish brown to piceous, 2.4 to 2.9 mm. long, about 2.94 times as long as wide.

Frons very wide between eyes, frontal rectangle about 0.96 as long as wide, piceous brown, with epistoma reddish brown; epistoma moderately impressed at each side, elevated but not carinate in middle fourth; epistomal margin piceous, thickened, and liplike, its medium lobe broad and short, deeply impressed in middle third, with free end emarginate; transverse impression broad, not very deep, scarcely arcuate, with no indication of either carina or sulcus below it; surface subopaque, finely, closely punctate, feebly granulate; vestiture of fine, short, inconspicuous hairs. Eye ovate, wider above, twice as long as



wide, inner line entire, finely granulate. Antenna with first segment of club about as long as other three combined.

Pronotum slightly narrower than elytra, from 1.15 to 1.2 times as long as wide; posterior outline nearly straight; posterior angles rounded; sides nearly straight (sometimes feebly arcuate) and subparallel on more than posterior half, then gradually narrowed to the moderately broadly rounded anterior margin; surface shining and polished between moderately coarse, deep, close punctures, not granulate; punctures smaller and denser in front, smaller and rugose-granulate at sides; side margin not acute behind; median line moderately broad, distinctly elevated; vestiture of short, fine, semierect hairs, not readily seen except in profile.

Elytra somewhat wider than pronotum, about 1.89 times as long as wide; bases nearly straight; sides subparallel for more than two-thirds their length, then strongly narrowed to the narrowly rounded tip; surface opaque to subopaque on disk, opaque on declivity; striae distinctly impressed, first one more strongly, wider than interspaces; punctures coarse and close; interspaces moderately narrow, convex, with fine, confused punctures and granules, more strongly convex on declivity, with granules coarser and uniseriate; vestiture of numerous short, fine hairs, irregularly arranged on discal interspaces, longer and uniseriate, and with short, recumbent scales on declivity. Last abdominal sternite weakly convex, finely, closely, roughly punctured, narrowly rounded behind.

*Male*.—Often slightly shorter and stouter, but similar to female in sculpture; last abdominal sternite slightly shorter than in female, very broadly rounded behind, devoid of median groove and of special pubescence.

*Remarks*.—Nearly 200 specimens from such diverse localities as Ithaca, N. Y., eastern Tennessee, Key West, Fla., and various localities in West Virginia, Maryland, Virginia, North Carolina, and the District of Columbia have been studied by the writer. The species has also been reported from Georgia and Texas by Chapuis. Most of the specimens were taken at sawmills, where they had been attracted by the freshly sawn pine, but a number were collected from the inner bark of stumps and roots of cut or deeply girdled *Pinus taeda* L., *P. palustris* Mill., *Picea* sp., and *Abies* sp.

As is usual in this genus, *tenuis* shows considerable variation, although by no means so much as *porculus*, *nigrinus*, and *gracilis*. Three specimens from Morgantown, W. Va., answer in part to the description of Eichhoff's tentatively proposed *criticus*, and Swaine, who has studied Eichhoff's specimens, believes they are the same. This may well be correct, but a careful study of several of the larger series of specimens of *tenuis* shows other specimens having similar characters and along with them many specimens possessing characters intermediate between typical *tenuis* and the so-called *criticus*. A large number of specimens have been studied which show from one to three or four of the five characters mentioned by Eichhoff in his descriptions of the tentative species *criticus*, and a few specimens show all the differences mentioned. However, such specimens are found in long series, of which most of the specimens are unmistakably *tenuis* or intermediate forms, and in the writer's opinion represent variations of *tenuis*. The writer believes that *criticus* should be placed as a synonym of *tenuis*.

### HYLASTES PUSILLUS, new species

*Female*.—Dark piceous brown, 2.81 mm. long, about 3.05 times as long as wide.

Frons rather wide between eyes, frontal rectangle almost exactly as long as wide, piceous brown with epistoma somewhat lighter; epistoma rather weakly impressed at each side, middle area elevated but not carinate; epistomal margin somewhat thickened and liplike, its median lobe poorly developed, very short,

emarginate, and impressed in middle area; transverse impression broad, not deep, rather indefinite, scarcely arcuate; surface subopaque, finely, very densely granulate-punctuate; vestiture of fine, short, erect, very inconspicuous hairs. Eye finely granulate, twice as long as wide, not strongly widened above, inner margin entire. Antenna with first segment of club slightly longer than other three combined.

Pronotum slightly narrower than elytra, about 1.24 times as long as wide, widest near middle; sides distinctly arcuate, moderately broadly rounded in front; posterior outline feebly bisinuate, posterior angles rounded, surface shining between the coarse, moderately deep, close punctures (distinctly coarser and somewhat rougher than in *tenuis*), not granulate on disk; punctures smaller and denser in front, distinctly rugose-granulate at sides, side margin not acute behind; median line distinctly elevated, not broad; vestiture of short, fine, erect hairs on disk, slightly longer on sides.

Elytra slightly wider than pronotum, about 1.95 times as long as wide; base of each sinuate; sides subparallel on anterior three-fourths, then narrowed, at first abruptly, then more gradually, with extreme tip rather broadly rounded; surface moderately shining; striae impressed, first and second more deeply so, punctures deep, close, moderately coarse (slightly finer than in *tenuis*); interspaces subequal to striae in width, convex, densely, finely rugose-granulate; strongly convex and finely, confusedly granulate on declivity; vestiture of moderately short and fine hairs, somewhat longer and stouter than in *tenuis*, arranged irregularly on disk, longer and slightly irregularly arranged on declivity, with shorter, recumbent hairs at sides of each interspace. Last abdominal sternite somewhat convex, rather narrowly rounded behind, finely, closely, rather roughly punctured, with rather short, fine hairs.

*Male*.—Smaller than female and slightly stouter, about 2.9 times as long as wide; pronotum much narrower than elytra, but with sides arcuate as in female; last abdominal sternite shorter, more broadly rounded behind, more finely and closely punctured, devoid of median groove and of special pubescence.

*Type locality*.—Florida.

*Host*.—Unknown.

*Holotype and allotype*.—U. S. National Museum No. 54036.

*Remarks*.—The holotype is from "Enterprise, Fla., 26-5" and the allotype from "Baldwin, Fla., 10-6." Both are from the Hubbard and Schwarz collection. They are almost certainly two of the three specimens mentioned by Schwarz in "Coleoptera of Florida" and erroneously listed as *exilis* Chapuis. These two specimens were compared by J. M. Swaine with a type of *exilis* and found to be different.

### HYLASTES PARVUS, new species

*Female*.—Reddish brown, 2.63 mm. long, about 3.06 times as long as wide; allied to *tenuis* but slightly smaller, more slender, and more finely punctured.

Frons very broad between eyes, frontal rectangle nine-tenths as long as wide; piceous brown above, reddish brown below; epistoma moderately impressed at each side, with a narrow middle area somewhat elevated, but not carinate; epistomal margin somewhat thickened and liplike, its median lobe rather broad, short, broadly impressed in middle, with free end emarginate; transverse impression wide but shallow, scarcely arcuate; surface moderately shining, very finely and closely punctured, subgranulate at sides and below; vestiture of small, inconspicuous hairs, longer on epistoma. Eye finely granulate, about twice as long as wide, widest above; inner line entire. Antenna with first segment of club longer than the other three combined.

Pronotum distinctly narrower than elytra, about 1.32 times as long as wide; posterior outline feebly arcuate; posterior angles slightly rounded, subequal in width near posterior border and in front of middle, with intervening portions of sides subparallel, feebly sinuate, narrowed to the broadly rounded front margin; surface shining, closely, rather finely punctured, interstices finely reticulate, not granulate on disk, minutely, densely punctured in front, granulate-punctate at sides; side margins behind more acute than in *tenuis*; median line rather wide, elevated, brightly shining; vestiture of very fine, short, suberect hairs, inconspicuous except in profile.

Elytra distinctly wider than pronotum (30:25), about 1.94 times as long as wide, sides subparallel on anterior three-fourths, moderately narrowly rounded behind; surface moderately shining; striae except first two rather weakly impressed; punctures rather small, close, moderately deep; interspaces distinctly wider than striae, weakly convex on disk, narrower and more strongly convex at sides and on declivity, finely rugose-granulate on disk, uniseriately granulate on declivity; vestiture of fine, rather short, irregularly arranged hairs on discal interspaces, declivity with a middle row of somewhat longer hairs in each interspace, with small, appressed scales at each side. Last abdominal sternite convex, moderately rounded behind, finely, densely, and somewhat roughly punctured.

*Male*.—Slightly smaller, with sculpture often coarser and rougher; last abdominal sternite distinctly shorter, much more broadly rounded behind, more roughly punctured, but with the surface not grooved behind and without special pubescence.

*Type locality*.—Williams, Ariz.

*Additional localities*.—Winslow, Chiricahua Mountains, Ariz., and Las Vegas, N. Mex.

*Host*.—Unknown, but probably *Pinus* spp.

*Holotype, allotype, and 49 paratypes*.—U. S. National Museum No. 54037.

*Remarks*.—The holotype, allotype, and 31 paratypes are labeled "Williams, Ariz.; Barber and Schwarz Coll."; 3 paratypes, "Chiric[hua] Mts., Ariz.; Coll. Hubbard and Schwarz"; 1 paratype, "Chiricahua Mts., Ariz.; Aug. 1907; J. L. Webb, Coll."; 1 paratype, "Winslow, Ariz., Wickham"; 3 paratypes, "N. Mexico, Snow; Coll. Hubbard and Schwarz"; 8 paratypes, "Las Vegas H. S., N. M.; Barber and Schwarz Coll."

The specimens from Williams, Winslow, and the Chiricahua Mountains, Ariz., show considerable uniformity in all the essential characters, but some of the specimens from New Mexico, while agreeing in the structure of the frons, the shape of the pronotum, etc., have the punctures of both pronotum and elytra coarser, approaching the conditions in *minutus* and *tenuis*.

### *HYLASTES MINUTUS*, new species

*Female*.—Dark reddish brown to piceous, 2.6 mm. long, about 3.08 times as long as wide; allied to *tenuis* and *parvus*.

Frons very broad between eyes, frontal rectangle about 0.96 as long as wide; piceous brown, scarcely lighter below; epistoma broadly, moderately deeply impressed, scarcely at all elevated, not carinate in median line; epistomal margin somewhat thickened and liplike, its median lobe short, with free end emarginate; transverse impression rather indefinite, wide and shallow; surface opaque to subopaque, very finely and densely punctate-granulate; vestiture of very fine, short, inconspicuous hairs, slightly longer on epistoma. Eye finely granulate, slightly more than twice as long as wide, not strongly widened above; inner line entire. Antenna with first segment of club longer than other three combined.

Pronotum about 1.2 times as long as wide; posterior outline feebly arcuate; posterior angles rounded, sides nearly straight and slightly diverging from base to widest point just in front of middle, then arcuately narrowed to the broadly rounded front; surface moderately shining, with punctures on disk of moderate size (coarser than in *parvus* and closer and slightly smaller than in *tenuis*), smaller and denser in front, granulate-punctate on sides; side margins subacute behind; median line distinctly elevated, moderately wide.

Elytra slightly wider than pronotum, about 2.03 times as long as wide; sides subparallel on anterior three-fourths, then arcuately narrowed to the narrow tip; surface feebly shining; first striae strongly, the others weakly impressed; punctures close, rather deep, of moderate size (distinctly coarser than

in *parvus*); interspaces rather flat on disk, somewhat convex on sides and declivity, narrower than striae (except second interspace), finely punctured, rugose-granulate on disk, uniseriately granulate on declivity; vestiture consisting of fine, rather short hairs irregularly arranged in each discal interspace, each declivital interspace with a middle row of slightly longer hairs and small, short, appressed scales at each side. Last abdominal sternite narrowly rounded behind; surface convex, finely, closely, and somewhat roughly punctured.

*Male*.—Slightly smaller than female, with sculpture slightly coarser; last abdominal sternite very broadly rounded behind, shorter than in female, more densely, roughly punctured behind, not grooved and without special pubescence in median line.

*Type locality*.—Lake Tahoe, Nev.

*Additional localities*.—California; Montana; San Mateo, Calif; Prineville, Oreg.

*Known hosts*.—*Pinus ponderosa* Laws., *Pseudotsuga taxifolia* (LaM.) Britt.

*Holotype, allotype, and 10 paratypes*.—U. S. National Museum No. 54038.

*Remarks*.—The holotype and 2 paratypes bear the data "L. Tahoe, Nev., Coll. Hubbard and Schwarz"; allotype and 1 paratype, "Cal."; 3 paratypes, "Hopk. U. S. 4324C, H. E. Burke collector; Big Basin, San Mateo Co., Cal.; *Pseudotsuga taxifolia*"; 3 paratypes, "Cala 9637"; 1 paratype, "Prineville, Oreg., 7-25-34; *Pinus ponderosa*; W. J. Buckhorn collector; Hopk. U. S. 18960"; 1 paratype, "Mon., Nason Collection."

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