NEW SYNONYMY, NEW COMBINATIONS, AND NEW SPECIES OF NORTH AMERICAN *PITYOPHTHORUS* (COLEOPTERA: SCOLYTIDAE). PART II

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Abstract.— New synonymies and new combinations affecting North American *Pityophthorus* are proposed as follows: *carinifrons* Blandford, *incompositus* Blandford, and *incommodus* Blandford are removed from *Pityophthorus* and placed in *Araptus*; *P. boycei* Swaine (=*Myeloborus catulus* Blackman and *M. iniquus* Blackman); *P. lautus* Eichhoff=*P. rhois* Swaine and *P. natalis* Blackman); *P. californicus* new name for *P. deleoni* (Bright) not Blackman. New species are: *P. abstrusus* (Mexico), *anthracinus* (Mexico), *arcanus* (Arizona), *brevicomatus* (Mexico), *dispar* (Mexico), *elimatus* (Mexico), *furnissi* (Mexico), *germanus* (Mexico), *ineditus* (Mexico), *litos* (Mexico), *megas* (Mexico), *minus* (Arizona), *occlusus* (Honduras, Mexico). *recans* (British Columbia), *siouxensis* (South Dakota), *speculum* (Mexico), *subimpressus* (Mexico), *thatcheri* (California), *thomasi* (Mexico), and *zonalis* (Arizona). A neotype for *P. lautus* Eichhoff is selected.

This is the second paper under this title in which various new taxonomic data affecting the genus *Pityophthorus* Eichhoff in North America are established. The first part is in press in the *Canadian Entomologist*.

Since it will be several years before the complete monograph of *Pityophthorus* is published, it was decided to present some of the results of the study now. In addition, these new data are needed for incorporation in a monograph of the Scolytidae of North America being produced by S. L. Wood, Provo, Utah, and for use in the catalog of North American Coleoptera presently being prepared at the United States Department of Agriculture in Washington, D.C.

The collections where the type material is located are abbreviated as follows: British Museum (Natural History), London (BMNH); Canadian National Collection of Insects, Ottawa (CNC); Karl E. Schedl collection, Lienz, Austria (KESC); S. L. Wood collection, Brigham Young University, Provo, Utah (SLWC); United States National Museum of Natural History, Washington, D.C. (USNM).

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Araptus carinifrons (Blandford) n. comb.

Pityophthorus carinifrons Blandford, 1904, p. 244. (Holotype ♂, Mexico, BMNH)

The unique specimen of *P. carinifrons* was examined and was found to represent a species in the genus *Araptus* Eichhoff. The holotype bears the following data: Type (an orange-bordered circle)/Motzorongo, Vera Cruz, Flohr/B.C.A. Col. IV, 6, Pityophthorus carinifrons Blandf./Pityophthorus carinifrons Bland. (handwritten, label upside down).

Diagnosis.— Length 1.6 mm, 2.6 times longer than wide. Frons convex with a distinct, sharp, moderately strongly elevated, longitudinal carina extending from epistoma to well above upper level of eyes; surface finely punctured, with abundant, short, scattered setae. Antennal club nearly circular, about 1.1 times longer than wide, widest at middle; sutures 1 and 2 strongly arcuate, extending to beyond middle of club on posterior face, other sutures not visible. Pronotum as long as wide, widest at about middle; sides broadly arcuate; anterior margin narrowly rounded with a row of 8 small, basally contiguous serrations; asperities on anterior slope very low, numerous, scattered in no apparent order; posterior area subasperate-punctate, the punctures shallow, fine, with lateral margins weakly elevated, resulting in a subasperate appearance; interpuncture space dull, minutely reticulate. Elytra 1.6 times longer than wide; striae indistinct; sur-

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face minutely, randomly punctate, with a short seta arising from each puncture. Declivity evenly convex; interspaces (except 2) bearing a median row of very sparse, short, flattened, scalelike setae.

Araptus incompositus (Blandford) n. comb.

Pityophthorus incompositus Blandford, 1904, p. 243. (Holotype ♂, Guatemala, BMNH)

The unique type of *P. incompositus* was examined and found to represent a species in the genus *Araptus*. The holotype bears the labels: Type (an orange bordered circle)/Coatepeque, 1300 ft., Champion/B. C.A. Col. IV. 6, Pityophthorus incompositus Blandf./Pityophthorus incompositus Bld. (handwritten, label upside down).

Diagnosis.— Length 1.5 mm. Frons convex, finely, densely punctured with no indication of a carina or special modification; vestiture scattered and inconspicuous. Antennal club oval, 1.3 times longer than wide, more broadly rounded at apex; suture 1 strongly arcuate, extending to just below center of club; other sutures not visible. Pronotum 1.1 times longer than wide; posterior portion finely, shallowly punctured, the punctures separated by a distance equal to more than their diameters; interpuncture surface with numerous, fine points. Elytra 1.8 times longer than wide; striae indistinct, punctures placed in fairly regular rows, very shallow and indistinct on disc; interspaces minutely rugulose, rather dull. Declivity steep; interspace 1 weakly elevated, with a median row of small but distinct granules and long setae; interspace 2 weakly impressed, flat; interspace 3 weakly elevated, equal in height to 1, bearing a median row of distinct granules and long setae; punctures in striae 1 and 2 obscure. Vestiture confined to declivital region (apical one-third of elytra), narrowly flattened, placed in all interspaces except 2.

Araptus incommodus (Blandford) n. comb.

Pityophthorus incommodus Blandford, 1904, p. 245. (Holotype ♂, Guatemala, BMNH)

This species was described from one specimen that was examined and was found to represent a species in the genus *Araptus*. The holotype is labeled: Type (an orange bordered circle)/Cerro Zunil, 4000 ft., Champion/B.C.A. Col. IV, 6, Pityophthorus incommodus Blandf./Pityophthorus incommodus Blandf./Pityophthorus incommodus Bld. (handwritten, label upside down).

Diagnosis.— Length 2.2 mm, 2.6 times longer than wide. Frons and antennae very similar to those of *A. carinifrons*. Pronotum as in *carinifrons* except serrations on anterior margin smaller. Elytra as in *carinifrons* except setae arising from strial and interstrial punctures longer. Declivity convex; interspace 2 flattened, weakly impressed, bearing a median row of numerous, flattened, scalelike setae equal in length to similar setae on other interspaces; interspace 1 weakly elevated, 3 not elevated but equal in height to 1, both apparently without granules but with setae similar to those on 2.

Pityophthorus boycei Swaine

Pityophthorus boycei Swaine, 1925, p. 192. (Holotype ♂, California, CNC)
Myeloborus catulus Blackman, 1928, p. 21. (Holotype ♀, Idaho, USNM) *New Synonymy*
Myeloborus iniquis Blackman, 1928, p. 27. (Holotype ♀, Wyoming, USNM) *New Synonymy*

The holotypes and paratypes of all three names listed above were compared. In addition, numerous other specimens from western North America were examined and compared to the type material. This comparison did not reveal any characteristic that could be used to distinguish species.

Blackman (1928) distinguished these species mainly on size and color. These are very variable characters and depend more upon the maturity of the specimens or the environmental conditions under which the specimens lived rather than upon genetic differences.

In the absence of any morphological characters to distinguish them, Blackman's names must be placed in synonymy.

Pityophthorus ramiperda Swaine

Pityophthorus ramiperda Swaine, 1917, p. 28. (Holotype ♀, Quebec, CNC)
Myeloborus fivazi Blackman, 1928, p. 23. (Holotype ♀, New York, USNM) *New Synonymy*

When Blackman (1928) described *M. fivazi*, he had seen only one authentic

specimen of *P. ramiperda*. He distinguished *M. fivazi* from *P. ramiperda* on a difference of host (*fivazi* in red pine, *ramiperda* in white pine), on its larger size, and on the more oblique declivity which had no punctures in the first striae. Blackman's specimen of *P. ramiperda* must have been in poor condition or somewhat aberrant. Three of the paratypes of *P. ramiperda* in the CNC have no punctures in the first striae on the declivity, and one paratype is only 0.3 mm smaller than some paratypes of *M. fivazi*. No differences could be detected in the declivital shape. The host difference is not considered significant, since most species of *Pityophthorus* occur in several host species. Blackman's name is therefore placed in synonymy under *P. ramiperda*.

Pityophthorus keeni Blackman, n. comb.

Myeloborus keeni Blackman, 1928, p. 19. (Holotype [sex?], California, USNM)
Myeloborus pinquis Blackman, 1928, p. 20. (Holotype ♀, Colorado, USNM) *New Synonymy*

The holotypes and paratypes of these two names have been examined and compared, along with numerous other specimens from western North America. No meaningful differences could be detected, even though Blackman (1928) distinguishes them in his key, based on minor differences in pronotal, elytral, and declivital shape. Specimens are now available that show a complete range of variation in these characters and account for the differences noted by Blackman. Therefore, *M. pinquis* is placed in synonymy under *P. keeni*.

Pityophthorus lautus Eichhoff

Pityophthorus lautus Eichhoff, 1871, p. 135. (Type destroyed, Amer. bor., neotype designated herein)
Pityophthorus rhois Swaine, 1917, p. 26. (Holotype [sex?], New York, Cornell University) *New Synonymy*
Pityophthorus natalis Blackman, 1921, p. 8. (Lectotype ♀, Mississippi, USNM) *New Synonymy*

The type of *P. lautus* Eichhoff was presumably destroyed in the destruction of the Hamburg Museum during World War II. In 1927, Eggers compared a series of specimens of different species from the USNM with the various Eichhoff types of *Pityophthorus*. These specimens were returned and are now in the USNM. My concept of *P. lautus* is based on a specimen in the USNM, hereby designated the NEOTYPE, that bears the data: 7237E, Hopk. W. Va./Morgantown, W. Va. /Picea/Pityophthorus picea n. sp. Hopk. 5-2-02 (folded)/8/Pityophthorus lautus Eichh. m. type in coll. Eichhoff vergleichen 1927 (in Eggers's handwriting) /NEOTYPE Pityophthorus lautus Eichhoff, D. E. Bright, 1977.

The neotype of *P. lautus* was compared with the holotype of *P. rhois* and the lectotype of *P. natalis*. No distinctive differences were detected.

Three varieties of *P. rhois* were described by Blackman (1928): *swainei*, *acerni*, and *hamamelidus*. When large numbers of specimens from different parts of the range and from different hosts are examined, the range of variation is seen to be considerable. The same structural differences that Blackman used to distinguish the varieties can also be seen in specimens from other different hosts and from other localities. Therefore, there is no basis for continuing to recognize varieties of this species.

Pityophthorus californicus, n. name

With the submersion of *Myeloborus* Blackman into *Pityophthorus* Eichhoff (Bright, in press), a homonym was created between *Pityophthorus deleoni* Bright (1966) and *Myeloborus deleoni* Blackman (1942). Blackman's name must remain unchanged and the later name must be changed. I therefore rename *Pityophthorus deleoni* Bright, *P. californicus*.

Pityophthorus abstrusus, n. sp.

Length 1.7 mm, about 2.9 times longer than wide.

FEMALE.— Frons slightly flattened on a subcircular area extending from epistoma to upper level of eyes and nearly from eye to eye, more distinctly flattened on a circular area in middle; surface brightly shining, very finely punctured, the punctures very small except at upper margin of flattened area and not especially close; the vestiture sparse and inconspicuous, the setae on periphery only very slightly longer than others. Antennal club circular, widest through segment 2; sutures 1 and 2 very weakly arcuate; first

2 segments occupy less than half the total club length.

Pronotum very slightly wider than long, widest behind middle; sides strongly arcuate; anterior margin broadly rounded with about 6 erect, sharp serrations, the median ones separate, not joined at bases to adjoining ones; asperities on anterior slope sharp, erect, small, arranged in no apparent order; summit prominent; posterior area densely punctured, punctures deep, of moderate size, close, separated by a distance equal to distinctly less than their own diameters; interpuncture space dull, densely, minutely reticulate.

Elytra 1.8 times longer than wide; apex broadly rounded; striae punctured in regular rows, punctures rather large, deep, separated by a distance equal to less than their diameters; interspaces about as wide as striae, flat, surface shining; interspaces 1, 3, 5, and alternate ones each with 2-4 setose punctures. Declivity convex; interspace 1 narrow, slightly elevated, bearing a median row of minute granules and short setae; interspace 2 equal to discal width, flat, very weakly impressed, surface shining, with minute lines and points; interspace 3 weakly elevated, very slightly higher than interspace 1, bearing a median row of very minute granules and short setae; punctures of striae 1 and 2 reduced but readily visible. Vestiture sparse, inconspicuous, consisting of very short, fine, strial setae, each seta slightly longer than the diameter of the puncture from which it arises, and slightly longer, sparser interstrial setae.

Male. — Frons flattened from epistoma to above upper level of eyes, with a small, sharp, laterally compressed, toothlike, longitudinal carina on lower portion just above the deeply emarginate epistomal margin; remainder of flattened surface shining, finely punctured. Pronotum, elytra, and declivity essentially as in female.

Type material.— The holotype (♀) and allotype were collected 25 miles (42 km) west of Orizaba, Vera Cruz, Mexico, on 29 April 1969 from *Pinus* sp. by D. E. Bright (CNC No. 15071).

Both specimens are in the CNC.

Adults are recognized by the small, toothlike carina on the lower part of the male frons, by the sparse pubescence on the weakly, transversely impressed female frons, by the small size, and by the distribution.

This species appears to be closely related to *P. absonus* Blackman. Adults of *P. abstrusus* may be distinguished by the more distinctly flattened, not concave, frons of the female; by the sparser pubescence on the female frons; by the more distinct punctures in striae 1 and 2 on the declivity; and by the distribution (*P. absonus* occurs in western North America, *P. abstrusus* occurs in southern Mexico).

Pityophthorus anthracinus, n. sp.

Length 1.6-1.9 mm, 3.2 times longer than wide; color black.

Female. — Frons flattened on a small, semicircular area extending from epistoma to above upper level of eyes and laterally occupying 75 percent of inner ocular distance; surface of flattened area very densely, very finely punctured and rather sparsely covered with moderately long setae, those on periphery longer and incurved; surface lateral to flattened area dull, punctures larger, more widely separated. Antennal club small, oval, about 1.3 times longer than wide; first 2 sutures transverse, straight; segments 1 and 2 occupy more than half the total club length.

Pronotum 1.2 times longer than wide, widest in front of summit; sides parallel on posterior two-thirds; anterior margin broadly rounded, bearing about 8 low, very broad, basally contiguous serrations, asperities on anterior slope small, low, but more erect than serrations on anterior margin, scattered in no apparent order; summit distinctly elevated; posterior portion weakly punctured, the punctures of moderate size but indistinctly impressed, separated by a distance equal to or less than their diameters; interpuncture space densely, minutely reticulate, obscuring the weakly impressed punctures; median line narrowly elevated on anterior half, broadly convex on posterior half.

Elytra 1.9 times longer than wide; apex weakly acuminate; striae punctured in regular rows, the punctures of moderate size, very weakly impressed and appearing obsolete in some specimens; interspaces wider than striae, impunctate, very densely microrugose, and reticulate, this sculpturing obscuring the strial punctures. De-

clivity convex, not impressed; interspace 1 distinctly elevated, bearing a median row of about 6 very small granules and fine setae; interspace 2 flat to weakly, broadly sulcate; interspace 3 not or only very weakly elevated, equal or very nearly equal in height to 2 and lower than 1, bearing a median row of 2-4 very fine granules and setae; remaining alternate interspaces with a few very fine setae; punctures in striae 1 and 2 not visible.

Male.— Frons flattened as in female, surface much more sparsely, deeply punctured and densely, minutely reticulate, setae absent except for a few along epistomal margin. Pronotum, elytra, and declivity essentially as in female, except punctures on posterior portion of pronotum and in elytral striae slightly larger and deeper, and granules on declivital interspaces 1 and 3 slightly larger.

Type material.— The holotype (♀), allotype, and 7 paratypes are labeled: Cerro Potosi, N. L., Mexico, III-21-1974/ Abies sp./M. M. Furniss, Hopk. #58614. The holotype, allotype, and 5 paratypes have been returned to the SLWC.

Bionomics.— Field data obtained by the collector (M. M. Furniss, pers. corr.) indicate that this species was collected from a shaded-out branch of fir. The galleries were radiate but not typically stellate and were found in the small diameter portion of the branch.

Remarks.— This is a rather nondescript species that is most easily recognized by its uniformly black color; by its small size; by the densely reticulate microsculpturing of the body surface; by the obscure, weakly impressed punctures on the posterior portion of the pronotum and in the striae; and by the host and distribution.

Pityophthorus arcanus, n. sp.

Length 1.8-2.4 mm, 2.7-2.8 times longer than wide.

Female.— Frons flattened on a broad, semicircular area extending from the epistomal margin to well above upper eye level and laterally nearly from eye to eye; surface of flattened area very densely, minutely punctured and clothed with dense, long, yellowish setae, those on periphery longer and incurved; surface above and lateral to flattened portion shining, smooth, with scattered, deep punctures. Antennal club elongate-oval, 1.6-1.7 times longer than wide, all 3 visible segments about equal in width; sutures 1 and 2 transverse, heavily chitinized at lateral margins; segments 1 and 2 occupy slightly more than half the total club length.

Pronotum 1.1-1.2 times longer than wide, widest on posterior half; sides subparallel on posterior half; anterior margin broadly rounded, bearing about 8-10 low, blunt, contiguous serrations; asperities on anterior slope arranged into 3 distinct, regular to slightly irregular, concentric rows, with several additional irregular rows at summit, the asperities in these rows moderately erect, of moderate size (larger than serrations on anterior margin), usually in even rows, but occasionally individual asperities may be offset or placed outside the rows; summit moderately elevated, distinct; posterior portion densely punctured, the punctures large, deep, and usually separated by a distance equal to less than their diameters; interpuncture space brightly shining, densely marked with numerous very fine points.

Elytra 1.7-1.8 times longer than wide; apex weakly acuminate; striae punctured in regular rows, the punctures very large (larger than those on posterior portion of pronotum), deeply impressed, almost touching; interspaces narrower than striae. 1 sparsely punctured, 2-4 usually not bearing punctures or setae, 5, 7, and 9 bearing a few scattered punctures and setae, these more evident on posterior portion. Declivity sloping; interspace 1 moderately elevated, slightly lower than level of 3, bearing about 6 moderately large, acute granules, each of these with a long, fine seta; interspace 2 broadly, moderately sulcate, surface dull, densely, minutely reticulate; interspace 3 distinctly elevated, slightly higher than 1, arcuate, bearing 6 or more moderately large, acute granules, these equal in size to those on interspace 1 and each bearing a longer, fine seta; punctures in striae 1 obsolete, in striae 2 distinct but smaller than those on disc.

Male.— Frons moderately deeply, transversely impressed from epistoma to upper eye level, median portion of upper margin of impression distinctly elevated,

forming a subtriangular elevation; surface of impression deeply, closely punctured except on a fine, low, longitudinal carina; surface above impression more deeply punctured, the punctures larger and closer. Pronotum, elytra, and declivity similar to those of female.

TYPE MATERIAL.— The holotype (♀), allotype, and 15 paratypes were collected in Bear Canyon, Santa Catalina Mountains, Santa Cruz Co., Arizona, on 15 August 1968 from *Pinus cembroides* by D. E. Bright (CNC No. 15081). Additional paratypes as follows: 26, 12 miles (20 km) north of Sedona, Coconino Co., Arizona, 13 August 1968, *Pinus ponderosa*; 7, same as holotype except host is *Pinus ponderosa*; and 7, Walker, Yavapai Co., Arizona, 15 August 1968, *Pseudotsuga menziesii*, all collected by D. E. Bright.

The holotype, allotype, and most of the paratypes are in the CNC. Additional paratypes are in the SLWC and the KESC.

REMARKS.— Adults of this species resemble certain species related to *P. confertus* Swaine, but the present species is placed in an entirely different group based on the presence of concentric rows of asperities on the anterior portion of the pronotum. These concentric rows may be somewhat irregular but nearly always show evidence of their concentric nature. Only one specimen of the 24 specimens examined does not clearly show the concentric rows of asperities. *P. arcanus* is therefore placed in the species group containing those species related to or similar to *P. virilis* Blackman.

Adults of this species are distinguished by the dense pubescence on the flattened female frons; by the very broad, moderately sulcate, declivital interspace 2, the surface of which is opaque and densely, minutely reticulate; by the large, distinct strial punctures; and by the narrow, impunctate, discal, elytral interspaces.

Pityophthorus brevicomatus, n. sp.

Length 2.2-2.5 mm, 2.9 times longer than wide.

FEMALE.— Frons generally flattened from epistomal margin to above upper level of eyes, frequently longitudinally inflated or elevated in midportion; surface densely clothed with very short, semirecumbent, flattened, scalelike setae, these directed toward midline and seemingly more abundant and more erect over midline. Antennal club elongate-oval, 1.5 times longer than wide, widest through segment 2; sutures 1 and 2 transverse; segments 1 and 2 occupy about two-thirds of total club length.

Pronotum 1.2 times longer than wide, widest at about middle; sides weakly arcuate to subparallel; anterior margin broadly rounded with about a dozen relatively small, contiguous serrations; asperities on anterior slope small, acute, isolated, arranged in no apparent order; posterior portion moderately shining, densely punctured, the punctures of moderate size, deep, separated by a distance equal to or less than their own diameters; interpuncture space smooth with numerous fine lines and points.

Elytra 1.8-1.9 times longer than wide; apex narrowly rounded to subacuminate; striae punctured in regular rows, the punctures of moderate size, fairly shallow, separated by a distance equal to about half of their own diameters; interspaces about twice as wide as striae, surface moderately shining, rather densely microreticulate to sub-rugulose, interspaces 3, 5, 7, etc., each bearing a median row of widely scattered, setiferous punctures, 2 with a median row of setiferous punctures near declivity. Declivity sloping; interspace 1 distinctly elevated above 2, slightly lower than level of 3, with a median row of numerous, close, distinct granules; interspace 2 flattened, slightly sulcate, only slightly wider than discal width, sometimes bearing 3 or 4 setiferous punctures on upper level; interspace 3 moderately elevated, higher than 1, with a median row of distinct punctures; punctures of striae 1 and 2 obsolete or, if visible, then much smaller and shallower than on disc. Vestiture consisting of short, hairlike, strial setae and slightly longer, interstrial setae, the interstrial setae distinctly longer on declivital interspaces 3 and 5.

MALE.— Frons flattened to weakly, transversely impressed from epistoma to upper level of eyes, divided by a distinct, low, longitudinal carina; surface on each side of carina with distinct, abundant punctures. Pronotum and elytra essentially as in female except elytral apex slightly

more broadly rounded; declivital interspace 2 more deeply sulcate; declivital interspace 3 distinctly higher than interspace 1 and with granules slightly larger, occasionally with inner slope of the declivital interspace 2 bearing row of very short, flattened, scalelike to spatulate setae; and with all declivital interstrial setae stouter than in the female.

TYPE MATERIAL.— The holotype (♀), allotype, and 11 paratypes were collected on Cerro Potosi, Nuevo Leon, Mexico, on 4 May 1971 from *Pinus strobiformis* at an elevation of 11,500 feet (3,500 m) by D. E. Bright (CNC No. 13731).

The holotype, allotype, and most of the paratypes are in the CNC. Additional paratypes are in the SLWC and the KESC.

REMARKS.— This very pretty species is closely related to *P. furnissi* Bright. See the discussion under that species for remarks on the differences between the two species.

Pityophthorus dispar, n. sp.

Length 2.4-3.1 mm, 2.4-2.6 times longer than wide.

FEMALE.— Frons broadly flattened to weakly, transversely impressed on a semicircular area from epistoma to upper level of eyes; surface obscurely punctured, the punctures small, shallow, usually vaguely defined; a weakly elevated, impunctate callus present on midpoint of epistoma; vestiture moderately abundant, consisting of long, yellowish setae, each arising from a puncture; all setae of nearly equal length, except those on periphery may be slightly longer and incurved; epistomal margin deeply emarginate. Antennal club elongate-oval, 1.4 times longer than wide, widest through segment 2; suture 1 weakly arcuate, 2 more strongly so; first 2 segments occupy about half the total club length.

Pronotum about as long as wide or slightly wider than long, widest at posterior angles; sides weakly arcuate, converging anteriorly; anterior margin rather narrowly rounded, bearing 6-8 very low, broad, indistinct serrations; asperities on anterior slope low, broad, very numerous, becoming almost granulate on and toward summit, scattered in no apparent order; summit located behind middle of disc, not elevated; posterior area not transversely impressed behind summit, densely, deeply punctured, the punctures usually separated by a distance equal to less than their own diameters; interpuncture space dull, densely microreticulate; median line broad, impunctate, weakly elevated, frequently with a very weakly impressed, longitudinal, median impression.

Elytra about 1.5 times longer than wide; apex broadly rounded; striae and interstriae densely, deeply punctured, usually in definite, discernable rows; all punctures equal or nearly equal in size and depth; interstrial punctures numerous, each bearing a moderately long, hairlike seta; setae arising from strial punctures very short, about equal in length to diameter of puncture. Declivity convex, steep; interspace 1 slightly elevated, with a median row of fine setae as on disc; interspace 2 flat, not widened, weakly impressed, impunctate; interspace 3 weakly elevated, about equal in height to 1, with a median row of setose punctures as on disc; punctures of striae 1 and 2 vague, indistinct, only moderately to weakly impressed.

MALE.— Frons convex from about midpoint to vertex with a distinct, strongly elevated, toothlike median callus located below midpoint and overlapping the narrow, deeply impressed epistoma; epistoma below callus densely fringed with moderately long, yellowish setae and with a narrow, arcuate impression immediately above and around callus; epistomal margin deeply emarginate; surface above callus densely, deeply punctured, microreticulate between punctures. Pronotum, elytra, and declivity essentially as in female.

TYPE MATERIAL.— The holotype (♀), allotype, and 8 paratypes were collected 7 miles (4.5 km) east of San Cristobal, Chiapas, Mexico, on 13 May 1969 from twigs of *Pinus montezumae* by D. E. Bright (CNC No. 13727). Eight additional paratypes are from the same locality, collected on 26 May 1969 from *Pinus* sp.; 1 paratype was collected 8 miles (13 km) east of San Cristobal, Chiapas, Mexico, on 30 May 1969 from *Pinus montezumae;* 1 paratype same as above except date is 6 June 1969 and the host is *Pinus ochoterenai;* and 1 paratype is from 5 miles (8 km) east of San Cristobal, Chi-

apas, Mexico, collected on 8 July 1969 from *Pinus* sp.; all above collected by D. E. Bright.

The holotype, allotype, and most of the paratypes are in the CNC. Additional paratypes are in the SLWC and the KESC.

Remarks.— This species is easily recognized by the peculiar frons of the male (see description), by the vague punctures in declivital striae 1 and 2, by the abundant interstrial setae, and by the broadly flattened to weakly, transversely impressed female frons.

Pityophthorus elimatus, n. sp.

Length 2.0-2.2 mm, 2.8 times longer than wide.

Female.— Frons arcuately flattened from epistoma to above upper level of eyes and from eye to eye or very shallowly, broadly, transversely impressed on an arch from eye to eye, the impression frequently divided by a weak, longitudinal carina; surface of flattened area shining, finely and densely punctured, the punctures shallow and indistinct; vestiture very sparse. Antennal club elongate-oval, 1.2-1.3 times longer than wide; widest through segment 2; sutures 1 and 2 transverse; first 2 segments occupy slightly more than one-half of the total club length.

Pronotum about 1.1 times longer than wide, widest at about middle; sides weakly but distinctly arcuate; anterior margin broadly rounded with about a dozen moderately sized, basally contiguous serrations; asperities on anterior slope of moderate size, erect, and placed in no apparent order; summit high; posterior area moderately shining, the punctures rather large, deep, and almost touching; interpuncture space smooth with fine points and/or lines.

Elytra 1.8-1.9 times longer than wide; apex somewhat narrowly rounded; striae punctured in regular rows, the punctures large, deep, and very close, almost touching; interspaces weakly convex or flattened, as wide as or slightly narrower than striae, surface moderately shining, minutely reticulate, impunctate on disc. Declivity evenly convex; interspace 1 weakly elevated, with a median row of very fine setose granules; interspace 2 as wide as 1, not wider than discal width, and at most very weakly impressed; interspace 3 not elevated or only very slightly so, bearing a median row of very fine setose granules; surface of interspaces minutely reticulate, moderately dull; punctures of striae 1 and 2 easily visible, about equal in size to those on disc. Vestiture confined to declivital region; interspaces 1, 3, 5, 7, etc., each with a median row of fine, hairlike setae, those in interspace 1 much shorter than those in other interspaces; a very short seta also arises from each strial puncture on disc and declivity.

Male.— Frons convex, very weakly impressed on each side of the moderately elevated, longitudinal carina that extends from epistoma to about half the distance to the upper level of the eyes; surface moderately dull, minutely reticulate with shallow punctures scattered on each side and above carina except on an oval, frequently very weakly elevated area just above the longitudinal carina; vestiture sparse, inconspicuous, the setae frequently longer on lateral margins of flattened area. Pronotum and elytra essentially as in female except declivital granules slightly larger.

Type material.— The holotype (♀), allotype, and 10 paratypes were collected 51 miles (85 km) northwest of Oaxaca, Oaxaca, Mexico, on 10 May 1971 at an elevation of 7500 feet (2300 m) from *Quercus* sp. by D. E. Bright (CNC No. 15082).

The holotype, allotype, and most of the paratypes are in the CNC. Additional paratypes are in the SLWC and the KESC.

Remarks.— *Pityophthorus elimatus* seems most similar to *P. segnis* Blackman and *P. subopacus* Blackman, but the adults of *P. elimatus* are distinguishable by their larger size, by the different sculpturing of the frons of both sexes, and by the more strongly, deeply, and more closely punctured posterior portion of the pronotum.

The host label, "*Quercus* sp.," on the specimens is questionable. If this is the true host, then *P. elimatus* is the only species of this group of species known to occur in a deciduous tree. The species related to this species occur in *Pinus* sp. and it is reasonable to assume that *P. elimatus* is no exception.

Pityophthorus furnissi, n. sp.

Length 2.0-2.5 mm, 3.0 times longer than wide.

Female.— Frons very broadly flattened on a very large area extending from epistoma to well above upper level of eyes, frequently weakly elevated on a longitudinal, median line and weakly impressed on each side of elevation; surface of flattened area very densely, minutely punctate and appearing almost subgranulate, clothed with fine, short to moderately long, yellowish setae, those on median, longitudinal elevation or on a longitudinal, central portion appearing longer and more densely placed. Antennal club small, nearly circular, about 1.1 times longer than wide, widest through segments 2 and 3; sutures 1 and 2 transverse, rather strongly chitinized at lateral margins; segments 1 and 2 occupy more than half the total club length.

Pronotum about 1.1 times longer than wide, widest at posterior angles; sides weakly arcuate, weakly converging; anterior margin narrowly rounded with about a dozen rather large, erect serrations; asperities on anterior slope smaller than serrations, erect, scattered in no apparent order; summit high; posterior portion densely punctured, the punctures large, deep, almost touching or at least separated by a distance less than their diameters; interpuncture space moderately shining to dull, densely, minutely reticulate; median line broad, impunctate.

Elytra 2.0 times longer than wide; apex narrowly rounded to subacuminate; striae punctured in regular rows, the punctures about equal in size to those on posterior portion of pronotum, shallow, almost touching; interspaces about as wide or wider than striae, all (except first) usually impunctate, but 3 and sometimes 5 may bear one or two setose punctures. Declivity convex; interspace 1 distinctly elevated, equal in height to 3, bearing a median row of numerous small granules, each bearing a short, erect seta; interspace 2 weakly impressed, not wider than discal width, bearing a median row of scattered fine granules and setae; interspace 3 weakly elevated about as high as 1, bearing rather numerous scattered granules and setae, these not always in an even row; a vague area lateral to interspace 2 is roughly, randomly punctured, setose, and granulate, strial punctures obsolete in this area; punctures in striae 1 and 2 usually distinct, only slightly smaller than those on disc.

Male.— Frons weakly transversely impressed or flattened on an area from epistoma to upper level of eyes; a distinct, short, transverse, median carina usually present on upper margin of impression; a weakly to moderately elevated, longitudinal carina extending from epistomal margin across transverse impression to the more pronounced transverse carina. Pronotum and elytra essentially as in female except punctures larger and deeper. Declivity convex, weakly impressed; interspace 1 weakly elevated, with a median row of numerous, very close granules; interspace 2 weakly sulcate, with scattered granules; median area lateral to interspace 2 weakly elevated slightly higher than interspace 1, and densely punctate, granulate, and setose; sometimes this elevated portion extends into interspace 2, causing interspace to be narrowed; strial punctures obsolete.

Type material.— The holotype (♀), allotype, and 9 paratypes are labeled: Amecameca, Mexico, III-17-54/Pinus hartwegii/R. L. Furniss, collector/Hopk. U.S. 33327 D.

The holotype, allotype, and most of the paratypes are in the USNM. Additional paratypes are in the CNC (No. 15064) and the SLWC.

Remarks.— This species is closely related to *P. brevicomatus*. Females may be distinguished by the very broadly flattened frons that frequently bears a low, elongate, median, longitudinal elevation. The frons is then weakly biconcave on each side of the median elevation, and the setae are longer and denser on or near the elevation. The male frons bears a distinct longitudinal and transverse carina; the transverse carina is more strongly elevated. The declivity of both sexes is similar. The lateral elevations are convex and broadly, weakly elevated and include all interspaces lateral to interspace 2. The surface of the elevation is densely, randomly punctured, granulate, and setose. The strial punctures are deep and distinct on the elytra but are much reduced and obsolete in this elevated declivital area. This elevated region is

slightly higher and more distinct in the male.

Pityophthorus germanus, n. sp.

Length 2.8 mm, 2.8 times longer than wide.

HOLOTYPE (♂).— Frons largely concealed by pronotum; visible surface convex, shining, closely and deeply punctured except for a longitudinal smooth space above epistomal margin, the lateral punctures separated by a distance equal to about half their diameters. Antennal club elongate oval, 1.7 times longer than wide, widest through segment 2; sutures 1 and 2 weakly arcuate; segments 1 and 2 occupy less than half the total club length.

Pronotum 1.1 times longer than wide, widest behind summit; sides moderately arcuate; anterior margin rather narrowly rounded with about a dozen rather large, basally contiguous serrations; asperities on anterior slope of moderate size, arranged into three definite, nearly even, concentric rows with two more broken, indefinite rows around summit; summit only weakly elevated; posterior portion densely punctured, the punctures large, deep, and separated by a distance nearly equal to, to much greater than, their own diameters; interpuncture space smooth, shining, densely micropunctate.

Elytra 1.5 times longer than wide; apex truncate, bisinuate; striae punctured in regular rows, the punctures large, deep, usually separated by a distance equal to less than their own diameters; interspaces weakly convex, more than twice as wide as striae; surface brightly shining, smooth, with a few punctures in each, these equal in size and depth to those in striae. Declivity deeply sulcate; interspace 1 deeply impressed, distinctly elevated above 2, bearing a median row of small but prominent, setaceous granules; interspace 2 deeply sulcate, narrow at commencement of declivity, widened on face to equal the discal width, smooth except for several setaceous granules at apex; interspace 3 much higher than interspace 1, with abundant, prominent granules along summit and scattered on upper level of the steeply precipitous inner slope; punctures of striae 1 and 2 prominent, about equal in size and depth to those in striae 1 and 2.

FEMALE.— Unknown.

TYPE MATERIAL.— The holotype (♂) was collected 92 miles (154 km) north of Oaxaca (along Highway Oaxaca 175), Oaxaca, Mexico, on 8 May 1971 at an elevation of 3000 feet (910 m) by D. E. Bright at black light.

The holotype is in the CNC (No. 15083).

DISCUSSION.— This species is related to *P. obtusipennis* Blandford, but it is larger in size, the declivital interspaces are more strongly elevated and bear smaller but more abundant granules, and the antennal sutures are weakly arcuate, not straight as in *P. obtusipennis*.

Pityophthorus ineditus, n. sp.

Length 1.9 to 2.2 mm, 2.8 to 2.9 times longer than wide.

FEMALE.— Frons broadly flattened nearly from eye to eye and from epistoma to well above upper level of eye, weakly concave on a small median area; surface rather brightly shining, with widely separated, fairly deep punctures, these more abundant around the indented peripheral margin; vestiture consisting of abundant, long, incurved setae around margin and shorter, much less abundant setae over remainder of flattened area. Antennal club about 1.3 times longer than wide, widest through segment 3; suture 1 arcuate, 2 more strongly so; segment 1 and 2 occupying about half the total club length.

Pronotum almost as long as wide, widest behind summit; sides rather broadly arcuate; anterior margin broadly rounded with about four small serrations confined to median area; asperities on anterior slope small, numerous, closely placed; area between asperities smooth, shining; posterior portion with close, deep punctures, these separated by a distance usually equal to or less than their own diameters; interpuncture space minutely reticulate, dull.

Elytra 1.7 times longer than wide; apex narrowly rounded; strial punctures close, deeply impressed, giving appearance of the striae being impressed; interspaces about twice as wide as striae, weakly convex; surface smooth, shining, with very faint, minute lines or scratches and sometimes 1 or 2 punctures, these

equal in size to those in striae. Declivity convex; interspace 2 weakly impressed, glabrous, impunctate; interspaces 1 and 3 distinctly but weakly elevated, 3 more so, each with a median row of fine granules; interspace 9 elevated and distinctly joined to 3 just before apex; strial punctures distinct, somewhat smaller than on disc, impressed. Vestiture mostly confined to declivity, consisting of very long setae on interspaces 3, 5, 7, 9, those on 3 as much as 3.0 or more times longer than interstrial width, a few very short interstrial setae on disc; strial setae absent.

MALE.— Frons rather deeply, transversely impressed, more so on lateral areas; median carina elevated just above epistomal margin, reduced to a line or crease above this; surface on each side of carina closely, densely punctured with abundant long setae. Pronotum as in female except punctures on posterior portion larger, deeper, and closer. Elytra as in female except strial punctures occasionally somewhat larger; declivity with interspaces 3 and 9 not as strongly elevated, junction more obscure, interstrial granules smaller or absent.

TYPE MATERIAL.— The holotype (♀), allotype, and 23 paratypes were collected 32 miles (53 km) south of Valle Nacional, Oaxaca, Mexico, 7000 feet (2100 m) elevation, on 21 May 1971 from *Pinus* sp. by D. E. Bright (CNC No. 15084). Six additional paratypes were collected 1 mile (2 km) west of Las Vigas, Vera Cruz, Mexico, on 5 July 1967 from *Pinus* sp. by S. L. Wood, and 4 paratypes were collected 7 miles (11.5 km) southeast of Las Vigas, Vera Cruz, Mexico, on 18 December 1948 by H. B. Leech.

The primary type and most of the paratypes are in the CNC. Additional paratypes are in the SLWC and the KESC.

REMARKS.— *P. ineditus* is closely related to *P. diglypus* Blandford and *P. glabratulus* (Schedl). Adults differ from *P. diglyphus* by the more weakly elevated, longitudinal carina on the male frons, by the smaller body size, and by the usually longer setae on the declivital interspaces of the elytra. From *P. glabratulus*, adults of *P. ineditus* may be distinguished by the much longer declivital setae, by the very slightly smaller average body size, and by the more deeply, transversely impressed male frons.

Pityophthorus litos, n. sp.

Length 1.6-1.7 mm, about 2.8 times longer than wide.

FEMALE.— Frons flattened on a semicircular area extending from eye to eye and from epistoma to slightly above upper level of eyes; surface shining, densely punctured, the punctures small, very close; vestiture abundant, consisting of long, yellowish setae scattered over surface, those setae on periphery much longer and incurved but not more abundant. Antennal club oval, 1.2-1.3 times longer than wide, widest through segment 3; segment 1 slightly narrower than 2; sutures 1 and 2 weakly arcuate; first 2 segments occupy slightly less than half the total club length.

Pronotum about as long as wide, widest behind middle; anterior margin rather narrowly rounded with about half a dozen small, inconspicuous, nearly contiguous serrations; asperities on anterior slope small, erect, acute, scattered in no apparent order; summit fairly high; posterior area opaque, the punctures distinct, rather deep, and moderately large, separated by a distance equal to or less than their own diameters; interpuncture space densely, minutely reticulate; median line occasionally very weakly elevated.

Eltyra about 1.7 times longer than wide; apex broadly rounded; striae punctured in regular rows, the punctures rather large, deep, separated by a distance less than half their diameters, and each bearing a short semierect seta; interspaces equal to or slightly wider than striae, surface minutely reticulate, interspaces 1, 3, 5, 7, 9 sparsely punctured and setose, the setae longer and more erect than those in striae; interspace 9 not elevated. Declivity convex; interspace 1 broad, slightly elevated, with a median row of very fine granules; interspace 2 about as wide as on disc, slightly but distinctly impressed, smooth, shining; interspace 3 not elevated but slightly higher than 1, with a median row of fine granules, these larger than those on 1, each granule with a long seta arising from the posterior base; punctures of striae 1 and 2 visible but reduced in size, those in striae 1 more deeply impressed.

MALE.— Frons convex, divided by a very fine, weakly elevated, longitudinal carina extending from the epistoma to the upper level of eyes; surface densely,

deeply, rather roughly punctured, with a few fine granules between the punctures; vestiture inconspicuous. Pronotum and elytra essentially as in female, except punctures on pronotum and elytra larger and deeper.

Type material.— The holotype (♀), allotype, and 6 paratypes were collected 25 miles (42 km) west of Orizaba, Vera Cruz, Mexico on 29 April 1969 from *Pinus* sp. by D. E. Bright (CNC No. 15085).

The holotype, allotype, and most of the paratypes are in the CNC; additional paratypes are in the SLWC.

Remarks.— This is a rather nondescript species which can be recognized by the narrow first antennal segment; by the convex male frons which is divided by a weakly elevated, longitudinal carina; by large and deep punctures and the densely, minutely reticulate interpuncture surface of the posterior portion of the pronotum; and by the row of very fine granules on declivital interspaces 1 and 3.

Pityophthorus megas, n. sp.

Length 3.1-3.9 mm, 3.1-3.2 times longer than wide.

Female.— Frons weakly flattened on a relatively small area extending from epistomal margin to just above upper level of eyes and laterally occupying about 77 percent of the inner ocular distance; surface of flattened area very densely, finely punctured, except on a small, impunctate, median circular area just above epistomal margin; the entire flattened area clothed with moderately long setae which are all generally equal in length; the periphery of the flattened area generally strongly indented, punctures larger and deeper; surface lateral to and above pubescent area with scattered deep punctures. Antennal club large, oval, 1.3 times longer than wide, widest through segment 3; sutures 1 and 2 broadly arcuate, 2 more strongly so; segments 1 and 2 occupy about half the total club length.

Pronotum 1.1-1.2 times longer than wide, widest slightly behind level of summit; sides weakly arcuate to subparallel on posterior half; anterior margin broadly rounded, bearing about a dozen rather large, broad, basally contiguous serrations; asperities on anterior slope large, erect, acute, scattered in no apparent order; summit distinct, moderately elevated; posterior area densely punctured, the punctures large and deeply impressed, separated by a distance equal to or less than their diameters; interpuncture space moderately shining, with numerous very fine points scattered between the punctures; median line broad, narrowly elevated just behind summit.

Elytra about 1.8 times longer than wide; apex weakly acuminate; striae punctured in fairly regular rows, the punctures very large, deeply impressed, and close, each bearing a moderately long, fine seta; interspaces about as wide as striae, each with a median row of large, deeply impressed punctures, each of these bearing a long, fine seta that is longer than those arising in strial punctures; punctures in striae and interstriae of equal size and depth and somewhat randomly placed, giving the appearance of a totally randomly punctured elytra; interspaces discernable because of the longer setae arising from interstrial punctures. Declivity moderately sulcate, steep; interspace 1 rather strongly elevated, slightly lower than 3, bearing a median row of about 5 large, acute granules, each bearing a long fine seta; interspace 2 broadly widened, flat, distinctly impressed, surface moderately shining, densely microreticulate; interspace 3 moderately elevated on upper half, slightly higher than 1, and bearing a median row of about 5 large, acute granules, each bearing a long fine seta; remaining interspaces bearing a row of long, fine setae; punctures in striae 1 and 2 much reduced and almost obsolete.

Male.— Frons deeply, narrowly, transversely impressed, the upper margin of impression strongly elevated, lateral and lower margins distinctly elevated but less so than upper; surface of impression densely punctured, the punctures of moderate size, abundant setae of moderate length but shorter than setae on epistomal margin. Pronotum, elytra, and declivity essentially as in female except declivital interspace 1 devoid of granules except at commencement of declivity and at extreme apex, 2 more deeply sulcate, and 3 more strongly elevated and granules larger.

TYPE MATERIAL.— The holotype (♀), allotype, and 10 paratypes were collected on Cerro Potosi, Nuevo Leon, Mexico, on 4 May 1971 at an elevation of 11,500 feet (3500 m) from twigs of *Pinus culminicola* by D. E. Bright (CNC No. 15066).

The holotype, allotype, and most of the paratypes are in the CNC; additional paratypes are in the SLWC and the KESC.

REMARKS.— This is one of the largest species in the genus, measuring up to nearly 4.0 mm in length. Adults can be easily recognized by the densely punctured elytra on which striae and interstriae are difficult to discern; by the deeply, transversely impressed frons of the male; by the relatively small, flattened, pubescent, median portion of the female frons; by its size; and by the host.

This species has only been found in the endemic *Pinus culminicola* at the summit of Cerro Potosi in northeastern Mexico. *P. megas* is probably endemic to that area.

Pityophthorus minus, n. sp.

Length 1.9-2.0 mm, about 2.8 times longer than wide.

HOLOTYPE (♀).— Head largely withdrawn into prothorax; frons appears flattened and sparsely pubescent; median carina not present. Antennal club elongate-oval, about 1.2 times longer than wide, widest through segment 2; sutures 1 and 2 nearly transverse, very weakly arcuate; segments 1 and 2 occupy at least two-thirds of total club length.

Pronotum about 1.1 times longer than wide, widest at about middle; sides arcuate; anterior margin broadly rounded with 8 low, erect, nearly contiguous serrations; asperities on anterior slope small, low, scattered in no apparent order; summit high; posterior area dull, punctures shallow, obscure, separated by a distance greater than their diameters; interpuncture space densely, minutely reticulate.

Elytra about 1.9 times longer than wide; apex broadly rounded; striae punctured in regular rows, the punctures somewhat obscure, shallow, close, almost touching; interspaces about as wide as striae or slightly narrower, surface dull, minutely reticulate, impunctate. Declivity strongly convex; interspace 1 very weakly elevated, devoid of granules; interspace 2 convex; 3 unmodified, devoid of granules; punctures in striae 1 and 2 very faint, very small, and shallow. Vestiture inconspicuous, consisting only of very fine, very short, strial setae.

MALE.— Frons weakly convex, divided by a fine, low, longitudinal, median carina; surface moderately dull, minutely reticulate, and very weakly punctured, the punctures widely scattered. Pronotum essentially as in female except serrations on anterior margin more erect, sharper, and longer. Elytra as in female except punctures in declivital striae 1 and 2 slightly more obvious and visible.

TYPE MATERIAL.— The holotype (♀) and allotype were collected at Hannagan Camp, Greenlee Co., Arizona on 11 July 1968 by D. E. Bright (CNC No. 15086). Both type specimens are in the CNC.

REMARKS. —Adults of this species are most easily distinguished by the very convex elytral declivity, by the obscure strial punctures on the first and second declivital striae, and by the obscure punctures on the posterior portion of the pronotum.

This species is placed in the group that contains *P. segnis* Blackman, *P. subopacus* Blackman, *P. elimatus* Bright, and several additional undescribed species, based on the reticulate, flattened, carinate male frons.

Pityophthorus occlusus, n. sp.

Length 1.4-1.7 mm, about 3.0 times longer than wide.

FEMALE.— Frons convex, weakly flattened on area below upper level of eyes; a weakly elevated, median callus is frequently evident at upper level of eyes, and a very weak longitudinal elevation is sometimes evident extending from epistomal margin to the callus (if present), this elevation frequently interrupted in middle by a very weak, transverse impression; surface rugose, rather strongly punctured; vestiture inconspicuous. Antennal club oval, 1.4-1.5 times longer than wide, widest through segment 3; sutures 1 and 2 weakly arcuate, usually not distinctly visible; segment 1 narrower than 2; segments 1 and 2 occupy about one-third of total club length.

Pronotum 1.2 times longer than wide, widest at middle; sides subparallel to weakly arcuate on basal half; anterior margin broadly rounded with 6-10 low, small, basally contiguous serrations; asperities on anterior slope somewhat larger, more erect, generally isolated but may be basally contiguous, especially on lateral areas, arranged into 4 concentric rows with 1 or 2 indistinct concentric rows at summit; summit weakly elevated, transverse impression behind summit weak; posterior portion moderately punctured, the punctures rather small, moderately impressed, separated by a distance equal to or less than their diameters; interpuncture space brightly shining, rather densely micropunctate; median line very narrow, very feebly elevated.

Elytra 1.7 times longer than wide; apex almost truncate; striae punctured in regular rows, the punctures very large (much larger than those on posterior portion of pronotum), separated by a distance equal to less than their diameters; interspaces narrower to slightly wider than striae, brightly shining, with numerous very fine lines and points. Declivity weakly bisulcate; interspace 1 rather strongly elevated, impressed slightly below level of interspace 3, bearing a median row of 5 or 6 moderately large, acute granules; interspace 2 flat, about as wide as discal width, slightly impressed below 1 and 3; interspace 3 moderately elevated, bearing a median row of 6-8 moderately large, acute granules, these larger than those on interspace 1; punctures in striae 1 and 2 distinct, equal in size or only very slightly smaller than those on disc. Vestiture inconspicuous, consisting of moderately long interstrial setae on posterior one-fifth of elytra.

Male.— Virtually indistinguishable from female except by abdominal segmentation.

Type material.— The holotype (♀), allotype, and 19 paratypes were collected at Yuscaran, Paraiso, Honduras, on 23 April 1964 at an elevation of 2400 feet (730 m), from *Pinus caribaea* by S. L. Wood. Additional paratypes were collected at: 10, San Lucas, Paraiso, Honduras, on 22 April 1964 from *Pinus oocarpa* by S. L. Wood; 2, 26 miles (42 km) southeast of Nochixtlan, Oaxaca, Mexico, on 17 June 1967 from *Pinus* sp. by S. L. Wood; and 3, Laguna Sta. Maria, N., Mexico, on 6 July 1975 from *Pinus* sp. at an elevation of 3000 feet (910 m) by S. L. Wood.

The holotype, allotype, and most of the paratypes are in the SLWC. Additional paratypes are in the CNC (No. 15087) and the KESC.

Remarks. —This species belongs in a group of species that is almost exclusively found in nonconiferous hosts. It does not appear to be closely related to any of the presently described species.

The large, distinct granules on the first and third declivital interspaces, the large strial punctures, the concentric rows of pronotal asperities, the distinct punctures in declivital striae 1 and 2, and the rugose frons of both sexes should distinguish this species.

Pityophthorus recens, n. sp.

Length 1.9-2.1 mm, 2.8-2.9 times longer than wide.

Female.— Frons distinctly, strongly convex, may be narrowly, transversely impressed or flattened just above epistomal margin; surface glabrous, very densely granulate-punctate on a large, median, subcircular area extending from epistomal margin to near upper level of eyes, the punctures in this area very small and very close, interpuncture spaces weakly elevated and shining; a very small, median, smooth, epistomal callus or longitudinal elevation is frequently present just above epistomal margin; surface above and lateral to this punctate-granulate median area smooth and shining, bearing large, deep, usually separated punctures. Antennal club oval, 1.3 times longer than wide, widest through segment 2; sutures 1 and 2 very weakly arcuate to transverse; segments 1 and 2 occupy one-half or more of total club length.

Pronotum 1.1 times longer than wide, widest near posterior angle; sides subparallel to weakly arcuate; anterior margin broadly rounded, bearing about a dozen erect, moderately large, basally contiguous serrations; asperities on anterior slope low, erect, varying from small to moderately large, scattered in no apparent

order; summit low but distinct; posterior portion finely punctured, the punctures small, rather deep, and separated by a distance at least twice their own diameters; interpuncture space brightly shining, smooth with numerous fine, impressed points; median line broad.

Elytra about 1.8 times longer than wide; apex broadly rounded; striae punctured in regular rows, the punctures slightly larger than those on posterior portion of pronotum, deeply impressed, and usually separated by a distance equal to or less than their diameters; interspaces about twice as wide as striae, surface shining and bearing dense, fine lines, interspaces 1, 3, 5, 7, and 9 bearing a few, widely scattered, setose punctures, these smaller and shallower than those in striae. Declivity steep; interspace 1 moderately elevated, as high as 3, bearing a median row of fine granules; interspace 2 wider than discal width, moderately sulcate, surface shining, with fine reticulation as on disc; interspace 3 weakly elevated, equal in height to 1, with a median row of fine granules; punctures in striae 1 and 2 obsolete, not visible; vestiture in interspaces 1, 3, 5, 7, and 9 fine, long.

Male.— Frons strongly convex, evenly, densely punctured over entire surface, the punctures of moderate to large size, rather deep and close; a very fine, median, longitudinal elevation is present on epistoma. Pronotum and elytra essentially as in female except punctures somewhat stronger and microsculpturing of posterior portion of pronotum and elytral interspaces denser. Declivity as in female except granules on interspaces 1 and 3 slightly stronger and interspace 2 slightly more deeply impressed.

Type material.— The holotype (♀), allotype, and 4 paratypes were collected at Pine Pass, British Columbia, on 11 July 1972 from *Picea* sp. by D. E. Bright (CNC No. 15088). Two additional paratypes were collected at Rampart House, Yukon Territory, on 24 May 1951 by J. E. H. Martin.

The holotype, allotype, and four paratypes are in the CNC; one paratype each is in the SLWC and the KESC.

Remarks.— Adults of this species are readily recognized by the very densely granulate-punctate median portion of the strongly convex female frons, by the small, widely separated punctures on the posterior portion of the pronotum, and by the fairly dense microsculpturing on the elytral interspaces and on the pronotum.

Pityophthorus siouxensis, n. sp.

Length 2.9-3.1 mm, 2.7-2.8 times longer than wide.

Female.— Frons weakly, transversely flattened on a somewhat arcuate area extending from epistomal margin to upper level of eyes, this area finely, densely, shallowly punctured and divided by a prominent, sharply elevated, longitudinal carina; surface of this arcuate flattened region convex, much more strongly and deeply punctured, the punctures quite large and almost touching; vestiture inconspicuous, confined to flattened region above epistoma, consisting of short, erect setae scattered over surface, setae much shorter or absent on area above flattened region. Antennal club large, nearly circular, about 1.1 or less times longer than wide, widest through segment 3; sutures 1 and 2 weakly arcuate, devoid of chitinous septa; segments 1 and 2 narrow, and occupy less than half the total club length.

Pronotum 1.1 times longer than wide, widest behind summit; anterior margin broadly rounded, bearing about a dozen large, erect serrations, those in center larger; asperities on anterior slope large, erect, isolated, placed in no apparent order; summit distinct, high; posterior portion densely punctured and subasperate, the punctures very large, deep, and almost touching, lateral or basal margins of each puncture weakly to moderately elevated, resulting in a subasperate or subgranulate appearance; interpuncture spaces shining, smooth with a few scattered minute points; median line broad, impunctate, broadly elevated.

Elytra about 1.7 times longer than wide; sides weakly arcuate; apex broadly rounded; striae punctured in vague rows, the punctures obscure, weakly impressed, and small, separated by a distance several times their own diameters; interspaces several times wider than striae, each bearing a median row of fine, shallow, setaceous punctures, these less numerous than those in striae; surface moderately shining, smooth but with numerous, scattered, fine lines and points. Declivity

steep; interspace 1 moderately elevated, distinctly impressed below level of interspace 3, bearing a median row of very fine granules; interspace 2 moderately sulcate, sculpturing as on disc; interspace 3 weakly elevated, distinctly higher than 1, with a median row of very small granules, these very slightly larger than those in interspace 1; punctures in striae 1 and 2 obscure, nearly invisible, punctures in other striae and interstriae not visible or only very weakly so on declivital area.

Male.— Frons very similar to female, except median carina slightly more strongly elevated and punctures larger and deeper. Antennal club narrower, 1.2 times longer than wide, widest through segment 2. Pronotum essentially as in female except asperities and serrations slightly larger. Elytra as in female except strial and interstrial punctures slightly larger, more obvious. Declivity as in female except granules in interspaces 1 and 3 smaller or absent.

Type material.— The holotype (♀), alltoype, and 7 paratypes were collected in the Black Hills, South Dakota, on 7 July 1975 from twigs of *Pinus ponderosa* by D. E. Bright (CNC No. 15089).

The holotype, allotype, and most of the paratypes are in the CNC. Some paratypes are in the SLWC and the KESC.

Remarks.— This species is in what I have called the "ramiperda" group, which contains those species that have antennal clubs that are without chitinized septa between the segments. Within that group, *P. siouxensis* is most closely related to *P. boycei* Swaine, but the adults of *P. siouxensis* differ by their larger size, by the very obscure strial punctures on the declivity, and by the very small granules on declivital interspaces 1 and 3.

Pityophthorus speculum, n. sp.

Length 2.3-2.7 mm, 2.5 times longer than wide.

Female.— Frons very broadly flattened on a large semicircular area extending from epistomal margin to well above upper level of eyes and laterally from eye to eye; surface shining, mirrorlike, with very fine, widely separated, setose punctures, the setae arising from these punctures very fine and short; periphery of flattened area much more densely, roughly punctured, with setae very long and incurved, the longest setae arising on upper margin may extend to or beyond mandibles when flattened down over surface; setae on epistomal margin and around mandibles long and dense. Antennal club elongate-oval, 1.3-1.4 times longer than wide, widest through segments 2 and 3; suture 1 nearly transverse, 2 more strongly arcuate; segments 1 and 2 occupy about half the total club length.

Pronotum about as long as wide, widest at about level of summit; sides distinctly arcuate; anterior margin broadly rounded, bearing about a dozen erect, moderate-sized serrations; asperities on anterior slope numerous, erect, isolated, scattered in no apparent order; summit weakly elevated; posterior portion distinctly punctured, the punctures of moderate size, deep, and usually separated by a distance equal to or less than their diameters; interpuncture space moderately shining, with densely placed, fairly deep, fine lines and points; median line fairly broad, weakly elevated.

Elytra about 1.7 times longer than wide; apex broadly rounded; striae punctured in regular rows, the punctures as large as those on posterior portion of pronotum, deep, and separated by a distance about equal to their own diameters; interspaces weakly convex, wide, at least 2.0 times wider than striae, surface shining, with numerous fine points and lines; interspaces 1, 3, 5, 7, and 9 with 2 or 3 widely scattered setose punctures, those in 1 more numerous. Declivity sloping; interspace 1 moderately elevated, weakly impressed below level of 3, bearing a median row of distinct, fairly large granules; interspace 2 not widened, moderately sulcate, bearing a few fine, long setae and granules at commencement of declivity, glabrous and smooth on declivital face; interspace 3 weakly elevated, bearing a single or double row of prominent granules, each bearing a long, fine, erect seta on its posterior margin; punctures in striae 1 and 2 obsolete, but if visible, then reduced in size; remaining interspaces with a median row of rather long, erect setae.

Male.— Frons weakly convex, divided by a broad, distinctly elevated, longitudinal carina extending from the epistoma to above upper level of eyes, surface of each

side strongly punctured, the punctures large and deep, almost touching. Antennal club as described for female. Pronotum and elytra essentially as in female. Declivity sloping; interspace 1 much more deeply impressed than in female; interspace 2 more deeply sulcate, lateral portions precipitously rising to interspace 3; interspace 3 much higher than 1, bearing a median row of distinct granules.

TYPE MATERIAL.— The holotype (♀), allotype, and 37 paratypes were collected at the 11,000 foot (3300 m) level of Cerro Potosi, Nuevo Leon, Mexico, on 3 May 1971 from twigs of *Abies reliogosa* (?) (27 specimens) or *Pseudotsugae menziesii* (12 specimens) by D. E. Bright (CNC No. 15090). Eight additional paratypes are labeled: Abies/Cerro Potosi, Nuevo Leon, Mexico, 21-III-1974/M. M. Furniss, Hopk. No. 58615 B.

The holotype, allotype, and most of the paratypes are in the CNC. Additional paratypes are in the SLWC and the KESC.

REMARKS.— This species is closely allied to *P. elatinus* Wood. Adults of *P. speculum* may be distinguished by their larger size, by the longer interstrial setae on the apical portion of the elytra, by the more shallowly impressed declivity, by the darker and more uniform pronotal and elytral color, and by the absence of granules on the posterior portion of the pronotum.

Pityophthorus subimpressus, n. sp.

Length 1.4-1.7 mm, about 2.1 times longer than wide.

FEMALE.— Frons flattened on a semicircular area extending from epistomal margin to slightly above upper margin of eyes, usually with a very faint, narrow, longitudinal, median elevation on lower half; surface of flattened area densely and finely punctured except along median elevation, surface above and lateral to flattened area smooth, shining, and virtually impunctate; vestiture on flattened area rather abundant, consisting of rather long, fine, yellowish setae, those on periphery longer and incurved. Antennal club elongate-oval, about 1.3 times longer than wide, widest through segment 2; suture 1 transverse, usually heavily chitinized at lateral margin, suture 2 obsolete, not chitinized, not readily visible; segments 1 and 2 occupy about half of total club length.

Pronotum 1.1 to 1.2 times longer than wide, widest behind middle; sides subparallel to weakly arcuate; anterior margin broadly rounded, bearing about 10 fairly prominent, erect, basally contiguous serrations; asperities on anterior slope arranged into 2 or 3 somewhat irregular, broken, concentric rows, with 1 or 2 additional vague rows visible around summit; summit not distinctly elevated, surface not strongly impressed behind it; posterior area distinctly punctured, the punctures of moderate size, deep, separated by a distance equal to or less than their own diameters; interpuncture space moderately shining, with numerous fine points and lines to minutely reticulate; median line broad, not elevated, impunctate.

Elytra 2.0 times longer than wide, 1.7 times longer than pronotum; apex weakly acuminate; striae punctured in regular rows, the punctures slightly larger and deeper than those on posterior portion of pronotum, separated by a distance less than their own diameters; interspaces about as wide or slightly narrower than striae, surface shining, smooth to very minutely subrugulose, impunctate, and glabrous. Declivity convex; interspace 1 broad, weakly elevated, with a median row of 3 or 4 granules; interspace 2 flat, not wider than discal width, very weakly to moderately impressed; interspace 3 weakly elevated, slightly higher or equal in height to interspace 1, bearing a median row of very fine, sparse granules; punctures in striae 2 distinct but usually reduced, striae 1 narrowly impressed, punctures fine and distinct. Vestiture sparse, consisting of fine, erect, yellowish setae on declivital interspaces 1, 3, 5, and 7.

MALE.— Frons weakly, transversely, broadly impressed from epistoma to upper eye level, the upper margin of impression distinct, almost forming a transverse carina at upper level of eyes, surface finely punctured, setae fine, sparse. Pronotum, elytra, and declivity essentially as in female except interstrial granules on declivity larger and more numerous and interstrial setae slightly stouter.

TYPE MATERIAL.— The holotype (♀), allotype, and 14 paratypes were collected

32 miles (53 km) south of Valle Nacional, Oaxaca, Mexico, on 21 May 1971 at an elevation of 7000 feet (2100 m) from *Pinus* sp. by D. E. Bright (CNC No. 15091). Nine paratypes were collected along Highway 24, 9 miles (15 km) southeast of Teopisca, Chiapas, Mexico, on 14 May 1969 by D. E. Bright; 11 paratypes were taken at Lagos des Colores (Lagunas de Montebello, National Park), Chiapas, Mexico, on 14 June 1969 by D. E. Bright; and 32 paratypes were collected 6 miles (10 km) northeast of Teziutlan, Pueblo, Mexico, on 2 July 1967 at an elevation of 4800 feet (1450 m) from *Pinus* sp. by S. L. Wood.

The holotype, allotype, and most of the paratypes collected by me are in the CNC; some are in the KESC. The paratypes collected by Wood are in the SLWC.

Remarks.— Adults of this species very closely resemble those of *P. attenuatus* Blackman. Adults of *P. subimpressus* may be distinguished by the distinct strial punctures on the declivity in contrast to the obscure, not usually visible punctures in the declivital striae of *P. attenuatus*. Other distinctions were noted such as the punctation of the female frons, the characteristics of the male frons, etc., but the differences are variable and very subtle and, therefore, difficult to describe. The distinct strial punctures are easily visible and serve as the best means to distinguish the species.

Pityophthorus thatcheri, n. sp.

Length 1.9-2.1 mm, 2.6-2.7 times longer than wide.

Female.— Frons broadly flattened from eye to eye and from epistoma to well above upper level of eyes; surface shining, sparsely, very finely punctured; vestiture abundant, consisting of rather long, erect, yellowish setae scattered over surface, those on periphery more densely placed, much longer and incurved. Antennal club nearly circular, widest through segment 3; segment 1 definitely narrower than others; suture 1 transverse, 2 moderately arcuate; first 2 segments occupy slightly more than half the total club length.

Pronotum about as long as wide, widest at middle; anterior margin rather narrowly rounded with about 8 erect, moderately large, contiguous serrations; asperities on anterior slope rather small, erect, scattered in no apparent order; posterior portion opaque, the punctures shallow, rather poorly defined, separated by a distance equal to more than their own diameters; interpuncture space densely and minutely reticulate.

Elytra 1.7 times longer than wide; apex broadly rounded; striae punctured in regular rows, the punctures fine, shallow, separated by a distance about equal to their diameters; interspaces at least 2.0 times wider than striae, surface dull and minutely reticulate; interspaces 1, 3, 5, 7, and 9 with 2-4 widely separated, setose punctures; interspace 9 at most very weakly elevated. Declivity convex; interspace 1 distinctly, moderately elevated, bearing a median row of 5 or more small, rounded granules; interspace 2 only moderately impressed, sulcate, very slightly wider than discal width; interspace 3 not elevated, equal to or very slightly higher than interspace 1, bearing a median row of about 5 small, acutely pointed granules, these larger than those on interspace 1, each granule bearing a long, stout seta arising from the lower base; punctures of striae 1 and 2 obsolete, not visible. Vestiture inconspicuous, except for the few stout setae on declivital interspace 3.

Male.— Frons weakly, transversely impressed from epistoma to upper level of eyes, this impression divided by a very fine, longitudinal, median elevation; a more strongly elevated, transverse carina is present at upper margin of impression; surface shining, faintly, finely punctate except on median, longitudinal elevation and on the transverse carina, reticulate over entire surface. Pronotum and elytra essentially as in female except declivital granules slightly larger.

Type material.— The holotype (♀), allotype, and 2 paratypes were collected at Big Sandy Meadow, S28T5SR22E, California, on 9 July 1946 from *Pinus lambertiana* by T. O. Thatcher.

The holotype, allotype, and 1 paratype are in the SLWC; and 1 paratype is in the CNC (No. 13729).

Remarks.— Adults of this species are unique among those with a small first antennal segment in having the male

frons transversely and longitudinally carinate. Adults may be further distinguished by the densely pubescent female frons with long incurved setae on the periphery, by the convex elytral declivity with rather prominent, acute granules on interspace 3, and by the other characteristics given in the description.

It gives me great pleasure to name this species after its collector, Dr. T. O. Thatcher, who was my adviser and a constant source of patient assistance and help during my undergraduate years at Colorado State University, and has remained a good friend over the years.

Pityophthorus thomasi, n. sp.

Length 1.3-1.6 mm, about 3.0 times longer than wide.

Female.— Frons rather narrowly but strongly flattened from epistoma to well above the eyes, occupying about 75 percent or more of the interocular distance; surface shining, densely and minutely punctured, usually concealed by vestiture; vestiture abundant, consisting of a dense brush of long, yellowish setae, which arise on the vertex above the flattened area and extend nearly to the base of the mandibles, and with much shorter but still rather long, yellowish setae scattered over the flattened portion, those on the periphery of flattened portion longer and incurved, but not as long as those arising on vertex. Antennal club 1.2-1.3 times longer than wide, widest through segment 3 or sometimes 2; sutures 1 and 2 distinctly arcuate; first 2 sutures occupy more than half the total club length.

Pronotum nearly 1.2 times longer than wide, widest behind summit; anterior margin broadly rounded with numerous erect, contiguous serrations; asperities on anterior slope rather small, erect, scattered in no apparent order; posterior portion brightly shining, the punctures fine, small, separated by a distance equal to or greater than their own diameter; interpuncture space with sparsely placed, minute points.

Elytra 1.2 times longer than wide; apex broadly rounded; striae punctured in regular rows, the punctures very small, very weakly impressed to unimpressed, rather widely spaced, separated by a distance equal to 2-3 times their own diameter; interspaces much wider than striae, surface moderately shining and densely, finely sculptured with minute lines and points, almost giving the appearance of minute reticulations; interspaces 1 and sometimes 3 with sparse setae extending nearly to base, 5, 7, and 9 with sparse setae only on apical half or less, these setae about equal in length to interstrial width. Declivity convex, dull, entire surface minutely reticulate, punctate; interspace 1 weakly elevated and devoid of granules; interspace 2 not widened, very weakly impressed if at all; interspace 3 not elevated and devoid of granules; punctures in striae 1 and 2 distinct to obsolete.

Male.— Frons flattened on a semicircular area from epistoma to slightly above upper margin of eyes, with a distinct, slightly elevated longitudinal carina (may be absent in some specimens), flattened area narrowly, transversely impressed just above the arcuate epistomal margin; pubescence longer and denser in the impressed area, very short and sparse over remainder of surface. Pronotum and elytra essentially as in female. Declivity as in female, except interspace 2 even less strongly impressed and strial punctures may be completely obsolete.

Type material.— The holotype (♀), allotype, and 22 paratypes were collected 10 miles (17 km) southwest of El Salto, Durango, Mexico, on 7 July 1964 from *Pinus cooperi* by J. B. Thomas (CNC No. 15092).

The primary types and most of the paratypes are in the CNC; additional paratypes are in the SLWC and the KESC.

Remarks.— This unique species is easily recognized by the very dense brush of setae which arises on the vertex of the female head and extends nearly to the base of the mandibles, by the punctate, reticulate elytral (including declivital) surface, and by the sparsely punctured and setose alternate elytral interspaces.

Pityophthorus zonalis, n. sp.

Length 2.5 mm, 3.1 times longer than wide.

Holotype (♀).— Frons mostly concealed in the one specimen available but pubescence visible, consisting of a dense fringe of very long yellowish setae on

periphery, those on lower portion above epistoma and on lateral area near eye erect and very long. Antennal club oval, 1.45 times longer than wide; sutures 1 and 2 transverse, straight except at lateral margins, segments 1 and 2 occupy about half the total club length.

Pronotum 1.2 times longer than wide, widest at summit; sides subparallel on posterior half; anterior margin broadly rounded, bearing only a few very low, very broad serrations; asperities on anterior slope larger and more erect than serrations on anterior margin, scattered in no apparent order; summit not strongly elevated; posterior portion strongly punctured, the punctures large, deep, separated by a distance less than their diameters; interpuncture space smooth and shining, with numerous fine points scattered between the punctures; median line rather narrow, seemingly very weakly elevated.

Elytra slightly more than 2.0 times longer than wide; apex strongly acuminate; striae punctured in even, regular rows, the punctures large, deeply impressed, and almost touching; discal interspaces equal in width or narrower than striae, weakly convex, impunctate, surface shining, with numerous scattered fine points. Declivity generally convex, steep; interspace 1 strongly elevated, slightly impressed below level of 3, bearing a median row of 6-8 small, acute granules, each of these bearing a long, fine seta; interspace 2 weakly sulcate, slightly wider than discal width; interspace 3 moderately elevated, slightly higher than 1 and bearing a median row of 4-6 acute, small granules, each of these bearing a long, fine seta; remaining interspaces each with a median row of several, long, fine setae; punctures in striae 1 and 2 distinct, smaller and less deeply impressed than those on disc.

Male.— Unknown.

Type material.— The holotype (♀), is labeled: 638-7/Jerome, Ariz., 11-22-35/ Pinus ponderosa.

The holotype has been returned to the USNM.

Remarks.— This species is closely related to *P. spadix* Blackman. Females of *P. zonalis* may be distinguished by the very long, erect, and incurved setae on the periphery of the frons; by the much less strongly elevated third declivital interspace; and by the much less deeply sulcate second declivital interspace. In *P. spadix*, the third declivital interspace is much higher than the first and is most strongly elevated on the upper half. In *P. zonalis*, the third declivital interspace is only very slightly higher than the first and is more evenly elevated along its entire length, except at the extreme apex.

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