

North American Species in Group IX of *Ips* De Geer (Coleoptera : Scolytidae)¹

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Abstract

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Group IX of North American *Ips* contains *I. grandicollis* (Eichhoff), *I. confusus* (Leconte), *I. montanus* (Eichhoff), *I. cribricollis* (Eichhoff) and *I. lecontei* Swaine. *I. chagnoni* Swaine is made a synonym of *I. grandicollis* (Eichhoff). *Ips* of Group IX differ from other *Ips* by having five spines on each side of the elytral declivity. Species are described and a key is given. They breed in various species of *Pinus* and most of them occur south of the boreal forest.

This paper is one of a series describing the species of North American *Ips* (Hopping 1963a, b, c, d; 1964; 1965a, b, c). Species in Group IX are 2.8–5.4 mm. long and 1.0–2.1 mm. wide. There are five spines on each lateral margin of the declivity, the third and largest spine having a notch on the ventral side (Figs. 5, 6). Sutures of the antennal club are strongly angled at the middle. A median tubercle on the frons of the males is usually obsolete in females or reduced to a short inconspicuous carina. All of the species breed in *Pinus* and members of this group are distributed from southern Canada to Honduras.

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GROUP IX

Key to the Species

1. Distance (tip to tip) between first and second declivital spines approximately equal to distance between second and third (Fig. 5) 2
 Distance (tip to tip) between first and second declivital spines distinctly greater than distance between second and third (Fig. 6) 4
2. Elytral interspaces impunctate on the disc at least on basal half (Fig. 1) *Ips grandicollis* (Eichhoff)
 Elytral interspaces uniseriately punctate-setose 3
3. Median fovea on frons distinctly impressed (Fig. 9); setae of female becoming denser on anterior of pronotum and upper part of frons. Length less than 4.8 mm. *Ips confusus* (Leconte)
 Median fovea on frons shallowly impressed or obsolete (Fig. 10); setae of female not becoming appreciably denser on anterior part of pronotum and upper part of frons. Length usually 5 mm. or more *Ips montanus* (Eichhoff)
4. Median tubercle on frons separated from epistomal margin by about the width of the eye (Fig. 11); body length less than 4.0 mm. *Ips cribricollis* (Eichhoff)
 Median tubercle on frons of male bifid (Fig. 12), nearly on epistomal margin; frontal tubercle usually obsolete in female; body length more than 4.0 mm. *Ips lecontei* Swaine

Ips grandicollis (Eichhoff)

Tomicus grandicollis Eichhoff, 1867, *Berl. ent. Z.* 11: 402.

Tomicus cacographus Leconte, 1868, *Trans. Amer. ent. Soc.*: 162.

Ips grandicollis, Swaine, 1909, *Bull. N.Y. St. Mus.* 134: 132; Swaine, 1918, *Bull. Can. Dep. Agric.* 14(2): 108, 113; Dodge, 1938, *Tech. Bull. Univ. Minn. Agric. Exp. Sta.* 132: 47, 48; Chamberlin, 1939, *Bark and Timber Beetles of N. A.*: 410, 417; Beal and Massey, 1945, *Bull. Duke Univ. Sch. For.* 10: 140, 142; Hopping, 1963, *Canad. Ent.* 95: 514.

Ips chagnoni Swaine, 1916, *Canad. Ent.* 48: 186, *New Synonymy*. Swaine, 1918, *Bull. Can. Dep. Agric.* 14(2): 108, 113; Dodge, 1938, *Tech. Bull. Univ. Minn. Agric. Exp. Sta.* 132: 47, 49; Chamberlin, 1939, *Bark and Timber Beetles of N. A.*: 410, 418.

I. grandicollis is 2.8–4.7 mm. long and 1.0–1.7 mm. wide (Fig. 1). Adults are dark reddish-brown to black.

Females have the front of the head slightly and evenly convex and the median tubercle on the frons small or reduced to a short carina; the fovea above the tubercle is shallow and sometimes obsolete. The vertex is medium coarsely punctate with shining glabrous areas between punctures; the frons is granulate, the granules being irregular in size; granules along the epistomal margin become gradually larger as they approach the median line.

The pronotum is 1.2 times longer than wide having the sides slightly and evenly arcuate and faintly obtusely angled at the apical fifth, then converging to the broadly rounded front margin; the caudal margin is strongly arcuate. Lunar rugosities extend to about the center of the pronotum medially and stop considerably short of the postero-lateral angles on the sides; larger and smaller ones are intermixed in about equal proportions. Punctures on the caudal half are fine on the disc, 0.02 mm. in diameter, irregularly spaced, becoming coarser and closer together on the sides.

Elytra are 1.5 times longer than wide, having moderately impressed striae and stria punctures about 0.04 mm. in diameter; the first interspace is finely uniseriately granulate-punctate, the granules becoming larger and more sharply pointed towards the declivity; interspaces 2–4 are impunctate at least on the basal

half, the remainder of the interspaces being punctate-setose throughout. The first declivital spine is approximately 0.06 mm. long, conical, slightly curved and acutely pointed; the second spine, 0.1 mm. long, is stouter than the first and the base is usually extended on one side towards but not quite reaching the base of the third spine; the third and largest spine, 0.15 mm. long, is stouter than the others, blunt at the tip and has the notch on the ventral side which is characteristic of the group (Figs. 5, 6); the fourth spine is as long as the first, stouter, nearly conical but with the sides slightly convex; the fifth spine is as long as the fourth, similar in shape but stouter and subacute at the tip. The declivity is rather densely punctate, the punctures being nearly as large as those of the striae. Ventral punctures are coarser than in most *Ips*, the diameter of the puncture on the metasternum being about 0.02 mm. in diameter; the surface between punctures is micro-reticulate (magnification $\times 50$).

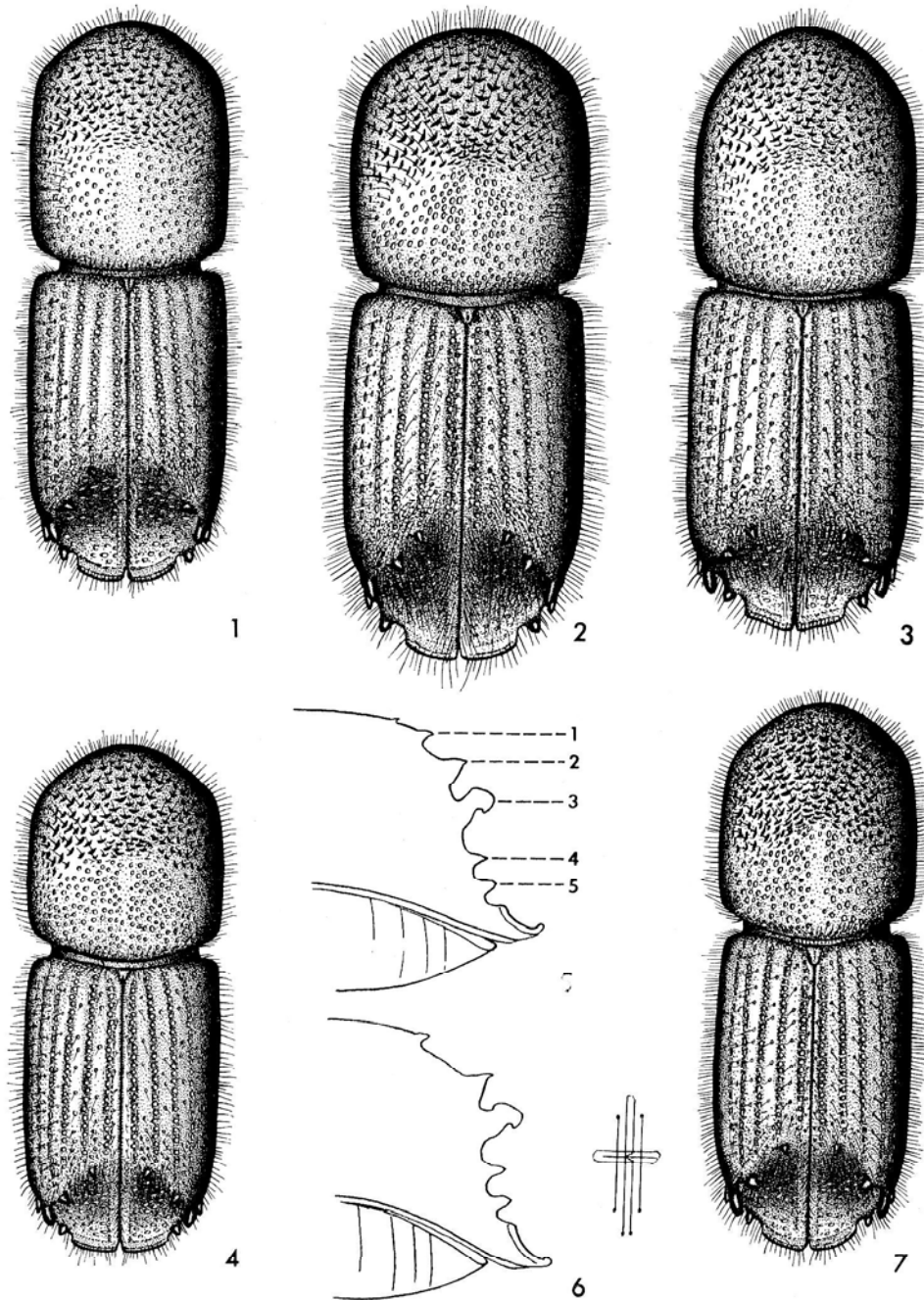
The male has a coarser frontal tubercle and coarser declivital spines than the female; median granules on the epistomal margin are also coarser and the fovea above the frontal tubercle is more deeply impressed.

I. grandicollis breeds in species of *Pinus* from Quebec to Florida in the east and from Manitoba to Texas in the western part of its range (Fig. 15). Apparently it has become established in some pine plantations of Australia; 20 specimens in the U.S. National Museum are labelled "Wirrabara Forest, S. Australia, from *Pinus laricio*, 1943", and four specimens labelled "Gnangarra Pine Plantation, W. Australia, 1953." The type locality of *I. grandicollis* is "Amer. bor." but the type was destroyed in the Second World War. The concept of the species is based on material in the U.S. National Museum and Canadian National Collection.

Specimens have been seen from Wichwood, Wakefield, Aylmer, Deschenes, Rigaud, Montreal Isl., St. Annes, Fort Coulonge, Hull and Laniel in **Quebec**; Thor Lake, Long Lake, Port Hope, Algonquin Pk. and Black Sturgeon Lake in **Ontario**; Falcon L. in **Manitoba**; Manor, Hampton Bays, Shoreham, Peekskill, Ithaca and Olcott in **New York**; Lakehurst, Malaga, Avalon, Clementon, South Amboy, Egg Harbor, Chatsworth, Newfoundland and Orange Mts. in **New Jersey**; Framington in **Massachusetts**; Stratford in **Connecticut**; Lehigh Gap, Frankford and Pocono Lake in **Pennsylvania**; Roscommon and Battle Ck. in **Michigan**; Cedar Island, Solon Springs and Port Edwards in **Wisconsin**; Itaska Pk. in **Minnesota**; Jefferson City in **Missouri**; Minn'l Sprgs. in **Indiana**; Iowa City in **Iowa**; Halsey in **Nebraska**; Hope in **Arkansas**; **Washington, D.C.**; Beltsville, Silver Springs, College Park, Nanjemoy and Sparrows Pt. in **Maryland**; Falls Church, Mt. Vernon, Arlington Farm and Nelson Co. in **Virginia**; Kanawha Falls in **West Virginia**; Southern Pines, Tryon, Boardman, Asheville, Pink Beds, Raleigh, Black Mts. and Hendersonville in **North Carolina**; Mobile in **Alabama**; Baxterville in **Mississippi**; Savannah, Myrtle, Barnsville, Milner and Brooklet in **Georgia**; Hillsboro, Marion, Hardee, Orange, Duval, Citrus, Lake, Flagler and Seminole Counties, Tampa, Amelia Island, Baldwin, Starke, Quincy, Tarpon Sprs., Homestead, Paradise Key, Punta Gorda and St. Augustine in **Florida**; Deweyville, Dallas, Bastrop St. Pk., Huston and Sour Lake in **Texas**; more than 1500 specimens were seen.

Known hosts in North America are *Pinus echinata* Mill., *P. taeda* L., *P. sylvestris* L., *P. virginiana* Mill., *P. palustris* Mill., *P. rigida* Mill., *P. banksiana* Lamb., *P. strobus* L., *P. caribaea* Mor.

Schedl (1955) expressed doubt that *I. chagnoni* was different from *I. grandicollis* but did not definitely establish the synonym. The type of *I. chagnoni* from Montreal Isl., Quebec, was studied. Except for a slightly larger size and



Figs. 1-7. *Ips* species in Group IX (males). 1, *I. grandicollis* (Eichh.); 2, *I. montanus* (Eichh.); 3, *I. confusus* (Lec.); 4, *I. cribricollis* (Eichh.); 5, declivital spines (lateral) of *I. confusus* (Lec.); 6, declivital spines (lateral) of *I. lecontei* Sw.; 7, *I. lecontei* Sw.

consequently coarser sculpturing there is no real morphological difference between it and specimens from southeastern United States. Differences noted by Swaine (1918) such as the more elongate pronotum of *I. grandicollis* and the more confused elytral punctures near the declivity of *I. chagnoni* fall within the variability of specimens from one locality. For instance the length over width ratio of the pronotum of 30 specimens of *I. chagnoni* from Quebec had a range of 1.12–1.34 with a mean of 1.21; 10 specimens from North Carolina, range 1.08–1.30, mean 1.19; 10 specimens from east Texas, range 1.20–1.28, mean 1.22; 7 specimens from Manitoba, range 1.20–1.28, mean 1.23. There is great variability in the size of *I. grandicollis*, individuals becoming progressively larger from south to north. The smallest specimens seen were from Texas.

Ips confusus (Leconte)

Tomicus confusus Leconte, 1876, *Proc. Amer. phil. Soc.* 15: 364.

Ips confusus, Swaine, 1909, *Bull. N.Y. St. Mus.* 134: 122; Swaine, 1918, *Bull. Canad. Dep. Agric.* 14(2): 108, 113; Chamberlin, 1939, *Bark and Timber Beetles of N. A.*: 411, 419; Schedl, 1955, *Z. angew. Ent.* 38: 33, 40; Chamberlin, 1959, *Scolytoidea of the Northwest*: 163, 167; Schedl, 1960, *Col. Bull.* 14: 7; Hopping, 1963, *Canad. Ent.* 95: 514.

I. confusus is 4.1–5.7 mm. long and 1.5–2.1 mm. wide (Fig. 3). Fully pigmented adults have the dorsal surface black and the ventral surface dark brown; legs and antennae are lighter brown.

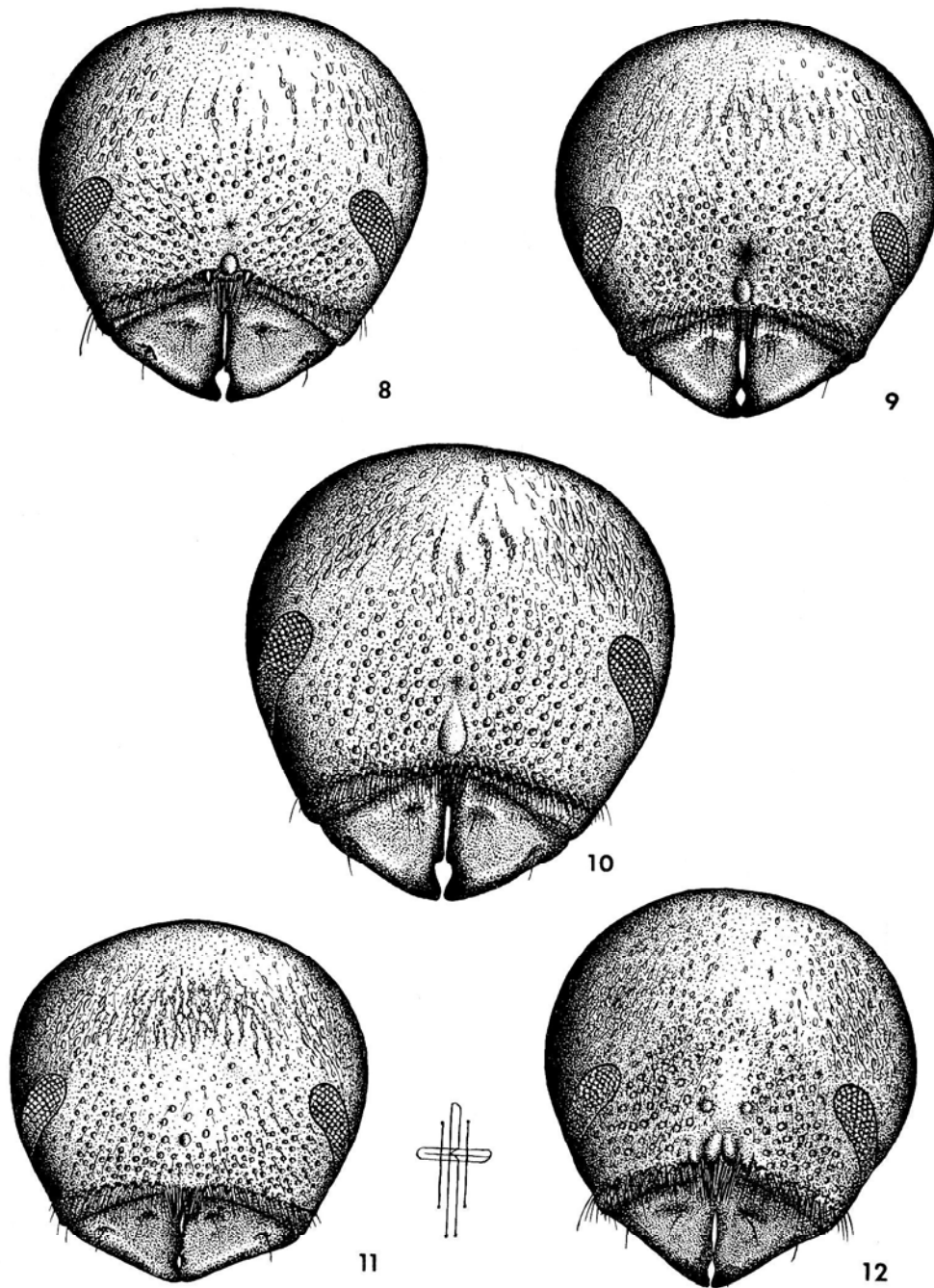
Females have the front of the head evenly convex and medium coarsely granulate except for a small glabrous median fovea about 0.1 mm. across which is more strongly impressed at the center and extends in a narrow band to the epistomal margin; the median tubercle is sometimes faintly apparent but is usually obsolete.

The pronotum is 1.2 times longer than wide having the sides slightly and evenly arcuate, moderately obtusely angled at the apical fifth, the front margin broadly rounded and the caudal margin strongly arcuate. Lunar rugosities extend behind the center of the pronotum medially and slightly farther back on the sides. The caudal portion of the disc is densely and medium-coarsely punctate, the diameter of a puncture being about 0.03 mm.; a median, impunctate narrow strip extends from the summit to the base.

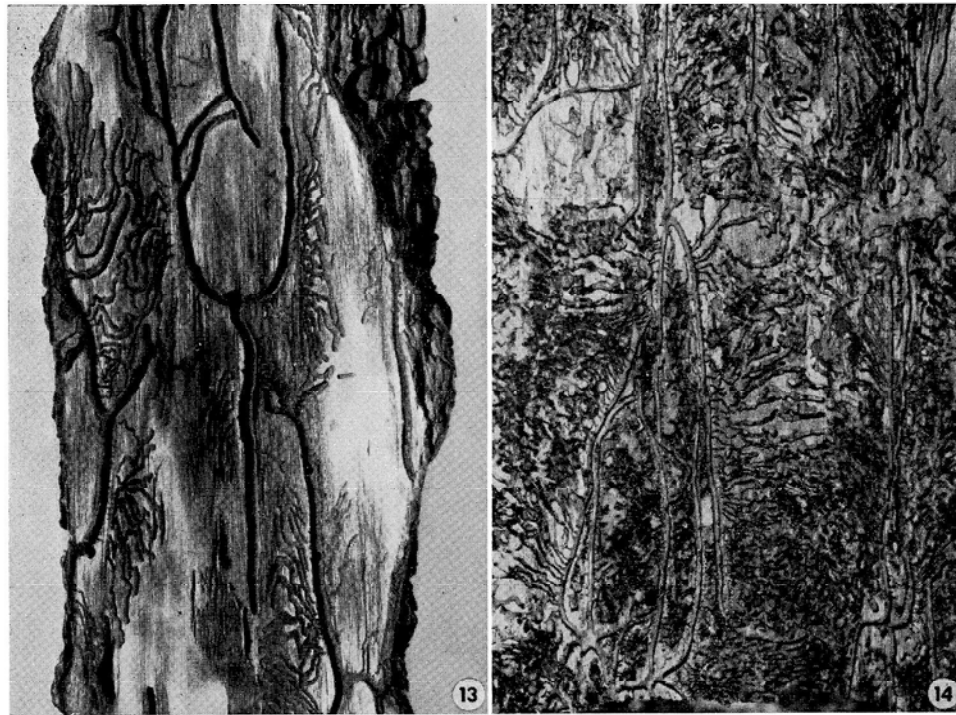
Elytra are slightly more than 1.5 times longer than wide, having striae punctures about 0.04 mm. in diameter; the first interspace is uniseriately granulate-punctate, the granules becoming a little larger and more pointed near the declivity; other interspaces are uniseriately punctate-setose, the punctures becoming more confused and the surface somewhat rugose near the declivity. The first spine is 0.08 mm. long being conical and acute or subacute at the tip; the second spine, 0.1 mm. long, is also conical and acute at the tip but stouter, with a much broader base and separated from the first one by 0.2 mm. (tip to tip); the third spine is the stoutest, 0.2 mm. long and similar in shape to that of *I. grandicollis*; the distance between second and third spines is only slightly greater than the distance between the first and second; the fourth spine is nearly as long as the second but is more cylindrical, less acutely pointed; the fifth spine is similar to the fourth but stouter. The declivity is densely punctate, the punctures being slightly smaller than those of the striae.

The male differs from the female by having coarser declivital spines (Fig. 5) and a large median granule or tubercle below the fovea on the frons (Fig. 9). Setae on the upper part of the frons and anterior margin of the pronotum are sparser than in the female.

I. confusus occurs in western United States and southward to central Mexico (Fig. 15). There are two specimens labelled "Type 1025" in the Leconte



Figs. 8-12. Heads (front) of *Ips* species in Group IX (males). 8, *I. grandicollis* (Eichh.); 9, *I. confusus* (Lec.); 10, *I. montanus* (Eichh.); 11, *I. cribricollis* (Eichh.); 12, *I. lecontei* Sw.



Figs. 13-14. Egg and larval galleries of *Ips* Group IX. 13, *I. confusus* (Lec.); 14, *I. montanus* (Eichh.). Fig. 13—Oregon State University, Forest Insect Laboratory photograph. Fig. 14—U.S. Forest Service photograph.

Collection at Harvard University. The first one bearing the locality label "Cala." is accepted as the type of *I. confusus* (Swaine 1924). The second one was designated by Swaine as the holotype of *I. lecontei*.

Specimens have been seen from Corvallis, Medford, Grants Pass and Ashland in **Oregon**; Cassia Co. in **Idaho**; Carrville, McCloud, Shasta Springs, Hayfork, Grass Valley, Colfax, Placerville, Coleville, Anderson Val., Angels Camp, Feather R., Middletown, Battersons (Madera Co.), Miami R. S. (Madera Co.), Middle Fork Kaweah R., Palo Alto, Badger Pass, Pine Crest, Summerdale, Grassy Lake, Chiquita Basin, Los Olivos, Arrowhead Lake, Self R. S. (Glenn Co.), Cabinero Cr., North Fork, Nevada City, Idyllwild, Descanso and Joshua Nat. Monument in **California**; Mesa Verde Nat. Pk. and Grand Junction in **Colorado**; Dixie N. F. in **Utah**; Flagstaff, Window Rock, Grand Canyon, Coconino N. F. and Chiricahua Mts. in **Arizona**; Grant, Capulin Nat. Mon., Los Alamos, Corona and Datil Mts. in **New Mexico**; Davis Mts. in **Texas**; Mesa del Huracan in **Chihuahua**; Sierra La Marta Rayones in **Nuevo Leon**; Zimapan in **Hidalgo**; Temascaltepec in the **State of Mexico**; more than 200 specimens were seen.

Hosts recorded are *Pinus attenuata* Lemm., *P. monophylla* Torr., *P. ponderosa* Dougl., *P. edulis* Engelm., *P. contorta* Dougl., *P. coulteri* D. Don., *P. cembroides* Zucc. and *Abies grandis* Lindl.; the last may be a mistake in host record. Egg galleries of *I. confusus* are the typical tuning fork pattern (Fig. 13) or sometimes with four or five arms. They are excavated mainly in the bark, scoring the sapwood lightly and may be 6-10 inches long (Chamberlin 1958).

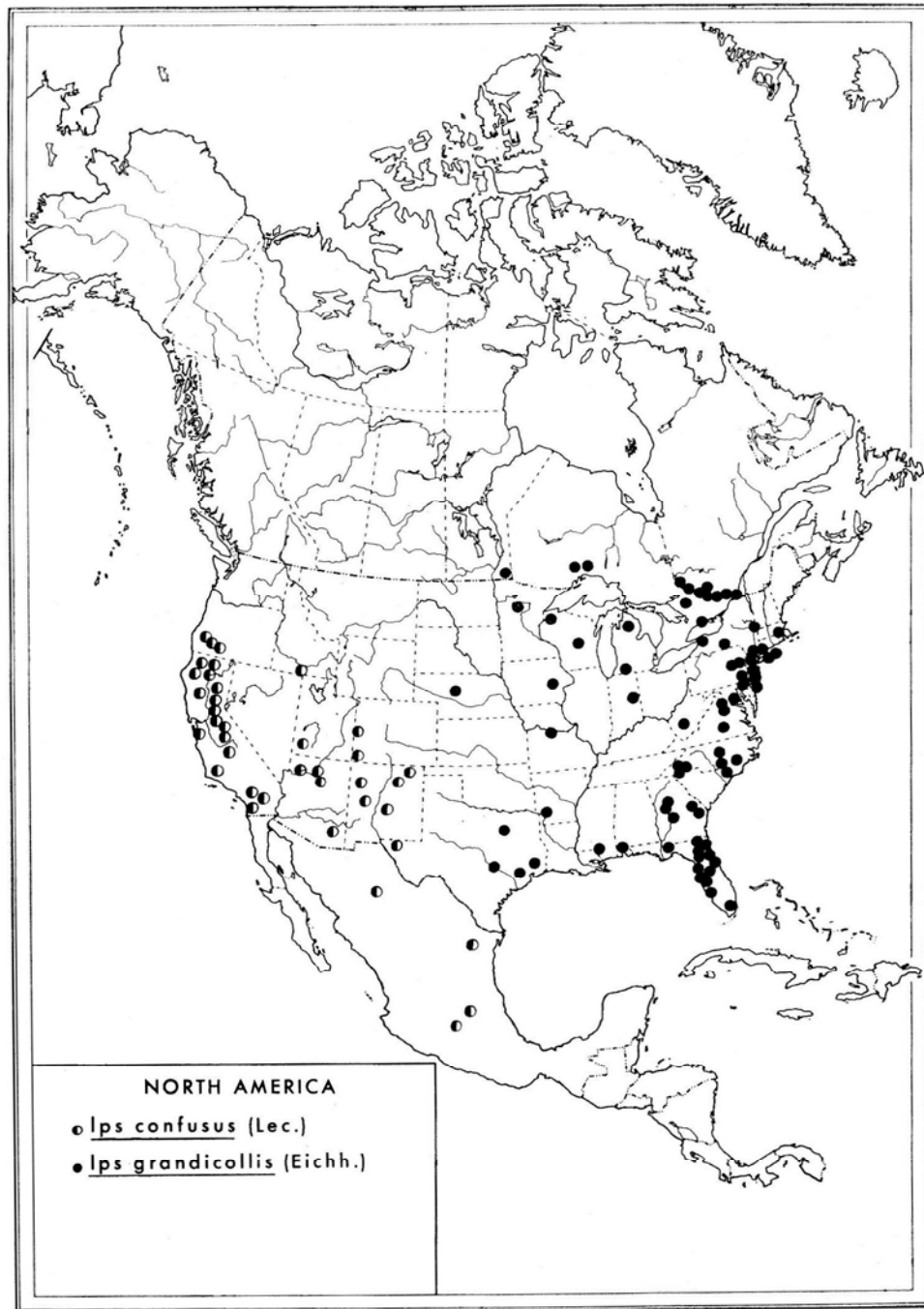


Fig. 15. Distribution of *Ips* species in Group IX—*I. grandicollis* (Eichh.) and *I. confusus* (Lec.).

Ips montanus (Eichhoff)

Tomicus montanus Eichhoff, 1880, Die Europäischen Borkenkäfer: 219.

Ips montanus, Swaine, 1918, *Bull. Canad. Dep. Agric.* 14(2): 113; Chamberlin, 1939, Bark and Timber Beetles of N. A.: 431; Wood, 1957, *Canad. Ent.* 89: 398; Chamberlin, 1958, Scolytoidea of the Northwest: 163, 167; Hopping, 1963, *Canad. Ent.* 95: 514.

Ips vancouveri Swaine, 1916, *Canad. Ent.* 48: 188; Wood, 1957, *Canad. Ent.* 89: 398; Chamberlin, 1958, Scolytoidea of the Northwest: 167.

I. montanus is 4.7–5.5 mm. long and 1.8–2.1 mm. wide (Fig. 2); adults are black when fully pigmented with dark brown legs and antennae.

Females have the front of the head evenly arcuate, the frons densely and coarsely granulate and the median fovea proportionately smaller than in *I. confusus* or *obsoletus* (Fig. 10).

The pronotum is nearly 1.2 times longer than wide, similar to *I. confusus* but having the obtuse angles at the apical fifth less evident; punctures on the caudal portion are coarser and denser than in *I. confusus*, the diameter of a puncture being about 0.04 mm. in diameter.

Elytra are nearly 1.6 times longer than wide with moderately impressed striae and closely spaced stria punctures, the diameter of a puncture being about 0.05 mm. The first interspace is granulate-setose, the granules becoming acutely pointed denticles near the declivity; other interspaces are punctate-setose on the disc with punctures about half the size and half as numerous as stria punctures, becoming more granulate-punctate and confused near the declivital spines; interspaces towards the lateral margins have punctures nearly as numerous as stria punctures. Declivital spines are similar to those of *I. confusus* but coarser. The declivity is densely punctate, the punctures being considerably smaller than those of the striae. The elevated sutural margins on the declivity are finely granulate with numerous long setae which are also numerous over most of the declivity. Ventral punctation of *I. montanus* is somewhat finer than in other species of the group.

I. montanus occurs from Vancouver Island across southern British Columbia to Idaho and Montana and south to California (Fig. 16). The type series was destroyed in the second world war but there is one specimen in the Canadian National Collection labelled "*Ips montanus* metatype Eichh. verglichen Eggers det., Cisco, July, '69." According to Wood (1957) specimens in Eichhoff's type series were labelled either "Cal." or "Cisco" and the above specimen is probably from the type series. Wood (1957) also stated: "Eggers (1933, *Ent. Machr.* Bl. 7: 20) suggested that "Cisco" might refer to a town in Texas or to San Francisco, California. Since the species does not occur in Texas, or in California anywhere near San Francisco, at least those specimens labelled "Cisco" were probably taken at Cisco, British Columbia, the only locality known as Cisco within the distribution of the species." Wood apparently overlooked Cisco in Tahoe National Forest, California, where the usual host *Pinus monticola* Dougl. occurs. This is probably the exact type locality.

Specimens were seen from Courtenay, Sidmouth, Quathiaski Cove, Campbell River, Kaslo, Nacillawaet Cr., Trinity Valley and Slocan Lake in **British Columbia**; Mt. Rainier and Metaline Falls in **Washington**; Prospect in **Oregon**; Grassy Lake (Lassen Co.), Badger Flats, Cisco, Fallen Leaf Lake, Yosemite Nat. Pk. and Avalanche Mdw. in **California**; Kootenai Forest in **Montana**; Priest L., Sand Point, Collins, Kootenai, Pierce, Lakeview, Pend Oreille N. F., Coeur d'Alene, Clearwater Nat'l. For. and Kaniksus N. F. in **Idaho**; 325 specimens were seen.

The only known host is *Pinus monticola* Dougl. The gallery pattern is shown in Fig. 14.

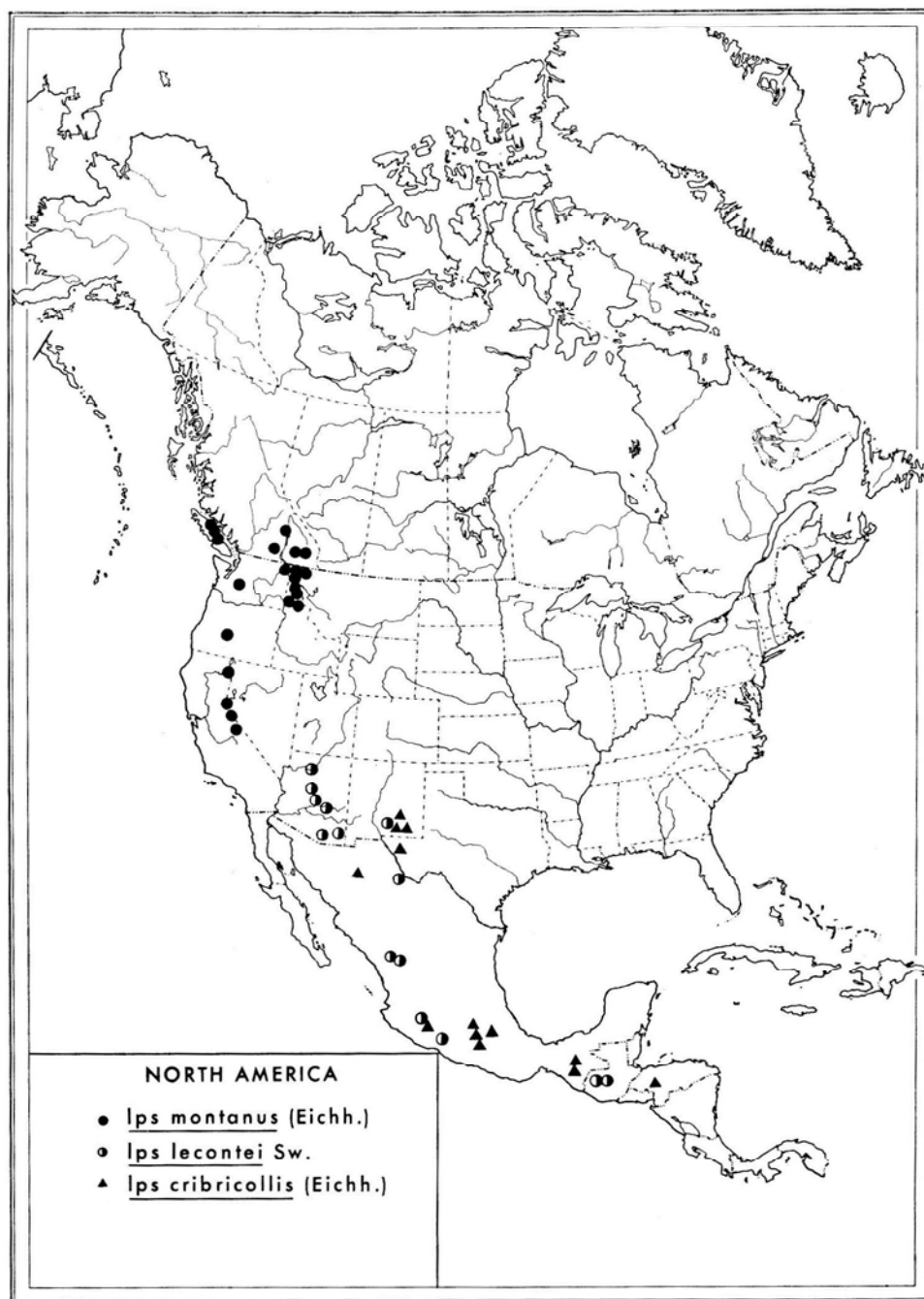


Fig. 16. Distribution of *Ips* species in Group IX—*I. montanus* (Eichh.), *I. cribricollis* (Eichh.) and *I. lecontei* Sw.

Schedl (1955) pointed out that *I. montanus* and *I. vancouveri* were identical but he considered both to be synonyms of *I. confusus*. Wood (1957) correctly recognized *I. montanus* as a good species and placed *I. vancouveri* as a synonym.

***Ips cribricollis* (Eichhoff)**

Tomicus cribricollis Eichhoff, 1868, *Berl. ent. Z.*: 273.

Ips cribricollis, Hagedorn, 1910, *Coleopterorum Catalogus*, Pars. 4: 52; Schedl, 1955, *Z. angew. Ent.* 38: 33, 41; Wood, 1957, *Canad. Ent.* 89: 397; Schedl, 1960, *Col. Bull.* 14: 8; Hopping, 1963, *Canad. Ent.* 95: 514.

Ips cloudercrofti Swaine, 1925, *Canad. Ent.* 56: 49.

I. cribricollis is 3.1–3.9 mm. long and 1.0–1.5 mm. wide (Fig. 4); adults are dark brown to black and superficially resemble *I. grandicollis*.

Females have the head moderately and evenly arcuate, sparsely punctured on the vertex, the punctures being somewhat confluent leaving irregular shining areas between; the frons is moderately densely granulate with shining areas between granulates; the median tubercle is appreciably above the margin of the epistoma which bears a row of small granules.

The pronotum is slightly less than 1.2 times longer than wide having lateral margins slightly and evenly arcuate with faint obtuse angles at the apical fourth and broadly rounded in front. Lunar rugosities on the front portion extend behind the center of the pronotum on the disc and nearly to the postero-lateral angles on the sides. The caudal portion of the pronotum is densely punctate, the diameter of a puncture being about 0.02 mm. and the distance between punctures usually less than this; the median impunctate strip between the summit and the base is narrow and faintly elevated.

Elytra are nearly 1.6 times longer than wide, having moderately impressed striae and stria punctures about 0.03 mm. in diameter; the first interspace is uniseriately granulate-setose throughout the other interspaces are granulate-setose near the declivity; otherwise they are uniseriately punctate-setose, the punctures being about one-third as numerous as stria punctures and irregularly spaced. Punctures on the declivity are nearly as large as stria punctures and separated by about the diameter of a puncture or less. The first declivital spine is 0.05 mm. long and is conical, slightly curved and acute at the tip; the second spine, 0.3 mm. from the first (tip to tip), is about twice the size of the first and is conical with a subacute tip; the tumescent base coalesces with the base of the third spine which is twice the length of the first one, much stouter and with a notch on the ventral side as in all of the five-spined *Ips*; the distance between the second and third spines is only two-thirds the distance between the first and second as in *I. lecontei*; the fourth spine is about the length of the first but more cylindrical, stouter and with a rounded tip; the fifth spine is also about the length of the first but even stouter than the fourth one, having the sides more sloping and with a rounded tip. In common with other five-spined *Ips*, the punctures on the ventral surface are coarser than in most other *Ips* groups, the diameter of a puncture being about 0.02 mm. and the areas between punctures micro-reticulate.

I. cribricollis occurs from New Mexico and western Texas south to Honduras (Fig. 16). The type locality was given as "Mexico" by Eichhoff (1868). The type was destroyed in the second world war and the concept of the species is based on the material in the U.S. National Museum, Canadian National Collection and California Academy of Sciences.

Specimens have been seen from Capitan Mts., Cloudcroft and White Mts. in **New Mexico**; Ft. Davis in **Texas**; El Salto in **Durango**; 7 mi. S. Mazamitla in **Jalisco**; 5 kilos. east of Puebla in **Puebla**; Cuernavaca and San Diego Huixtla in

Morelos; San Cristobel de las Casas and El Guayaquil in **Chiapas**; Villa del Carbon in the **State of Mexico**; Tegucigalpa in **Honduras**; 150 specimens were seen. Schedl (1955) recorded *I. cribricollis* from Omiltene in Guerrero; Jonacatepec in Morelos; border between Distrito Federal and Morelos; road, Mexico-Cuernavaca. Schedl (*op. cit.*) recorded specimens taken by Schwerdtfeger at Guatemala City, Quezaltenango, road Quezaltenango-Huehuetenango, Chichicastenango, Las Trojadas, Finca La Concepcion bei San Juan Sac. and Poptún in Guatemala; bei Zamorano in Honduras.

Hosts are *Pinus ponderosa* Laws., *P. durangensis* and *P. strobiformis* (= *P. flexilis* James). Schedl (*op. cit.*) listed *Pinus hondurensis*, *P. lawsoni*?, *P. montezumae*, *P. oocarpa*, *P. pseudostrobis*, *P. rudis*, *P. tecumani* and *P. tenuifolia*.

Ips lecontei Swaine

Ips lecontei Swaine, 1924, *Canad. Ent.* 56: 70; Chamberlin, 1939, *Bark and Timber Beetles of N. A.*: 411, 419; Wood, 1957, *Canad. Ent.* 89: 398; Schedl, 1960, *Col. Bull.* 14: 8; Hopping, 1963, *Canad. Ent.* 95: 514.

I. lecontei Swaine is 4.0–4.8 mm. long and 1.5–1.8 mm. wide (Fig. 7); adults are black when fully pigmented with brown legs and antennae.

Females have the front of the head slightly convex and the frons coarsely granulate except for a small, median shining fovea; granules above the fovea are coarser and more widely separated than the finer granules between the fovea and the eyes and on the sides below the eyes; the epistomal margin bears a row of small granules fairly uniform in size. The front of the head bears many more long setae than in the male.

The pronotum is slightly more than 1.1 times longer than wide; the lateral margins are slightly convex and faintly convergent from the base towards the apex; the obtuse angles at the apical fourth are a little more pronounced than in the male (Fig. 7), and the front margin is more narrowly rounded. Lunar rugosities are similar to those of *I. cribricollis*. Numerous long setae on the anterior portion of the female pronotum, particularly along the anterior margin distinguish females from males. Corresponding parts on the male have sparser and shorter setae. Punctures on the caudal half of the pronotum are medium coarse, the largest ones being 0.03 mm. in diameter, irregularly spaced and often separated by more than the diameter of a puncture.

Elytra are slightly more than 1.5 times longer than wide, the striae punctures being about 0.05 mm. in diameter. The first interspace is uniseriately granulate-setose, the granules extending down the declivity. Other interspaces are punctate-setose, the punctures on the disc being irregularly spaced, more numerous and becoming confused with striae punctures towards the lateral margins. The declivity is moderately densely but irregularly punctate, the punctures being slightly smaller than those of the striae. The first declivital spine is 0.06 mm. long, conical, recurved and subacute at the tip; the second spine, 0.4 mm. from the first (tip to tip) is twice the length of the first and much stouter with a subacute tip; the third spine, 0.3 mm. or slightly less from the second is nearly 0.2 mm. long and has a notch on the ventral side which is characteristic of the group. The fourth and fifth spines are slightly larger than the first, considerably stouter and rounded at the tip. The ventral punctation is the same as described for other species in Group IX.

The male has a large bifid median tubercle almost on the epistomal margin, flanked on each side and a little below by large granules that form part of the marginal row of granules on the epistoma. Above the bifid tubercle a narrow glabrous strip extends for a short distance up the frons with a large granule on

either side of the strip (Fig. 12). The remainder of the frons is more coarsely granulate than in the female and the declivital spines are coarser. The line of granules that extends down each sutural interspace in the female is obsolete in the male.

I. lecontei is found from Arizona and New Mexico south to Guatemala (Fig. 16). The type, in the Leconte collection at Harvard University, was studied (see under *I. confusus*).

Specimens have been seen from Santa Rita Mts., Catalina Mts., Chiricahua Mts., Pinal Mts., Prescott N. F., Tonto Nat. For., Grand Canyon N. P. and Jerome in **Arizona**; Cloudcroft in **New Mexico**; Ojinaga in **Chihuahua**; El Salto and Durango in **Durango**; Mazamitla in **Jalisco**; S.E. slope of Mt. Colima in **Colima**. The following localities in Guatemala reported by Schedl (1955) for *I. confusus* actually refer to *I. lecontei* (Schedl 1960): S. Tartin Jilotepeque; road Quezaltenango-Huehuetenango, Rancho Allegre; Finca Concepcion bei San Juan Sac. Two of these Guatemalan specimens loaned by Dr. Schedl were examined; more than 375 specimens of *I. lecontei* have been seen.

The host in Arizona is usually *Pinus ponderosa* Laws. Schedl (1955) gave *P. montezumae* and *P. oocarpa* as hosts in Guatemala. Specimens collected by J. B. Thomas in Durango bear the host label *Pinus durangensis*.

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