



## The species of *Pandeleteius* Schoenherr of coastal Chile and Peru (Coleoptera, Curculionidae)

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### Abstract

The taxonomy and biology of *Pandeleteius variegatus* (Pierce) and *Pandeleteius baccharis* Kuschel living along the arid coast of Peru and Chile is reviewed. Genitalia of both species are illustrated. Another two species recorded from this area are known only from their descriptions.

**Key word:** *Pandeleteius*, taxonomy

### Introduction

While studying *Pandeleteius* species south of the equator, I became interested in two very distinct species of *Pandeleteius* living along the arid coast of northern Chile (*P. baccharis* Kuschel) and Peru (*P. variegatus* Pierce). These species are here studied in greater detail and their genitalia described. An attempt was made to clarify the status of two additional species described by Voss (1954), *P. distinctus* and *P. peruvianus*, from Peruvian localities north of those of *P. baccharis*. However, all specimens of these two species in Voss' collection were destroyed in the Second World War, and the published literature is not sufficiently detailed for accurate identification.

### Collections cited

AMNH	American Museum of Natural History, New York, USA, (L. Herman)
AUEM	Auburn University Entomology Museum, Auburn, Alabama, USA (W. Clark)
CCBM	Collection of Carlos Bordon, Maracay, Venezuela
CMNC	Canadian Museum of Nature, Ottawa, Ontario, Canada (R. Anderson, F. Génier)
CWOB	C. W. O'Brien Collection, 2313 West Calle Balaustre, Green Valley, AZ, USA
HAHC	H. and A. Howden Collection, Ottawa, Ontario, at CMNC
NZAC	New Zealand Arthropod Collection, Auckland (G. Kuschel, R. Leschen)
SEMC	Snow Entomological Museum, University of Kansas, Lawrence, Kansas (J.S. Ashe, deceased; Z. Falin)
USNM	National Museum of Natural History, Washington DC (D. Furth, J. Prena)

***Pandeleiteius variegatus* (Pierce)**

(Figs. 1–12, 20)

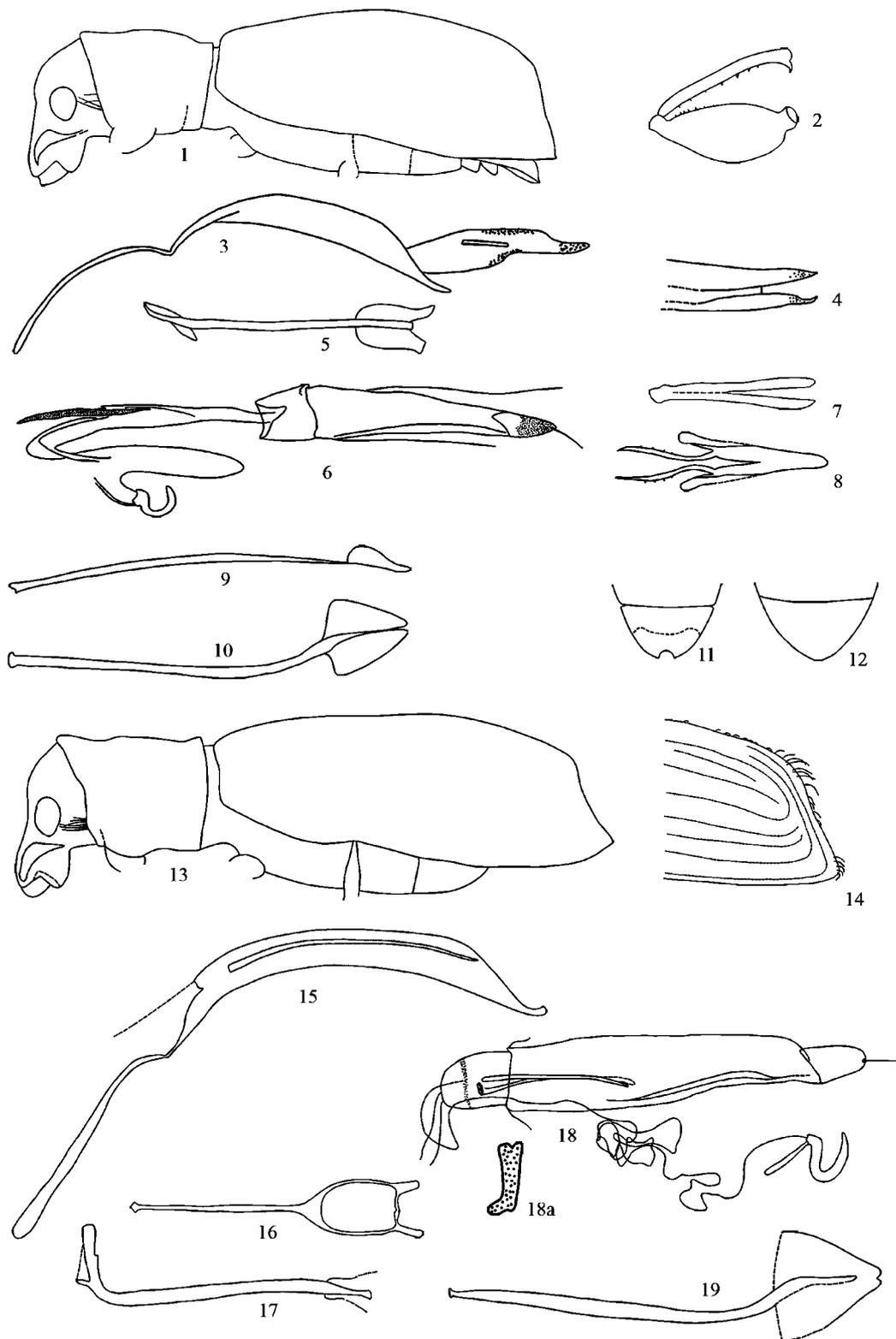
*Menetypus variegatus* Pierce 1915: 11, pl. 2, fig. 2.

*Pandeleiteius variegatus* (Pierce): Emden & Emden 1939: 257, Wibmer & O'Brien 1986: 71.

**Diagnosis.** Apex of epistoma reaching one half or more to interantennal line; posterior margin of epistoma low, sides finely carinate. Elytra in profile almost flat, declivity distinct (Fig. 1). Both sexes with numerous long, fine setae on inner surface of fore coxa, base of fore femur and fore tibia. Fore femur greatly but gradually swollen (Fig. 2); ventral surface usually with nodules. Fore tibia straight, apex usually curved distally. Ventrite 5 basally without or with very few scales, in male narrowly to broadly, deeply emarginate, the emargination convex as if pushed in rather than cut out. Aedeagus not hooked at apex; internal sac complex (Fig. 3). Vagina with complex, heavily sclerotized bursal sclerite (Figs. 6–8) approximately one third as long as contracted ovipositor.

**Redescription.** Length: male 2.3–3.8 mm, female 3.0–4.5 mm; width: male 0.9–1.3 mm, female 1.0–1.7 mm. Color: dorsal pattern ranging from entirely ashy white with irregular tan maculations on elytra to vivid color pattern as follows: head and rostrum light brown with black triangle on occiput and short white supraocular vitta; pronotum dark, medially with indistinct diamond-shape, dorsolaterally with white vitta flanked by narrower admedian vitta; elytra with broad white or tan “V” encompassing most of declivity, “V” bordered anteriorly with black or piceous; intervals 1 and 2 partially white or tan; patterns variously fragmented symmetrically and asymmetrically. Rostrum: epistoma triangular with row of one to three pairs of short, fine setae along sides. Eye prominent, very slightly elliptical in lateral view, separated from convex surface of head by three or four scales. Pronotum: often with small flattened or very slightly concave transverse depression. Scutellum usually glabrous. Elytra: 2.1–2.3 times (male), 2.5–2.8 times (female) longer than prothorax; 1.1–1.3 times wider across humeri than across prothorax, 1.6–1.8 times longer than wide; in dorsal view male with sides straight or slightly divergent, lacking apical umbo, apex broadly rounded, female with sides slightly rounded, apex narrowly rounded. Legs: fore femur as in Fig. 2; inner edge with row of denticles on anterior face, sometimes with additional denticles; denticles sometimes lacking in male. Ventral surface: thoracic sterna and abdominal ventrites 1 and 2 densely squamose, ventrites 3 and 4 with scales sparser, ventrite 5 without or with fewer than 10 normal scales basally; margin in male (Fig. 11) as in Diagnosis, in female explanate, slightly convex apically with pair of shallow basal depressions (Fig. 12). Genitalia of male (n=6) as in Diagnosis (Figs. 3–5): aedeagus with body 0.7–1.0 mm long, apodemes 0.5–0.7 mm long, dorsolateral edges rounded, dorsal surface distally with median portion coriaceous and granulate; internal sac complex, approximately half as long as aedeagus, containing short, slender, lightly sclerotized tube between pair of elongate pieces; tegmen 0.5–0.7 mm long, with pair of long parameres; sternite 9 (Fig. 5) 0.9–1.1 mm long. Genitalia of female (n=8) as in Diagnosis (Figs. 6–8); ventral baculus 0.7 mm long; vagina proximally with complex, very heavily sclerotized bursal sclerite (Figs. 7–8) in form of a stout rod 0.4–0.5 mm long, forked distally; each fork dorsally with slender, curved rod 0.3–0.4 mm long bearing four minute knobs on outer edge; proximal end of bursal sclerite appearing to be free but closely encased in tissue for at least half its length, end irregularly shaped; spermathecal duct 1.5–1.6 mm long, situated ventrally of bursal sclerite; sternite 8 (Figs. 9–10) 1.2–1.5 mm long, apodeme abruptly curved in older specimens.

**Material.** Holotype, male (not examined): “Ex. cotton squares” (hand printed in ink); “Dept. Piura/Peru” (mechanically printed); “CHT TOWNSEND coll” (mechanically printed); “No. 22009” (hand printed in ink). “Holotype/18449/U.S.N.M.” (on red paper) (USNM). Paratypes: 3 males, 1 female with labels identical to those of holotype. Other specimens: 47 males, 38 females. PERU. Cajamarca: nr. Celendín, Llangua, Zonanga. Huánuco: Huánuco. Lima: Chorrillos, Chosica, Cocachacra, Lima, Rimac Valley. Piura: Piura. Department unknown: Huascaray, Santa Ana. (AMNH, AUEM, CCBM, CMNC, CWOB, HAHC, SEMC, USNM).



**FIGURES 1–19.** Structural details of *Pandeteleius variegatus* Pierce and *Pandeteleius baccharis* Kuschel. 1–12, *P. variegatus*; 13–19, *P. baccharis*. 1, female paratype (allotype), lateral view; 2, male, fore femur and tibia; 3, aedeagus with internal sac everted, lateral view; 4, internal sac everted, dorsal view; 5, male, sternite 9; 6, female, genitalia, lateral view; 7, bursal sclerite, dorsal view; 8, bursal sclerite, ventral view; 9, female, sternite 8, lateral view (Huánuco); 10, female, sternite 8, lateral view (Cocachacra), enlarged diagram; 11, male, ventrite 5; 12, female, ventrite 5; 13, female, lateral view; 14, male, apex of elytra; 15, male, genitalia; 16, male, tegmen; 17, male, sternite 9; 18, a, female, genitalia (b, enlargement of sclerite); 19, female, sternite 8.

**Distribution.** Western Peru from the Departments of Cajamarca south to Lima (fig. 20), from near sea level to 2000 m elevation in dry scrub.

**Biology.** *Pandeleiteius variegatus* specimens have been reported from an irrigation ditch and a streamlet at 2000 m (CMNC, SEMC), dry scrub at 2000 m (AUEM), a suburban vacant field at 100 m (CWOB) and on “alcalifa” - an ornamental plant (USNM). Both C.H.T. Townsend, the collector of the type series, and Pierce thought that *P. variegatus* might breed in some part of the cotton plant. This has not been established, to my knowledge, although cotton has been domesticated in this area of Peru since 6000 B.P.! (Balter, 2007; 1833.).

**Remarks.** The species was described from a series of specimens, not just the holotype. A female is illustrated on an unnumbered insert between pages 8 and 9 entitled “Weevils Reared from Cotton in Peru” (Pierce, Plate II, Fig. 2). There is no mention of *P. variegatus* actually having been reared from cotton. This same female paratype bears the label “Drawn by Bradford”, and on it there is a dried regurgitate across the apex of the rostrum, which explains why it appears so vague in his illustration.

Pierce named this species aptly; the color pattern of the dorsum is usually variegated and most other characters are variable. The complex structures of the male and female genitalia are the most constant and reliable characters for distinguishing the species. A series of two males and a female from Santa Ana differ in several characters: all scales of the rostrum apicad of the interantennal line are green, many are shiny and metallic, the scales of the sides of the rostrum are mostly green and there are few or no denticles on the fore femur. -However, the bursal sclerite complex is like that in the other specimens.

### *Pandeleiteius baccharis* Kuschel

(Figs. 13–19, 20)

*Pandeleiteius baccharis* Kuschel 1949: 16, Fig. 2b, c; pl. 1, fig. 6.

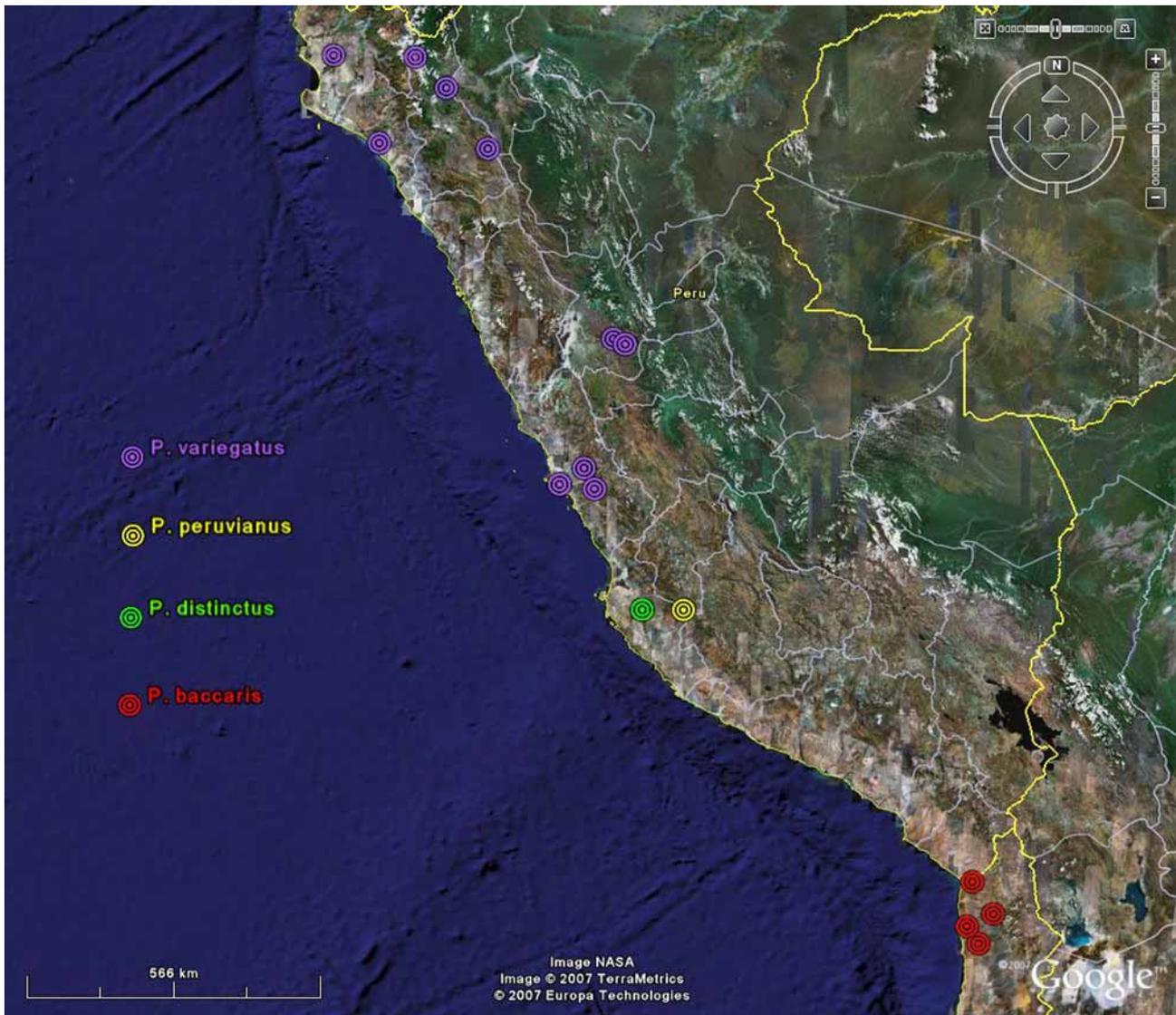
**Diagnosis.** Epistoma with sides not carinate. Rostrum as wide as long, distinctly narrower than frons. Prothorax almost parallel-sided, cylindrical, with slight transverse depressions. Scutellum squamose. Elytra with declivity in male in profile varying from oblique to slightly concave (Fig. 14), in female concave, apex extending conspicuously (Fig. 13); sutural interval at summit of declivity with elongate, decumbent or arcuate setae. Ventrite 5 in male with only two to nine scales; in female scales usually absent. Aedeagus with internal sac consisting in part of slender sclerotized tube almost as long as aedeagus, often visible through aedeagus. Vagina with two pairs of proximal blades, at least the ventral pair of blades attached to very small sclerite. Spermathecal duct longer than beetle.

**Redescription.** Length: male 3.6–4.3 mm, female 4.0–5.0 mm; width: male 1.4–1.7 mm, female 1.6–2.0 mm. Eye moderately prominent. Fore femur on inner edge unmodified or with minute nodules; in male 1.5–2.0 times wider than hind femur, in female 1.3–1.8 times wider. Ventrite 5 with apex in male broadly truncate or slightly emarginate, in female rounded with explanate evanescent margin. Genitalia of male (dissected, n = 1; partly extruded, n = 4) (Fig. 15): aedeagus with body 1.4 mm long, apodemes 0.9 mm long; dorsally with basal half smooth, apical half with narrow median strip forming a flexible closure over opening, integument transparent either side of strip; internal sac (as seen through aedeagus) a sclerotized, slender tube as long as aedeagus; tegmen (Fig. 16) 0.9 mm long; sternite 9 (Fig. 17) 1.1 mm long. Genitalia of female (n = 4) (Fig. 18): ventral baculus 0.9–1.0 mm long; vagina with two pairs of proximal blades 0.5–0.7 mm long, the ventral pair attached to very small sclerite (Fig. 18a, enlargement); spermathecal duct extremely long, more than 5.0 mm in the only specimen disentangled from its surrounding tissue; sternite 8 (Fig. 19) 1.6 mm long.

**Material.** Holotype, female (not examined): “CHILE-Tarapacá/ Arica (ciudad)/13.2.48/Kuschel leg.” (hand written). “HOLOTYPE (printed)/ *Pandeleiteius baccharis* Kuschel” (hand written) (Museo Nacional de Historia Natural, Santiago de Chile). Paratypes: 3 males, 5 females. Other specimens (20): CHILE. Tarapacá,

Arica, Camarones, 29.11.46, Coll. Kuschel (HAHC, NZAC); 2 males, 1 female, Cuya, 19.2.48 (NZAC, USNM); 5 males, 3 females, Cuya, 13.2.48, Coll. Kuschel (HAHC, NZAC); 2 males, 1 female, Ciudad Cuya, 10.2.48, Coll. Kuschel (HAHC, NZAC); 1 male, Huancarane, 30.11.48, Kuschel leg. (NZAC); 1 male, 2 females, Lluta, Rosario, 10.2.48, Coll. Kuschel (NZAC); Pisagua: 1 male, 1 female, Tana, 900 m, 11.3.48, Coll. Kuschel (NZAC).

**Distribution.** Known only from the type series from extreme NW Chile.



**FIGURE 20.** Map of southern Peru and northern Chile showing known distribution of *Pandeleteius* species. *P. variegatus* (Pierce), purple; *P. peruvianus* Voss, yellow; *P. distinctus* (Voss), green; *P. baccharis* Kuschel, red.

**Biology.** The author and collector of the type series of *Pandeleteius baccharis*, G. Kuschel, reports (in litt.) that “..the area is the driest on earth, receiving less than one millimeter annually of precipitation. It starts largely as a 1000 m high plateau right from the sea, dissected by narrow valleys or deep gullies. The plateau is too dry even for lichens, but the valleys and gullies have groundwater which is replenished with seepages and rivulets running down from the altiplano or puna originating from summer storms and downpours from December to March. The xerophytic vegetation consists mainly of Asteraceae, Chenopodiaceae and Solanaceae, and the *Pandeleteius* species seems to be rather closely associated with *Baccharis* species, although a few specimens were obtained by sweeping *Tessaria absinthioides*, a nasty sticky riverbed plant of the same family, Asteraceae, as *Baccharis*.”

**Remarks.** Compared with the *Pandeleiteius* specimens I have seen, *P. baccharis* is easily recognized by its vestiture and habitus. However, in 1954 Voss described *Pandeleiteius distinctus* and *Pandeleiteius peruvianus* from adjacent SW Peru, which may be conspecific with *P. baccharis*. The type material of these two Voss species was destroyed in WW II, and I have seen no specimens of *Pandeleiteius* from this part of Peru (see following discussion of *P. distinctus* and *P. peruvianus*).

***Pandeleiteius distinctus* (Voss)**

(Fig. 20)

*Hadromeropsis (Pandeleiteinus) distinctus* Voss 1954: 232.

*Pandeleiteius distinctus* (Voss): Howden 1982: 2.

**Diagnosis** (based on Voss's description and his interpretation of *Hadromeropsis* and *Pandeleiteinus*). Length 3.5 mm. Scales of dorsal surface predominantly brown, thorax with two narrow gray vittae, elytral suture and sides of elytra gray, gray areas blending in with the brown and forming an indistinct oblique band on the apex of the elytra. Setae very short, curved. Frons twice as wide as length of eyes and as wide as rostrum, eyes moderately strongly convex. Antennal club twice as long as wide, spindle-shaped. Thorax as long as wide, sides rather strongly and symmetrically rounded, slightly wider anteriorly; basal and apical constrictions of equal width; disc between scales interspersed with shiny wrinkles. Elytra in dorsal outline with sides parallel, straight to apical third, here strongly rounded to the narrowed apex, the latter short, attenuated, beak-like; striae punctures fine, intervals wide and flat. Fore coxae "continuous" (see remarks). Fore femur very enlarged, fore tibia straight, only apex very feebly bent inwards and inner edge tuberculate-dentate; segments 1 and 2 of fore tarsus equal in length, each somewhat longer than wide, robust.

**Remarks.** Voss (1954:232) considered *Pandeleiteius distinctus* to belong to the former subgenus *Pandeleiteinus* Champion (1911) on the grounds that its fore coxae were contiguous, as in *Pandeleiteinus submetallicus* Schaeffer. In fact, *Pandeleiteinus submetallicus* and all subsequently described species of *Pandeleiteius* have separate fore coxae, although they may appear to be contiguous if the coxae obscure the area.

*Pandeleiteius distinctus* was evidently described from a single specimen (single measurement, single locality), probably a male (fore coxae "contiguous", fore femur "very enlarged"). This type was "destroyed in the war" with the Voss collection (Voss, in litt., 22 May 1963; Weidner 1976:129), the label data are "Südperu: Ica (21.3.1936, Hamb. Südperu-Expedition)".

The description of *P. distinctus* differs from that of *P. peruvianus* (see below) in: 1) sides of prothorax rather strongly and symmetrically rounded, 2) prothorax with "shiny wrinkles" interspersed between the scales, 3) fore coxae "contiguous" as in *Pandeleiteius griseus* Voss, 4) apex of elytra rounded, shortly beak-shaped as in *P. griseus*, 5) fore femur greatly enlarged. All of these descriptors are too imprecise to be useful for comparative purposes, with the possible exception of the surface of the prothorax. The descriptor "shiny wrinkles" may relate to an abraded specimen, although there is a color pattern given for the prothorax.

Voss compared *P. distinctus* with *P. griseus* on characters common to many species: straight fore tibia, different shape of the thorax and scales as well as flatter eyes. *Pandeleiteius griseus* has a wide range east of the Andes. Voss also associated *P. distinctus* with the Costa Rican *P. (Exmenetypus) hieroglyphicus* Champion on the insubstantial grounds of elytral markings and form of the prothorax, acknowledging that *P. distinctus* does not have the primary subgeneric character of *Exmenetypus*: the abruptly raised apex of the rostrum.

Assuming that the type of *P. distinctus* was in fact a male, there is still insufficient evidence to establish its identity as either a distinct species or as a synonym of *P. baccharis* or *P. peruvianus*.

## *Pandeleiteius peruvianus* Voss

(Fig. 20)

*Pandeleiteius peruvianus* Voss 1954: 230.

**Diagnosis** (based on Voss's description). Length 3.5–4.7 mm. Scales predominantly gray, head and thorax medially with wide brown vitta, elytra beside suture with brown spots, apical third with narrow, C-shaped oblique band; brown color in part somewhat "copperglazed". Setae very short, curved. Frons twice as wide as length of eyes, eyes slightly convex. Antennal club twice as long as wide, as long as segments 2 to 7 of funicle. Thorax almost as long as wide, greatest width anteriorly of middle, sides moderately strongly rounded; basal and apical constrictions cylindrical, of equal width; disc finely and not densely punctured among the scales. Elytral declivity in one sex in profile slightly concave and apex more attenuate; sutural interval at summit of declivity with setae longer, scales paler; intervals much wider than striae. Fore femur much more enlarged than the others, easily half as enlarged as width of thorax. Tibiae straight, fore tibia slightly curved inwards at apex and drawn out in a spine, inner edge sharply dentate.

**Remarks.** Voss compared *P. peruvianus* with *P. variegatus*, the only *Pandeleiteius* species known from coastal Peru at that time, but apparently did not see a specimen of *P. variegatus* ("...*P. variegatus* MIGHT possess an even wider head., ...the peculiar curved elytral apices in one sex MAY be missing in this species...", Voss 1954: 231). Because his knowledge of *P. variegatus* was limited to the illustration and description, his comment on its wider head is understandable (see *P. variegatus*).

The characteristics of *P. peruvianus* that suggest that its description may apply to *baccharis* are: 1) elytral declivity slightly concave, apex more attenuate "in one sex", 2) the longer setae on the sutural interval at the summit of the declivity with longer setae and paler scales IN BOTH SEXES, and 3) the brown color in part somewhat "copperglazed". Descriptors that do not seem to apply to *P. baccharis* are: 1) thorax with sides moderately strongly rounded, and 2) fore tibia drawn out in a spine.

Because of the Second World War, the publication of Voss's (1954) work on the Curculionidae of Peru was delayed for years after it was written and after the types were destroyed. Thus, *P. baccharis* Kuschel was published earlier and its name has priority over *peruvianus* and *distinctus*, whether or not these are synonymous with *baccharis*. Specimens of *Pandeleiteius* from southwestern Peru are needed to determine the status of *P. peruvianus*. The type series was also "destroyed in the war" (Voss, in litt., 22 May 1963; Weidner 1976:129); the label dates are "Südperu: Hac.[Hacienda?] (28.3.1936, Hamb. Südperu-Expedition)"; Viscas-Tal, "in 1000 Höhe (5.4.1936, Hamb. Südperu-Expedition)".

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