A new Species of Neotropical Passalidae[1])

(Coleoptera, Lamellicornia)

By **Pedro Reyes-Castillo**

Departamento de Zoología
Escuela Nacional de Ciencias Biológicas, I. P. N.
México 17, D. F.

In 1871, Johann J. Kaup established the genus *Spurius* for *Passalus bicornis* Truqui, 1857. Nowadays, *Spurius* Kaup includes, besides the formentioned species, that Gravely (1918: 26) assigned as type of the genus, two other species: *S. conradi* Rosmini, 1902 and *S. dichotomus* Zang, 1905.

Since Kaup, the genus *Spurius* has not been changed in its composition or limits. Following Gravely's (1918) classification scheme, it is included in the subfamily Pseudacanthinae, together with the genera *Oileoides* Gravely, *Oileus* Kaup, *Undulifer* Kaup, *Popilius* Kaup, *Pseudacanthus* Kaup and *Proculejus* Kaup. The main characters distinguishing *Spurius* from these genera are: Clypeus long, with sharp anterior edge; lack of frontal ridges and inner tubercles; pubescent frontal fosae; middle part of frons with lateral teeth, generally joined by a transversal ridge.

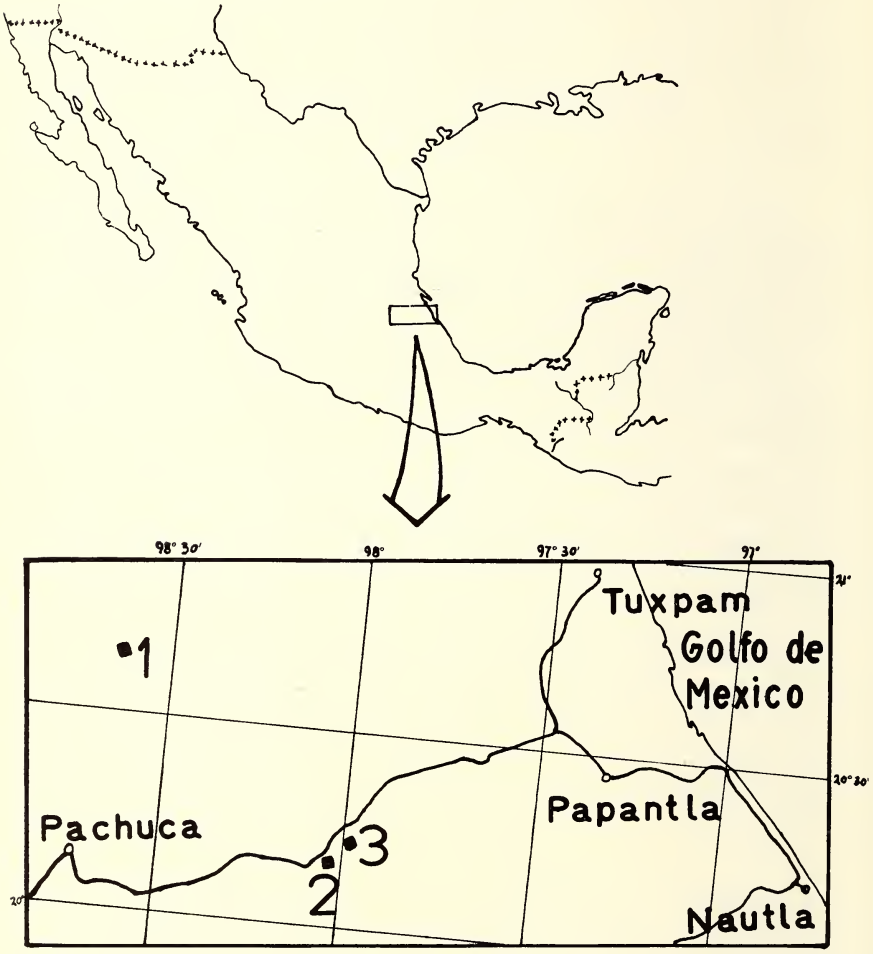
The geographic distribution of *Spurius* follows the pattern of Neotropical distribution (after Halffter's (1966) criterion) from the Mexican Transition Zone, with penetration at the specific level, to the north of South America. *S. bicornis* is found in the cloud forest and tropical mountain forest of Mexico, Guatemala and Belice, its northern limit being at Villa Juarez, State of Puebla, on the eastern slope of the Sierra Madre Oriental.

S. dichotomus was described by Zang (1905) from Central America; Gravely (1918: 26) limits its distribution to Guatemala. We have seen a specimen from the California Academy of Sciences Collection with a San Cristobal, Chiapas label; we assume it is from San Cristobal Las Casas, a locality on the Chiapas' plateau at an altitude of 2,100 m, surrounded by pine and

[1]) We are grateful to Biol. Daniel Lluch for the translation of the present manuscript.

oak temperate mountain forest. Finally, *S. conradi* is known from Gualaquiza, on the southern Ecuador (Rosmini, 1902).

In this paper, we describe a new species, collected from the beech temperate forest and cloud forest of the eastern slope of the Sierra Madre Oriental (map 1).



Map 1. Distribution area of *Spurius halffteri* and its location in the Republic of Mexico. 1. Zacualtipan, 2. Huauchinango and 3. Necaxa.

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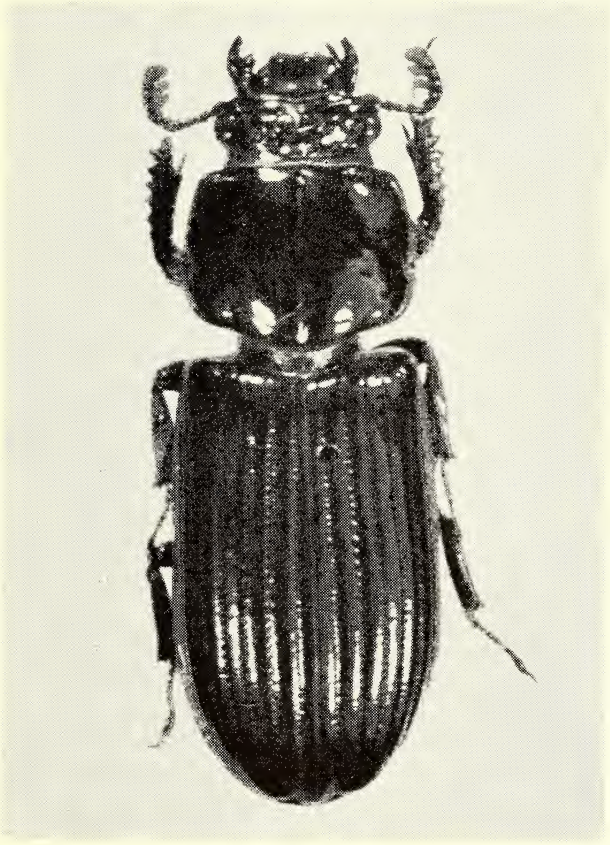
Spurius halffteri sp. nov.

(Figs. 1, 2 and 3; photo 1 and map 1)

Description of female holotype. – Small passalid, elongated, with a pronotum of lesser length than the mean length of elytra.



Spurius halffteri nov. sp.

Head (fig. 1). – Labrum with lateral edges slightly divergent; anterior edge emarginate with rounded angles. Clypeus with the anterior edge arched in a concavous shape, central part wider than laterals; anterior angle acute.

Frontoclypeal suture marked, with the shape of an open V. Outer tubercles rounded. Frontal fosae with pubescence limited to the anterior part. Lateral teeth of the median frontal structure[1]) large, higher than the supraocular ridges, subconical, rounded in the apex, oblique with respect to the longitudinal edge of the body, slightly directed anterior-wise; transversal ridge interrupted in the central part, with a small tubercle.

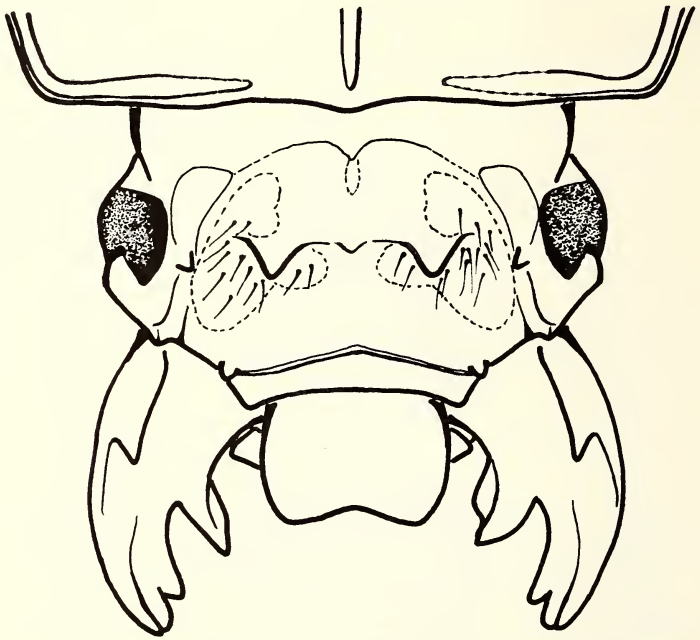


Figure 1. Dorsal view of the head and the anterior part of the pronotum.

Posterior frontal area with small median groove between the frontal median structure and the occipital groove. Supraocular ridges with the anterior tubercle obtuse and the posterior one acute. Occipital groove poorly marked on the sides. Canthus obtuse in its distal part, with a length equal to the longitudinal diameter of the eye. Eye of medium size, its transversal diameter less than one sixth of the cefalic width.

[1]) We denominate „median frontal structure" to what other authors denominate "horn", "central tubercle" or "cefalic tubercle", plus the so-called «lateral ridges or lateral tubercles". In the case of *Spurius* the median frontal structure is formed by two lateral teeth united or not by a transversal ridge.

Ligula plain between the palpi insertion sockets. Anterior edge of the mentum lobes, oblique. Hipostomal process very narrow, parallel to the edge of labium and separated from the labium by a wide gap. Antennal articles eighth and ninth with a width equal to two times their lenght, tenth antennal article very widened in its distal part.

T h o r a x . – Pronotum without protuberance over the anterior angle. The median groove reaches the posterior edge. Marginal groove deep, with puctures, at the anterior margin occupies one third of the pronotal width.

Over the lateral scars scarce punctures, in the scars a small setigerous puncture. Posterior part of the scutellum with setigerous punctures. Lateral depressions of the mesosternum opaque and with long setae on the anterior part. Lateral area of the metasternum narrow and pubescent throughout.

L e g s . – Femur I without anterior marginal groove on the ventral surface. Tibia II with small spine on the external edge; dorsal ridge arched, occupies two thirds of the tibial length, almost uniform height, with dense setae brush. Ventral side of tibia II with longitudinal pubescent groove slightly marked. Tibia III without spine on the external edge; longitudinal groove of the ventral side, obsolete, with a file of setae in the distal half.

E l y t r a. – Vertical anterior part with scarce setae, profile with an open V shape. Humeri and epipleurae hairless.

W i n g s . – Not reduced.

A b d o m e n . – Second to sixth sternites irregularily punctuated on the sides.

D i m e n s i o n s . – Total length 19.5 mm; elytral length 10 mm; pronotal length 4 mm; ocular width 4 mm; pronotal width 5.5 mm; and elytral width 5.5 mm.

D e s c r i p t i o n o f m a l e a l o t y p e . – The description given for the holotype practically corresponds to this specimen, no significant differences have been found. The only character that did not correspond was the longitudinal groove of the frontal posterior part, that is a small scar and does not reach the median frontal structure.

M a l e g e n i t a l i a (fig. 2). – Edeagus poorly sclerotizated in the dorsal part, completely in the ventral part. Length of the median lobe equals two thirds of the total length of the edeagus and longer than the basal piece and the joined paramera. Paramera and basal piece unsclerotizated in the dorsal part. For further details, see figure 2.

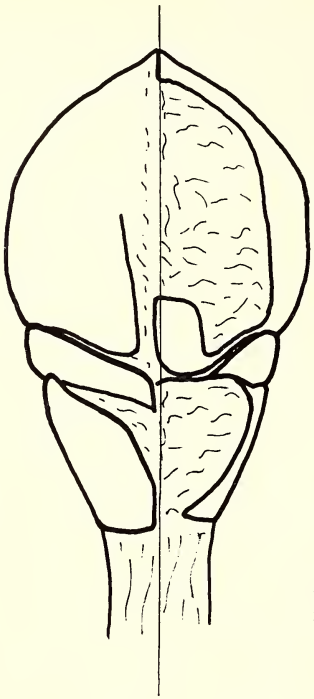


Figure 2. Edeagus. Left half, dorsal view; right half, ventral view.

Dimensions. – Total length 18 mm; elytral length 10 mm; pronotal length 3.5 mm; ocular width 4 mm; pronotal width 5.5 mm and elytral width 5 mm.

Variation .– Paratypes from Zacualtipan, Huachinango and Necaxa whose total length ranges from 17.5 to 19.5 mm and with non-reduced wings (fig. 3-a) show little differences with regard to the holotype and alotype. Characters with a larger variation are: Transversal ridge to the median frontal structure more or less complete and sometimes without the small tubercle; pubescence of the frontal fosae sometimes extending ahead of the median frontal structure; frontal posterior area with a small scar instead of a groove; anterior tubercle of the supraocular ridge acute; scutellum almost hairless in the posterior part; the punctures over the lateral scar of the pronotum may be more or less numerous and the small setigerous puncture in the scar may be lacking; posterior third of the lateral area of metasternum not pubescent; external spine of the tibia II sometimes lacking, although it may be present in tibia III.

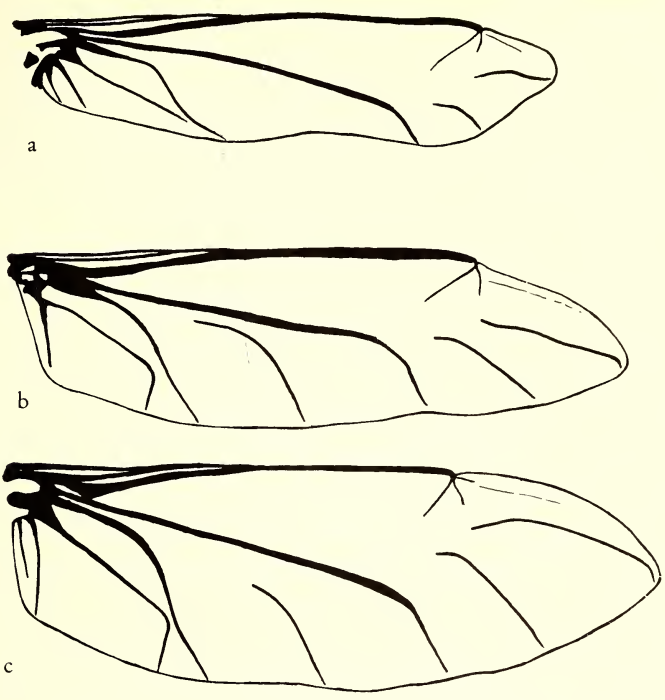


Figure 3. Wings in successive phases of reduction. a maximum reduction; b incipient reduction and c non reduced.

Two males from Huauchinango and two females from Zacualtipan whose total length ranges from 20.5 to 22 mm and that appear stronger than the preceeding specimens, have a greater variation in some characters in the frons and elytra. This variation is due in a greater part to the incipient or almost total reduction of the wing (figs. 3-b and 3-c).

The characters with a greater variation are: Pubescence of the frontal fosae extending densely ahead of the median frontal structure; lateral teeth of the median frontal structure of a lesser height than the supraocular ridges, very reduced in one of these specimens; fronto-clypeal suture arched in a concave shape, not in open V, almost being straight; eye smaller than longitudinal diameter of the canthus; in these specimens, eye reduction reaches the maximum within the species; anterior elytra profile straight, not in open V.

W i n g r e d u c t i o n . – The reduction of wings in *S. halffteri* reaches the maximum in two females from Zacualtipan. In these specimens wing length is equal to elytral length, there is loss of radial, median and one anal veins and shortening of the cubital and rest of anal veins. In two males

from Huauchinango, wing reduction is still incipient, wing length being greater than elytral length, narrowing and shortening of distal and anal parts and, furthermore, one of these specimens shows strong sclerotization of the wing until the flexion point that prevents its extension. This sclerotization of the flexion point was observed in one of the paratypes of the developed wings series.

The gradual and simultaneous reduction of the distal, anal and jugal areas of the wing reduces flying capabilities to an extreme of preventing flight. On the contrary, stridulatory functions of the wings' anterior part is not affected, but favoured by the wing reduction. Alas, this reduction is selectively limited by the stridulatory function and does not reach organ's total atrophy, as happens in some other Coleoptera groups where the wing does not have a stridulatory function, besides that of flying.

The maximum reduced wing, in Passalidae, has the shape of a narrow band, with a somewhat widened distal part and its length is equal to the elytral length; this degree of reduction is not reached by *S. halffteri*, but it has been observed in other genera of the family. The wings' double function, flight and stridulation, is one of the most notable characteristics of the family; American species showing reduction more often, although in some oriental and ethiopic passalids it has also been observed. Wings' reduction is a frequent phenomena in species inhabiting tropical and temperate mountain forests. We consider that reduction is an adaptation to mountain life, where flight has a reduced importance. On the contrary, stridulation has a relevating function as a mean of communication among individuals, maintaining unity of subsocial or subgregarious groups of passalids. In the family, stridulating capacity is observed amongst larvae and adults, living together in funnels within or under bark of decaying logs.

As opposed to the relevating role of the stridulation in the behaviour of the group, flight is of relatively little value; very few species fly, even those that have well-developed wings. This is why the mechanisms of natural selection have favoured, among the Passalidae family, the success of great number of species with reduced wings or in increasing degree of reduction, in none of which stridulation is affected.

In populations studied of *S. halffteri,* from Zacualtipan and Huauchinango, specimens were found with well-developed wings and reduced wings, these in smaller number.

Dimensions of paratypes. – Total length 17.5–22 mm; elytral length 10–12.5 mm; pronotal length 3.5–5 mm; cephalic width 4–4.5 mm; pronotal width 5–7 mm and elytral width 5–6.5 mm.

Material examined. – Mexico: State of Hidalgo: Zacualtipan, 2 ♀♀, 19-VII-1962, C. Bolivar, leg.; ibidem, 2 ♂♂ and 5 ♀♀, 6-IX-1964, P. Reyes C. and H. Romero, leg.; State of Puebla: Huauchinango, 2 ♂♂, 29-VII-1966, P. Reyes C., leg.; Km 185, Carretera México-Tuxpan (Huauchinango) 1 ♀, 20-IV-1963, Zeron H., leg.; ibidem, 1 ♀, A. Saenz, leg.; ibidem, 1 ♀, H. Cardona, leg.; ibidem, 1 ♂ and 1 ♀, S. Lopez, leg.; Necaxa, 1 ♀, 5-V-1968, F. de Lachica, leg.

Holotype and alotype from Zacualtipan, State of Hidalgo, in P. Reyes Collection (Mexico). Paratypes in the following collections: The American Museum of Natural History (New York), California Academy of Sciences (San Francisco), Florida State Collection of Arthropods (Gainesville, Florida), Hungarian Natural History Museum (Budapest), Instituto Nacional de Investigaciones Agricolas (Chapingo, México), Museo de Historia Natural de la Ciudad de México (México, D. F.), Museum G. Frey (Tutzing bei München), Museum National d'Histoire Naturelle (Paris), United States National Museum (Washington) and P. Reyes Collection (México).

Ecological Distribution. – *S. halffteri* is limited to the temperate beech forests and those of cloud forest type of the eastern slope of the Sierra Madre Oriental, from the localities of: Zacualtipan, State of Hidalgo (1800 m high); Necaxa (1400 m high) and Huachinango (1800–2000 m high), all these in the State of Puebla.

Affinities. – Within the genus, *S. halffteri* shows greater affinities with *S. bicornis* than with *S. dichotomus*. The comparted characters between the two first species are: Median frontal structure of very similar shape, frontal fosae pubescent and the median part of the ligula plain between the palpi insertion sockets of the labium. With *S. dichotomus* shares the transversal diameter of the eye less than one sixth of cephalic width and antennal articles eighth and ninth of less width than three times its length.

Characters exclusive of *S. halffteri* are: Trapezoidal clypeus, supraocular ridge with anterior tubercle obtuse and posterior tubercle acute, occipital groove not marked on the sides, hipostomal process narrow and widely separated from the labium, pronotum without protuberance over the anterior angles, lateral depression in the mesosternum pubescent, lateral area in the metasternum pubescent, femur I without anterior marginal groove on the ventral side and tibia II with long dorsal ridge.

Specimens of *S. conradi* were not seen. They are separated from the rest of the species in the genus by the frontoclypeal suture not marked in the

central part, median frontal structure very poorly marked, dense tuff of setae on the humeri and 30 mm total length. This species should be studied in detail as it shows unusual characters within the genus.

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