

Four new species and two subspecies of the genus *Pachyrhynchus* Germar, 1824 (Coleoptera: Curculionidae: Pachyrhynchini) from Luzon Island, Philippines

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Four new species and one new subspecies of the genus *Pachyrhynchus* Germar, 1824 from the Luzon Island are described and illustrated: *P. sagittatus* sp. nov.; *P. tetramaculatus* sp. nov.; *P. kirkclayroni* sp. nov.; *P. disargus* sp. nov.; *P. phaleratus* ssp. *dannylayroni* subsp. nov.; *P. congestus* ssp. *aedamlayroni* subsp. nov..

Key words: Coleoptera, Curculionidae, Pachyrhynchini, *Pachyrhynchus*, Luzon, taxonomy, new species

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INTRODUCTION

The genus *Pachyrhynchus* Germar, 1824 (Entiminae: Pachyrhynchini) currently contains 154 species, with fair part of them described in past few years (Bollino, Sandel & Rukmane 2017; Rukmane 2018; Cabras & Rukmane 2018). Luzon is believed to be the center of the species distribution (Schultze 1924) with majority of the species coming from this Island. During the following study of the genus *Pachyrhynchus*, four new species and two subspecies were found, all included taxon's, on my best knowledge, are distributed on Luzon Island.

MATERIAL AND METHODS

The study was based on specimens deposited at the Daugavpils University Beetle Collection (DUBC).

The laboratory research and measurements have been carried out using Nikon SMZ 745T and NIS – Elements 6D software. The illustrations were made using digital camera Canon EOS 6D with Canon MP-E 65mm macro lens, using stack shot system and Helicon Focus auto montage, subsequently was edited using Photoshop.

Label data are cited *verbatim*. In the text the following symbols and abbreviations were used:

/ = different lines

// = different labels

LB = body length, from apical margin of pronotum to the apex of elytra

LE = elytral length

LP = pronotal length

LR = length of the rostrum

WE = maximum width of the elytra

WP = maximum width of the pronotum

WR = maximum width of the rostrum

Number of specimens examined is written in brackets after citation of the label.

RESULTS

Pachyrhynchus sagittatus sp. nov.

Fig. 1C, 4J-K.

Type material. Holotype. Male. "PHILIPPINES / Luzon, Sierra Madre, Quirino / V. 2015 / local collector leg." (white rectangular label, printed); "HOLOTYPE / Male / *Pachyrhynchus sagittatus* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular label, printed).

Distribution: Luzon Island, Quirino Province.

Description. Dimensions (holotype): LB: 12.1; LE: 7.7; WE: 5.5; LP: 4.1; WP: 4.0; LR: 1.9; WR: 1.8. Integument coppery red, body strongly shiny, underside with weaker luster; body with markings of pale green round to recumbent scales. Dorsal habitus as shown in Fig. 1C.

Rostrum longer than wide (LR/WR 1.06), pubescent, finely punctured, bulging on apical part, with peak slightly before middle, deep triangular impression on basal half, longitudinal groove from midline to base of forehead, shallow transverse groove at base of forehead; forehead with lanceolate patch of scales medially, strongly wrinkled, nearly two times as wide as eye; lateral parts of rostrum covered with round to oval scales and hair-like scales, most intense along genae; few white hairs before antennal scrobes and long light hairs after antennal scrobes, with longer hairs

near apex; antennomeres evenly covered with long light hairs, scape covered with pubescence on basal part and long light hairs on apical part; pedicel 1.5 times as long as first antennomere, longer than wide, antennomeres II-V subspherical, subequal in length. Head glabrous, finely punctured; eyes small, slightly prominent from outline of the head.

Prothorax subspherical, nearly same length as width (LP/WP 1.03), widest just in the middle; weakly punctured; dorsal contour slightly incurved at apical 1/3, gradually increased to middle, rounded, gradually decreased to subbasal part, straightened to base; with the following markings of pale green scales: 1) arrow-shaped patch medially on disc from subbasal part to slightly after midline; 2) two small spots on disc medially, each redirected laterally; 3) subovate shape patch on each latero-ventral part.

Legs stout; coxa with pale green roundish scales and hair-like scales; femur with short light hairs on basal part, pubescent in all length and with round pale green scales on apical part; tarsus with long, rare, golden setae.

Elytra subovate (LE/WE 1.4), intervals slightly pronounced, nearly smooth; each elytron with the following markings: 1) elongated patch at subbasal part along interval III and one along lateral margin; 2) transverse medial stripe from one lateral margin to other, stripe interrupted at interval V and VII forming small round spot; 3) longitudinal line from apical 1/2 to apex along interval III; 4) longitudinal line along lateral margin from apical 1/3 to basal 1/2; widest just in the middle; on dorsal dimension narrow at the base, gradually increased to middle, widest just in the middle, rounded and gradually decreased to apex up to apical 1/2, narrowed more strongly in direction to apex; apex sharpened, with weak pubescence.

Elytra wider than prothorax (WE/WP 1.38), nearly twice as long as prothorax (LE/LP 1.88). Aedeagus as shown in Fig. 4J-K.

Female. Unknown.

Differential analyses. This new species according to its body characteristics and scaly markings on the body is unique enough to be different from any other known species of the genus *Pachyrhynchus* that comes from the Luzon Island. Nevertheless, *P. sagittatus* sp. nov. is similar to newly described *P. kirklayroni* sp. nov., but differs by the following characters: 1) Prothorax of *P. kirklayroni* sp. nov. wider, more strongly rounded, dorsal contour at apical 1/2 without depression; 2) rostrum of *P. kirklayroni* sp. nov. wider, with weaker depression on basal part; 3) elytra of *P. sagittatus* sp. nov. shorter, with unique scaly markings; 4) male aedeagus of different shape.

Etymology. This species was named based on its typical marking on the pronotum – arrow shape spot dorsally on disc. Latin word of the arrow is sagitta.

***Pachyrhynchus tetramaculatus* sp. nov.**

Fig. 1A-B, 4L-M.

Type material. Holotype. Male. "PHILIPPINES / Luzon, Nueva Vizcaya, Quezon / VI. 2018 / local collector leg." (white rectangular label, printed); "HOLOTYPE / *Pachyrhynchus tetramaculatus* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular label, printed).

Female. Paratype. Same label as holotype. "PARATYPE / *Pachyrhynchus tetramaculatus* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular label, printed).

Distribution: Luzon Island, Nueva Vizcaya Province.

Description. Dimensions (holotype): LB: 13.9; LE: 8.8; WE: 5.3; LP: 3.9; WP: 3.7; LR: 2.0; WR: 1.9.

Integument black, strongly shiny, pronotum, head and legs shiny, underside with weaker luster; body with pale orange to yellow round recumbent scales; genae, coxa and femori with pale orange, yellow and shimmering green scales. Dorsal habitus as shown in Fig. 1A-B.

Rostrum slightly wider than long (LR/WR 1.05), slightly pubescent, bulging on apical part, with peak slightly before middle, ovate-triangular impression on basal half, weak longitudinal groove from middle to base of the forehead, two bulges on basal 1/3 and weak transverse impression on base; laterally with patch of round scaled on genae; few pubescence before antennal scrobes and long light hairs after antennal scrobes, with longer hairs near apex; antennomers mingled with long light hairs, scape covered with pubescence on basal part and few light hairs on apical part dorsally; pedicel and first antennomer sub equal in length, longer than wide, antennomers II-V subspherical, sub equal in length. Head glabrous, finely punctured; eyes moderate, weakly prominent from the outline of the head. Forehead flat, more than two times as wide as eye width.

Prothorax sub spherical, longer than wide (LP/WP 1.05), widest at apical 1/2; weakly punctured; with the following markings of pale orange to yellow scales: 1) two roundish patches on disc laterally along apical margin; two ovate patches on basal part of the disc, redirected laterally; ovate patch on each latero-dorsal part; dorsal contour increased from moderate apex to peak at apical 1/2, then firmly rounded and decreased to just after the midline; then decreased strongly, with curve, sub basal margin slightly widened.

Legs stout; coxa patch of orange and shimmering green round scales; femur mingled with sparse pubescence and patch of scales on apical part along internal margin; tibiae incurved apically, covered with pubescence on all length and long light hairs on internal margin, with mucrones on all legs; tarsus with long, golden setae.

Elytra sub ovate (LE/WE 1.66), with weakly pronounced intervals, nearly smooth; each elytron with the following scaly markings: 1) two ovate patches on basal 1/2; 2) four ovate spots on medial part; 3) two sutural patches – one sub medial, one near apex; 4) three ovate patches on apical part 5) triangular apical patch along apex; widest just in the middle; on dorsal dimension narrow at the base, gradually increases to middle, widest just in the middle, then roundish and

gradually decreases to apex up to apical 1/3 where narrows more strongly in direction to apex; apex rounded, with weak pubescence.

Elytra wider than prothorax (WE/WP 1.43), more than twice as long as prothorax (LE/LP 2.26). Genitalia as shown in Fig. 4L-M.

Female. Dimensions: LB: 15.3; LE: 10.3; WE: 7.4; LP: 4.7; WP: 4.3; LR: 2.1; WR: 2.4. Larger than male. Elytra more wide and more strongly rounded, as well as more strongly elongate apically.

Differential analyses. *Pachyrhynchus tetramaculatus* sp. nov. according to shape of pronotum and elytra belong to *P. pinorum* Pascoe species group, with such species as *P. loheri* Schultze, *P. barsevskisi* Rukmane, 2016 etc. The new species differs from all species within the group by its pronotum, which is widest at apical 1/2, unique scaly markings on pronotum and elytra and shape of male eadeagus.

Etymology. This species was named after its characteristic markings on the pronotum – four round shape spots on the disc dorsally.

***Pachyrhynchus kirkalayroni* sp. nov.**

Fig. 1D, 4H-I.

Type material. Holotype. Male. "PHILIPPINES / Luzon, Ilocos, Adams / VII. 2019 / local collector leg." (white rectangular card, printed); "HOLOTYPE / *Pachyrhynchus kirkalayroni* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular card, printed).

Distribution: Luzon Island, Ilocos Province.

Description. Dimensions (holotype): LB: 13.7; LE: 8.9; WE: 5.8; LP: 4.5; WP: 4.9; LR: 1.9; WR: 2.0. Integument coppery brown, body strongly shiny except underside with weaker luster; body marked with pale green round to recumbent scales. Dorsal habitus as shown in Fig. 1D.

Rostrum wider than long (LR/WR 1.05), covered with pubescence, bulging on apical part, with peak slightly before middle, moderate subtriangular impression on basal half, two weak bulges on basal 1/2, longitudinal groove from middle of the rostrum to middle of forehead; lateral parts with few round scales on genae and after antennal scape; short light hairs laterally near apex mingled with few long golden hairs; antennomers rather rarely covered with long light hairs, scape covered with pubescence on basal part and few long light hairs on apical part. Head glabrous, finely punctured; eyes small, slightly prominent from the outline of the head. Forehead with weak medial impression, moderately wrinkled, nearly two times as wide as eye width.

Prothorax subspherical, wider than long (LP/WP 1.09), widest just before the middle; weakly punctured; scaly markings same as in *P. sagittatus* sp. nov. (see description part).

Legs thick; coxa with patch of pale green roundish scales and pubescence; femur with short light hairs on basal part and patch of round scales on apical part; hairs or scales.

Elytra subovate (LE/WE 1.53), with weakly pronounced intervals, nearly smooth; each elytron with the following scaly markings: 1) rectangular patch of scales at subbasal part from interval I to lateral margin; 2) thick transverse medial line from one lateral margin to another; 3) narrow longitudinal line at basal part before middle along interval III and one more along interval VII, lines connect rectangular patch and medial line; 4) longitudinal line along lateral margin in all length; 5) subtriangular patch at apical part from apex to apical 1/2 along interval II to lateral margin; widest just in the middle; on dorsal dimension narrow at the base, where gradually increased to middle, widest just in the middle, then rounded and decreased to apex.

Elytra wider than prothorax (WE/WP 1.23), nearly twice as long as prothorax (LE/LP 1.93). Genitalia as shown in Fig. 4H-I.

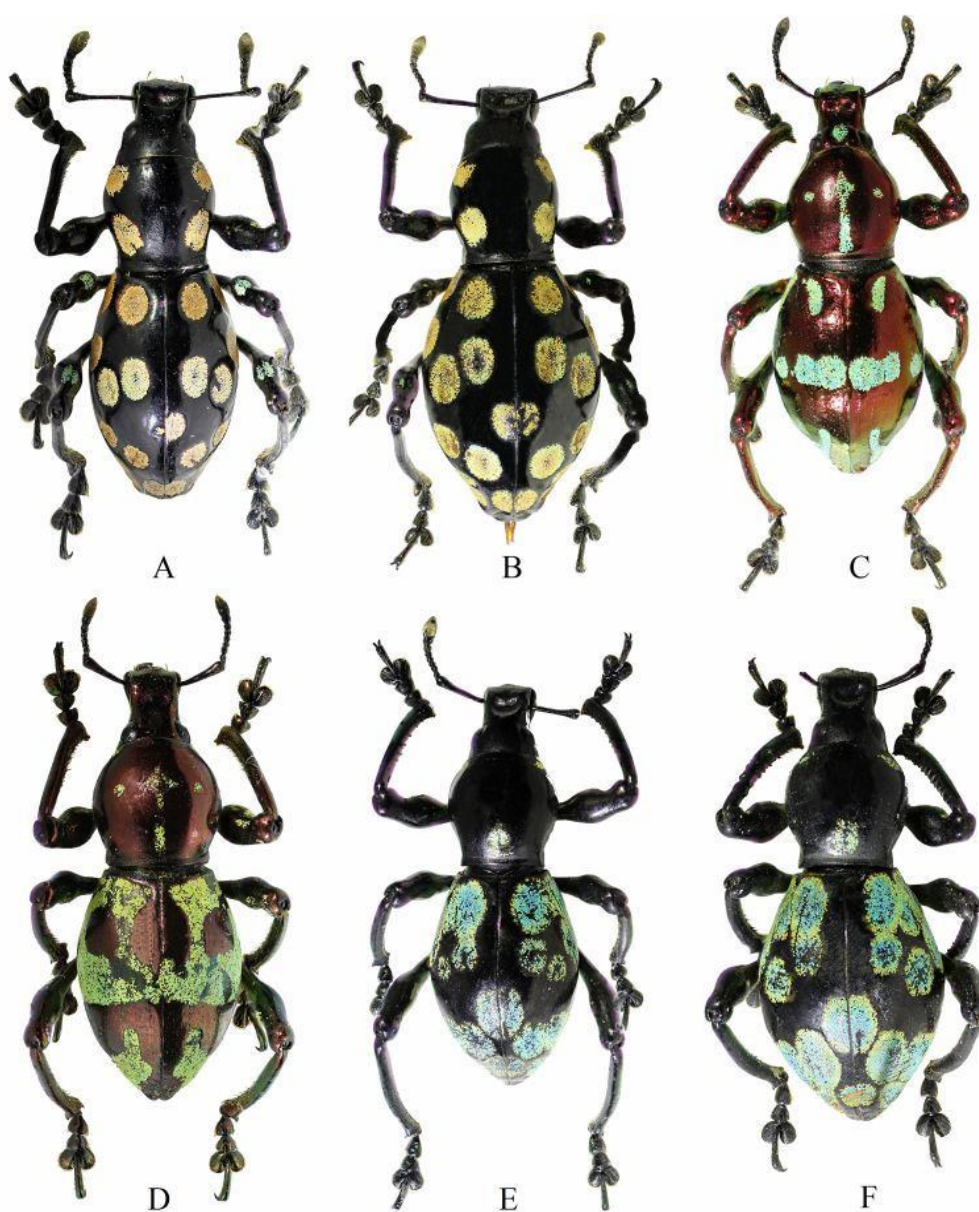


Fig. 1. Dorsal habitus of the following species: A – *P. tetramaculatus* sp. nov. male; B – *P. tetramaculatus* sp. nov. female; C – *P. sagittatus* sp. nov. male; D – *P. kirklayroni* sp. nov. male; *P. congestus* ssp. *aedamlayroni* subsp. nov. male; E - *P. congestus* ssp. *aedamlayroni* subsp. nov. female



Fig. 2. A - Dorsal habitus of *P. disargus* sp. nov. male; B – Lateral habitus of *P. disargus* sp. nov. male

Female. Unknown.

Differential analyses. This newly described species is similar on general appearance to *P. sagittatus* sp. nov. (find differential analyses at description of *P. sagittatus* sp. nov.).

Etymology. This species was named after Kirk Lane Layron in appreciation of cooperation and possibility to study current material.

***Pachyrhynchus disargus* sp. nov.**

Fig. 2, 4A-B.

Type material. Holotype. Male. “PHILIPPINES / Luzon, Nueva Vizcaya, Kasibu / V. 2015 / local collector leg.” (white rectangular label, printed); “HOLOTYPE / *Pachyrhynchus disargus* / Rukmane, 2019 / det. Rukmane A. 2019” (red rectangular label, printed).

Paratypes. Two males. “PHILIPPINES / Luzon, Nueva Vizcaya, Kayapa / VIII. 2013 / local collector leg.” (white rectangular label, printed); “PARATYPE / *Pachyrhynchus disargus* / Rukmane, 2019 / det. Rukmane A. 2019” (red rectangular label, printed).

Distribution: Luzon Island, Nueva Vizcaya Province.

Description. Dimensions: LB: 10.3-10.9 (Holotype 10.5, mean 10.57); LE: 7.1-7.8 (Holotype 7.1, mean 7.37); WE: 4.2-4.6 (Holotype 4.2, mean 4.4); LP: 2.9-3.3 (Holotype 3.1, mean 3.1); WP: 2.7-2.9 (Holotype 2.7, mean 2.77); LR: 1.6-1.8 (Holotype 1.7, mean 1.7); WR: 1.5-1.7 (Holotype 1.5, mean 1.57). N=3 for all measurements.



Fig. 3. Dorsal habitus of *P. phaleratus* ssp. *dannylayroni* subsp. nov. female

Integument black, body shiny, underside with weaker luster; body with markings of pale orange and blue round to recumbent scales. Dorsal and lateral habitus as shown in Fig. 2A-B.

Rostrum longer than wide (LR/WR 1.13), slight impression on apical ½, bulging on apical 2/2; triangular impression on basal part, shallow longitudinal groove from middle of rostrum to base of forehead; lateral parts covered with rare short white hairs, patch of scales on genae. Head glabrous, finely punctured; eyes small, slightly prominent from the outline of the head. Forehead slightly bulging, smooth, nearly 1.8 times as wide as eye width.

Prothorax subspherical, longer than wide (LP/WP 1.15), widest just before the middle; weakly punctured; with the following markings: 1) two subtriangular patches of pale orange scales on dorso-lateral part near apical margin; subovate patch on each lateroventral part; in dorsal contour increased from apical margin, widest just before the middle, firmly rounded, then decreased to basal 1/3 where slightly incurved and increased to basal margin; subbasal groove strongly pronounced, subapical groove interrupted on disc.

Legs stout; coxa without scaly markings; femur without hairs, patch of scales on apical part; tibiae incurved apically, covered with sparse pubescence on all length and long light hairs along internal margin; tarsus with long, golden setae. Elytra sub ovate (LE/WE 1.69), with weakly pronounced intervals, nearly smooth; each elytron with the following markings: 1) two subovate pale orange patches on basal part; 2) four pale blue subovate patches on medial; 3) two sutural patches, one just before midline, one close to apex; 4) three subovate patches on apical ½; 4) one triangular patch near apex laterally; widest just at the middle; on dorsal dimension narrow at the base, gradually increased to middle, widest just in the middle, then roundish and gradually decreased to apex; apex rounded, with weak pubescence.

Elytra wider than prothorax (WE/WP 1.56), more than twice as long as prothorax (LE/LP 2.29). Ventrites densely covered with blue to green round scales, minutely pubescent, mingled with few longer light color hairs. Genitalia as shown in Fig. 4A-B.

Female. Unknown.

Differential analyses. *P. disargus* sp. nov. is similar on general appearance to *P. argus* Pascoe by its shape of pronotum and elytra, yet, it is easily distinguishable by the following features: 1) narrower pronotum, that is widest just before middle, increased at subbasal part; 2) unique markings on pronotum and elytra of *P. disargus* sp. nov.

Etymology. This species was named after its similarity to *P. argus*.

***Pachyrhynchus phaleratus* ssp. *dannylayroni* subsp. nov.**

Fig. 3, 4E, F, G

Type material. Female. Holotype. "PHILIPPINES / Luzon, Dingalan, Aurora / I. 2019 / local collector leg." (white rectangular label, printed); "HOLOTYPE / *Pachyrhynchus phaleratus* ssp. *dannylayroni* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular label, printed).

Distribution: Luzon Island, Aurora Province.

Description. Female. Measurements (Holotype): LB: 13.1; LR: 1.9; WR: 1.8; LP: 4.0; WP: 3.7; LE: 8.9; WE: 6.2. Rostrum wider than long, LR/WR 1.05; pronotum slightly longer than wide, LP/WP 1.08; elytra nearly 1.5 times longer than wide, LE/WE 1.44; elytra more than two times as long as prothorax, LE/LP 2.23; elytra wider than prothorax, WE/WP 1.66. Body surface black, shiny, with pale green markings of round to recumbent scales. Dorsal habitus as shown in Fig. 3. Prothorax with same markings as in *P. phaleratus* ssp. *phaleratus*. Each elytron with the following markings: 1) three longitudinal stripes at basal



Fig. 4. A, C, H, J, L – aedeagus in lateral view; B, D, I, K, M – aedeagus in ventral view; A, B – *P. disargus* sp. nov.; C, D – *P. congestus* ssp. *aedamlayroni* subsp. nov.; H, I – *P. kirkclayroni* sp. nov.; J, K – *P. sagittatus* sp. nov.; L, M – *P. tetramaculatus* sp. nov.; E, F, G – female genitalia of *P. phaleratus* ssp. *dannylayroni* subsp. nov.; E – sternite VIII in ventral view; F – ovipositor in dorsal view; G – spermatheca. Scale bar 1.00 mm

part, from base to submedial part; 2) longitudinal line along lateral margin in all length; 3) two elongated sutural patches at apical part; 4) two roundish patches medially, two roundish patches at apical 1/2; 5) longitudinal stripe from the middle to apical 1/2 along interval IV; 6) triangular patch near apex laterally; elytra widest just in the middle, apex firmly rounded. Metasternum covered

with round pale green scales; two patches on ventrite I, each redirected laterally; round patch of scales on each side of ventrite II. Genitalia as illustrated in Fig. 4E-G.

Male unknown.

Differential analyses. This new subspecies is delimited from *P. phaleratus* ssp. *phaleratus*

mainly by its unique markings on elytra, which are much more thick than in *P.phaleartus* ssp. *phaleratus*.

Etymology. This subspecies was named after Danny Layron in appreciation of cooperation and possibility to study current material.

***Pachyrhynchus congestus* ssp. *aedamlayroni* subsp. nov.**
Fig. 1E-F, 4C-D.

Type material. Male Holotype. "PHILIPPINES / Luzon, Ilocos, Adams / VIII. 2019 / local collector leg." (white rectangular label, printed); "HOLOTYPE / *Pachyrhynchus congestus* ssp. *aedamlayroni* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular label, printed).

Female. Paratype. "PHILIPPINES / Luzon, Ilocos, Adams / VII. 2019 / local collector leg." (white rectangular label, printed); "PARATYPE / *Pachyrhynchus congestus* ssp. *aedamlayroni* / Rukmane, 2019 / det. Rukmane A. 2019" (red rectangular label, printed).

Distribution: Luzon Island, Ilocos Province.

Description. Male. Measurements (Holotype): LB: 13.3; LR: 1.9; WR: 2.0; LP: 4.8; WP: 3.9; LE: 8.7; WE: 5.9. Rostrum wider than long, LR/WR 1.05; pronotum longer than wide, LP/WP 1.23; elytra nearly 1.5 times longer than wide, LE/WE 1.47; elytra nearly two times as long as prothorax, LE/LP 1.81; elytra wider than prothorax, WE/WP 1.51. Body surface black, shiny, with pale green, orange and yellow markings. Dorsal habitus as shown in Fig. 1E. Prothorax with the following markings of round scales: 1) suboval dorso-lateral patch on each side; 2) basal subtriangular patch on middle of subbasal part; 3) two small round patches along apical margin, each redirected laterally. Each elytron with twelve ovate to elliptic patches of pale green round scales, each patch covered with line of orange, yellow or golden scales; patches may be isolated or confluent: 1) six patches on basal half, two smaller, redirected medially, four bigger, confluent, along

basal ½ from interval I to lateral margin; 2) two sutural patches, one slightly after midline, one on apical ½; 3) three oval patches on apical ½, from interval II to lateral margin, confluent; 4) triangular patch near apex. Metasternum covered with round pale green to golden round scales; two patches on ventrite I, each redirected laterally; round patch of scales on each side of ventrite II. Aedeagus as illustrated in Fig. 4C-D.

Female. Measurements: LB: 14.7; LR: 2.1; WR: 2.2; LP: 4.9; WP: 4.4; LE: 9.9; WE: 7.0. Elytra wider than in male, more strongly convex. Dorsal habitus as shown in Fig. 1F.

Differential analyses. This species is delimited from *P.congestus* ssp. *congestus* mainly by its unusual coloration and geographical isolation. Due to my research on genus *Pachyrhynchus*, such form of the current species is familiar only for Ilocos, Adams, and can't be found on any other part of the Luzon Island.

Etymology. This species was named after Aedam Stephen Layron in appreciation of cooperation and possibility to study current material.

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