

Three new species of *Notionotus* SPANGLER from French Guiana and Guyana (Coleoptera: Hydrophilidae)

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Abstract

Three new species of the genus *Notionotus* SPANGLER (Coleoptera: Hydrophilidae) are described: *N. dilucidus* and *N. lohezi* from French Guiana, and *N. shorti* from Guyana. A table with diagnostic characters is given to help for identifying all New World species of the genus.

Key words: Coleoptera, Hydrophilidae, Anacaenini, *Notionotus*, *N. dilucidus*, *N. lohezi*, *N. shorti*, new species, French Guiana, Guyana.

Introduction

Described in 1972, the genus *Notionotus* SPANGLER included until now seven species from the New World which have been recorded from Venezuela and Central America (SPANGLER 1972, PERKINS 1980, GARCÍA 2000). More recently, HEBAUER (2001, 2003) described six species from the Oriental Region. Within the tribe Anacaenini, species of *Notionotus* are characterized by the conjunction of several features, in particular: clypeus expanded in front of eyes, which are markedly emarginated anteriorly; antennae 8-segmented; maxillary palps short, about half as long as width of head, apical segment bending slightly outwards, about twice as long as penultimate; absence of elytral sutural striae; middle and hind femora pubescent; presence of a prosternal longitudinal carina; mesoventrite with triangular protuberance extending between the procoxae on same plane as metaventrite; apex of metaventrite broad between middle coxae; first abdominal ventrite not carinate medially.

HANSEN (1991) indicated that the elytra of *Notionotus* are completely without striae or rows of serial punctures though SPANGLER (1972) is not so affirmative when he defines the genus and GARCÍA (2000), describing *N. perijanus*, mentions seven more or less regular rows of setiferous punctures on each elytron. For my part I observed ten clear-impressed rows on every elytron of the three new species studied herein. These rows become readily apparent when the elytra are removed from the body. HEBAUER (2001) also mentions that some oriental species are distinctly subseriate. In his definition of tribus Anacaenini, HANSEN (1991) specifies: "Pronotum without systematic punctures, quite evenly punctate". In the new species I observed some closer and stronger setiferous punctures on lateral areas, numerous in two species, fewer in the third species.

The present paper deals only with Neotropical species. Within the genus, two characters seem very distinctive for species diagnosis: aedeagus and mesoventrite; color, quite stable within each species, and punctuation can also be used as further helps. Data from descriptions, giving some main distinctive characters useful to identify the species of the genus are summarized in Table 1.

Species	<i>rosalesi</i>	<i>liparus</i>	<i>mexi</i>	<i>nucle</i>	<i>tricari</i>	<i>edibe</i>	<i>perija</i>	<i>lohezi</i>	<i>dilucidus</i>	<i>shorti</i>
Author	SPANGLER (1972)		PERKINS (1980)			GARCÍA (2000)				
Characters										
Length (mm)	1.7–2.0	1.6–1.9	1.1	1	1	1.4–1.8	1.7	1.5–1.8	1.4–1.8	1.4–1.8
Width (mm)	0.9–1.1	0.9–1.2	0.7	0.6	0.6	0.8–1.1	1	0.9–1.1	0.8–1.0	0.8–1.0
Pronotal disc - testaceous - black or almost - dark brown red	X	X	X	X	X	X	X	X	X	X
Elytra - testaceous - testaceous with basal - reddish brown band - brown red - black (except margins)	X	X	X	X	X	X	X	X	X	X
Mesoventrite - protuberance carinate in - midline - protuberance rounded in - midline - protuberance with three - carinae medially	X	X	X	X	X	X	X	X	X	X
Aedeagus - median lobe much - shorter than parameres - median lobe as long as - parameres or slightly - longer - basal lobe as long as - parameres or longer - basal lobe shorter than - parameres	X	X	X	(1)	(2)	X	X	X	(3)	(4)
(1) Median lobe with half apical part parallel. (2) Median lobe with half apical part evenly narrowing. (3) Parameres apically shortly curved outwards. (4) Parameres apically almost straight.										

Table 1: Distinguishing characters for the species of *Notionotus* of the New World (*N. rosalesi* SPANGLER, *N. liparus* SPANGLER, *N. mexicanus* PERKINS, *N. nucleus* PERKINS, *N. tricarinatus* PERKINS, *N. edibethae* GARCÍA, *N. perijanensis* GARCÍA, *N. lohezi* QUENEY, *N. dilucidus* QUENEY, *N. shorti* QUENEY).

The primary type of habitat of *Notionotus* species in the Neotropical region appears to be rather steep and rocky streams, generally in forest, often where plant debris piles up between stones but also on surface of emergent rocks or among gravel in shallow and slowly flowing water, or less commonly in seepages (e.g. *N. liparus*).

Notionotus was already known from Mexico, Guatemala, Panama and Venezuela. The three species described here from Guyana and French Guiana significantly extend the distribution of *Notionotus* to the east, although the overall distribution for the genus remains very scattered (Fig. 10).

Depository abbreviations:

DL	Collection of Daniel Lohez, Arras, France
KSEM	University of Kansas Natural History Museum, Lawrence, USA
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NMW	Naturhistorisches Museum Wien, Austria
PQ	Collection of Pierre Queney, Paris, France
USNM	National Museum of Natural History, Smithsonian Institution, Washington, USA

Notionotus dilucidus sp.n.

Type material. Holotype ♂: GUYANA: Roura, Cascades de Fourgassié, 15 m, 11.IX.2009, leg. P. Queney (MNHN). Allotype ♀: same data as holotype. Paratypes (17 ♂♂, 13 ♀♀): same data as holotype (6: PQ, DL; 6:

KSEM); same locality but 17.XI.2007 (1: PQ); GUYANA: Roura, Cacao, Chemin Molokoï, crique, 20.XI.2007 (4: PQ); same data but 16.IX.2009 (5: PQ; 4: KSEM; 1: NMW); GUYANA: Régina, Montagne Favard, crique en forêt, 5 m, 10.IX.2009 (3: PQ); all paratypes leg. P. Queney.

Diagnosis. Habitus as in Fig. 1. Total body length: 1.76 mm, greatest width: 0.95 mm. Pronotum testaceous, elytra a little darker. Head with dual punctation. Mesoventrite with protuberance medially carinate on apical part (Fig. 4). Aedeagus with parameres as long as basal piece and median lobe. Parameres with apex sinuate outwards and with internal sides strongly concave towards their base. The aedeagus is quite diagnostic for separating this species (Table 1).

Description. Color. Dorsally shining and mostly testaceous. Frons blackish towards hind margin and near eyes. Elytra and scutellum slightly darker than pronotum, head somewhat reddish. Two small black spots along hind margin of pronotum. Some scattered black spots on pronotum and elytra. Underside of head except gula, prosternum, mesoventrite, tibiae and tarsi mostly testaceous. Maxillary palps, antennal base testaceous. Antennal club, gula, hind part of mesoventrite, metaventrite, abdominal ventrites, femora darker.

Head. Labrum shallowly emarginate medially, rather densely punctate (punctures separated by 1–2 times their diameter), microreticulate at base, shining elsewhere. Frons and clypeus shining and covered with a dual punctation: primary one strong (distance between punctures: 1–3 times their diameter), secondary one fine, superficial and denser. Some setiferous punctures near eyes. Front edge of clypeus concave medially. Frons microreticulate on hind margin. Maxillary palps with ultimate segment slightly longer than second one.

Thorax. Pronotal punctation very fine and sparse (punctures separated by at least five times their diameter); some closer and stronger setiferous punctures on lateral areas, which could be systematic punctures. Scutellum punctate. Mentum shining with sparse punctures. Prosternal process longitudinally carinate and prominent forwards, enlarged and narrowly concave backwards, plane in lateral view. Mesoventrite (Fig. 4) with a prominent and broad arrow-shaped protuberance, carinate on midline forwards and becoming rounded backwards. Protuberance with front sides concave and apex button-shaped. Mesoventrite merging on the same plane with metaventrite which is convex medially, pubescent and strongly punctate on front part, glabrous and impunctate on medial and hind part. Pubescent parts more or less microreticulate. All femora pubescent basally, hind femur on basal four-fifths.

Elytra. 10 fine rows of serial punctures, more conspicuous after separation of elytra, some of them setiferous. Another punctation present, scarce and as fine as on pronotum.

Abdomen. Pubescent and densely punctate.

Aedeagus (Fig. 7). Length 0.3 mm. Parameres as long as median lobe and a little longer than basal piece. Inner sides of parameres convex in apical half and strongly concave in basal half. Apex shortly curved outwards. Median lobe evenly narrowing from base to apex which is rounded (Fig. 7a).

Variations. Male length: 1.40–1.80 mm, on average 1.59 mm, greatest width: 0.80–0.95 mm; female length: 1.60–1.80 mm, on average 1.68 mm, greatest width: 0.90–0.95 mm. No variation was noted concerning pronotum and elytral color. Labrum more or less microreticulate, punctation on pronotum and elytra more or less impressed, testaceous color on ventral parts more or less extending. One female specimen with head punctation not dual, another female specimen without stronger punctures on pronotum. Pubescence covering sometimes only three-quarters of hind femora.

Etymology. *Dilucidus* (Latin), clear, bright, in reference to the dorsal color of the species.



Figs. 1–3: Habitus of 1) *Notionotus dilucidus*, 2) *N. shorti*, 3) *N. lohezi*. All about 1.6 mm long.

Biology. This species was collected during the relatively dry season in fast rocky streams with dense forest cover. The specimens were found in two types of habitat: some in plant debris making small dams in the stream, others inside minute gravel packs.

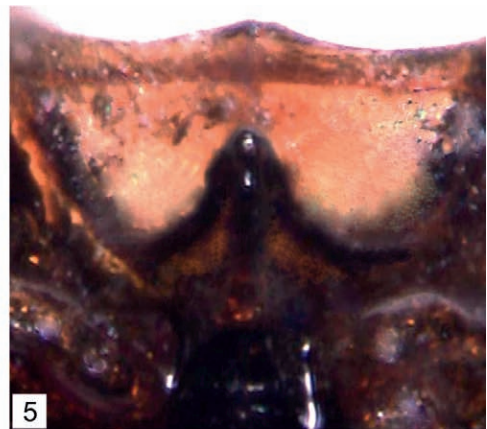
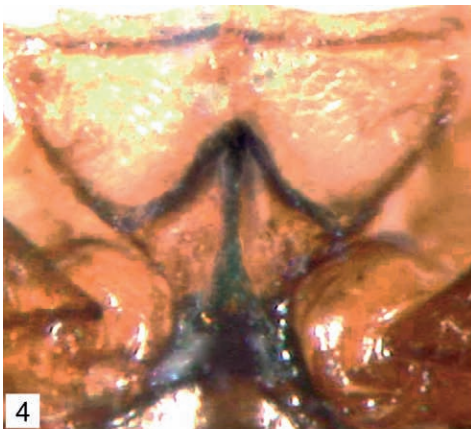
Distribution (Fig. 10). Known only from northeastern part of French Guiana.

***Notionotus shorti* sp.n.**

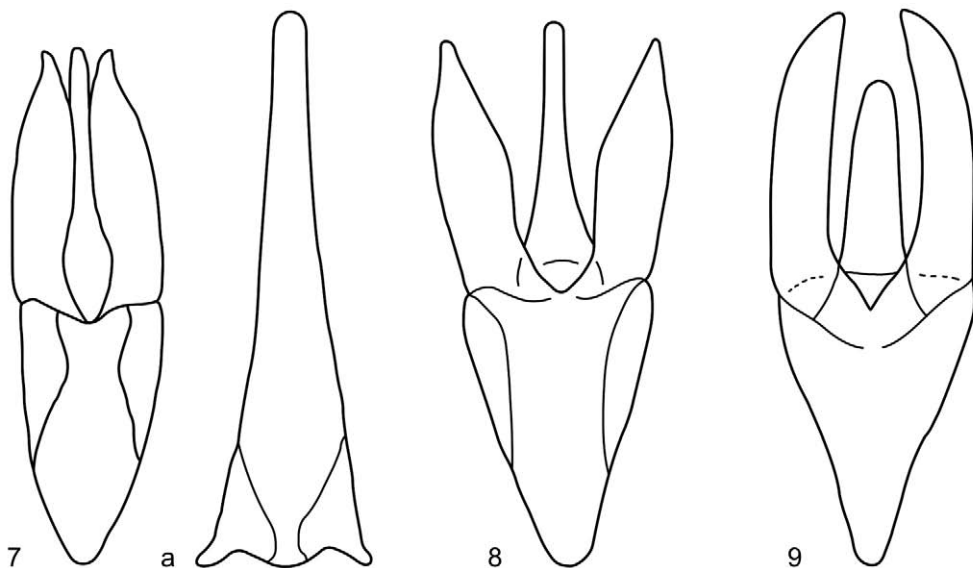
Type material. Holotype ♂: GUYANA: Mazaruni-Potaro District, Takutu Mountains, stream debris berlesed, 18.XII.1983, leg. P.J. Spangler, W.E. Steiner & M. Levine (USNM). Allotype ♀: same data as holotype. Paratypes (25 ♂♂, 11 ♀♀): same data as holotype (18: USNM; 8: KSEM; 10: MNHN, NMW, PQ).

Diagnosis. Habitus as in Fig. 2. Total body length: 1.68 mm, greatest width: 0.94 mm. Head with dual punctation. Pronotum reddish testaceous, elytra hardly darker. Mesoventrite with protuberance medially carinate on apical part. Aedeagus with longitudinal darkened stripes. Parameres as long as basal piece and median lobe, its internal sides basally concave, medially convex and apically straight or slightly concave. Aedeagus is quite distinctive for separating this species, in particular from *N. dilucidus* whose parameres are apically shortly curved outwards (Table 1).

Description. Color. Dorsally shining and reddish testaceous. Frons and front margin of pronotum darkened. Elytra and scutellum hardly darker than pronotum. Two small black spots along hind margin of pronotum. Some scattered black spots on pronotum and elytra. Maxillary palps, antennae testaceous. Underside of head except gula, prosternum, legs mostly testaceous. Gula, meso- and metaventrite, abdominal ventrites, for the most part blackish or brownish.



Figs. 4–6: Mesoventrite of 4) *Notionotus dilucidus*, 5) *N. shorti*, 6) *N. lohezi*.



Figs. 7–9: Aedeagus of 7) *Notionotus dilucidus* (a: median lobe), 8) *N. shorti* (parameres moved aside), 9) *N. lohezi*. All aedeagi about 0.3 mm long.

Head. Labrum emarginate medially, microreticulate but rather shining. Frons and clypeus shining and covered with dual punctation: primary one strong (distance between punctures: 1–3 times their diameter), secondary one fine, superficial and denser. Some setiferous punctures on frons. Front edge of clypeus concave medially. Frons microreticulate on hind margin. Maxillary palps with ultimate segment slightly longer than second one.

Thorax. Pronotal punctation very fine and sparse (punctures separated by 2–5 times their diameter); some stronger setiferous punctures on lateral areas, which could be systematic punctures. Scutellum punctate. Mentum shining with sparse punctures. Prosternal process longitudinally carinate and prominent forwards, enlarged and narrowly concave backwards, plane in lateral view. Mesoventrite (Fig. 5) with a prominent and broad arrow-shaped protuberance, carinate on midline forwards and becoming rounded backwards. Protuberance with front sides concave and apex button-shaped. Mesoventrite merging on the same plane with metaventrite which is convex medially, pubescent and strongly punctate on front part, glabrous and impunctate on medial and hind part. Pubescent parts more or less microreticulate. All femora pubescent basally, hind femur on basal four-fifths.

Elytra. 10 fine rows of serial punctures, more conspicuous after separation of elytra, some of them setiferous. Another punctation present but scarce and extremely fine.

Abdomen. Pubescent and densely punctate.

Aedeagus (Fig. 8). Length 0.32 mm, parameres nearly as long as basal piece and a little shorter than median lobe. Inner sides of parameres straight or hardly concave in apical third, convex in medial part and strongly concave in basal third. Apex rather broadly rounded. Median lobe evenly narrowing from base to apex, which is rounded.

Variations. Male length: 1.4–1.7 mm, on average 1.6 mm, greatest width: 0.8–1.0 mm; female length: 1.6–1.8 mm, on average 1.7 mm, greatest width: 0.9–1.0 mm. Pronotum and elytral color

very stable. Clypeus sometimes darkened medially. One specimen blackish medially on pronotum and elytra. Labrum can be dark but antennal club and femora seem to stay testaceous. Punctuation rather variable on pronotum and elytra, where fine punctures can become undetectable. Much less often small punctures of dual punctuation can vanish on head.

Etymology. Named for Andrew Short, who trustingly let me describe this species and allowed me to feel less alone with aquatic beetles from French Guiana.

Biology. This species was collected in “leaf packs from a rocky shaded stream”.

Distribution (Fig. 10). Known only from the type locality in Guyana.

Notionotus lohezi sp.n.

Type material. Holotype ♂: GUYANA: Régina, Patawa, crique en forêt, 170 m, 13.IX.2009, leg. P. Queney (MNHN). Allotype ♀: same data as holotype. Paratypes (10 ♂♂, 9 ♀♀): same data as holotype (4 PQ, DL; 4: KSEM); same locality but 19.XI.2007 (4: PQ); GUYANA: Roura, Camp Caïman, crique Grand Couacou, 250 m, 12.IX.2009 (2: PQ; 2: KSEM; 1: NMW); GUYANA: Roura, Route N2, crique à 11 km au sud de l’Orapu, 25 m (2: PQ); all paratypes leg. P. Queney.

Diagnosis. Habitus as in Fig. 3. Total body length: 1.58 mm, greatest width: 0.92 mm. Clypeus and pronotum testaceous, frons brown and elytra almost black. Head rather strongly punctate. Mesoventrite with protuberance strongly carinate medially on midline and on each side of midline. Aedeagus with parameres widely spaced and much longer than median lobe. The elytral color, mesoventrite and aedeagus are very distinctive for separating this species (Table 1).

Description. Color. Dorsally shining. Labrum, clypeus and pronotum testaceous. Frons and front margin of pronotum brown. Elytra and scutellum almost black, elytral margins and suture dark brown. Two small black spots along hind margin of pronotum. Underside of head, prosternum, mesoventrite, legs mostly testaceous. Maxillary palps, antennal base testaceous. Antennal club, metaventrite, abdominal ventrites, for the most part darkened.

Head. Labrum emarginate medially, microreticulate. Frons and clypeus shining and covered with irregular and strong punctuation (distance between punctures 1–3 times their diameter). Some setiferous punctures near eyes. Front edge of clypeus concave medially. Frons microreticulate on hind margin. Maxillary palps with ultimate segment slightly longer than second one.

Thorax. Pronotal punctuation of irregular size, less strong and dense than head one (punctures separated by 2–5 times their diameter or more); some few setiferous punctures on lateral areas. Scutellum superficially punctate. Mentum shining with superficial and sparse punctures. Prosternal process longitudinally carinate and prominent forwards, enlarged and narrowly concave backwards, plane in lateral view. Mesoventrite (Fig. 6) with a prominent arrow-shaped protuberance, with front sides concave and three carinae medially: one on midline and two others, on each side of midline, converging backwards. Protuberance with apex in shape of conspicuous button. Mesoventrite merging on the same plane with metaventrite which is convex medially, pubescent and punctate on front part, glabrous and impunctate on medial and hind part. Pubescent parts more or less microreticulate. All femora pubescent basally, hind femur on basal four-fifths.

Elytra. 10 fine rows of serial punctures, more conspicuous after separation of elytra, many of them setiferous. Another punctuation present, scarce and very fine, difficult to detect.

Abdomen. Pubescent and densely punctate.

Aedeagus (Fig. 9). Length 0.27 mm. Median lobe about 75 % the length of the parameres, these as long as basal piece; inner sides of parameres a little concave and outer sides convex, curved

inwards apically. Median lobe evenly and slightly narrowing from base to apex which is rounded.

Variations. Male length: 1.5–1.8 mm, on average 1.65 mm, greatest width: 0.9–1.0 mm; female length: 1.6–1.8 mm, on average 1.69 mm, greatest width: 0.90–1.05 mm. Dorsal color remarkably stable on all specimens examined. Punctuation on pronotum and elytra more or less impressed, blackish color on ventral parts more or less extending.

Etymology. Named for my friend Daniel Lohez who collected specimens of the new species with me.

Biology. This species was collected during the relatively dry season in rocky streams with dense forest cover. The specimens were found in plant debris making small dams in the stream.

Distribution (Fig. 10). Known only from northeastern French Guiana.



Fig. 10: Distribution of the species of *Notionotus* of the New World.

Acknowledgements

I warmly thank Andrew Short for providing specimens collected in Guyana and for kindly reviewing my manuscript.

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Autor(en)/Author(s): Queney Pierre

Artikel/Article: [Three new species of Notionotus SPANGLER from French Guiana and Guyana \(Coleoptera: Hydrophilidae\). 129-137](#)