# New data on the genus Oxytrechus Jeannel, 1927, with description of seven new species from Colombia and Ecuador (Coleoptera: Carabidae: Trechinae)

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# New data on the genus *Oxytrechus* Jeannel, 1927, with description of seven new species from Colombia and Ecuador (Coleoptera: Carabidae: Trechinae)

Pier Mauro Giachino, Gianni Allegro & Pierre Moret

Abstract

Seven new species of *Oxytrechus* Jeannel, 1927 are described: five from Ecuador (*O. andersoni* Giachino & Allegro **n. sp.**, *O. atahualpai* Giachino & Allegro **n. sp.**, *O. bavierai* Giachino & Allegro **n. sp.**, *O. fikaceki* Giachino & Moret **n. sp.**, and *O. sciakyi* Giachino & Allegro **n. sp.**) and two from Colombia (*O. floresanus* Giachino & Allegro **n. sp.** and *O. ruizianus* Giachino & Allegro **n. sp.**). *Oxytrechus equatorianus* Mateu, 1988 is re-established as a valid species. *O. globosus* Mateu, 1991 and *O. convexus* Mateu, 1991 are redescribed. New distributional data are given for *O. balli* Allegro, Giachino & Sciaky, 2008, *O. belloi* Giachino, Allegro & Baviera, 2014, *O. llanganatisianus* Mateu, 1988, *O. moreti* Mateu, 1988, *O. onorei* Allegro, Giachino & Sciaky, 2008, *O. pierremoreti* Allegro, Giachino & Sciaky, 2008 and *O. vulcanus* Mateu, 1988. An identification key is provided for the *Oxytrechus* species present in the Papallacta-Guamaní area (Ecuador, Pichincha/Napo provinces).

Keywords: Trechinae, *Oxytrechus,* new species, Colombia, Ecuador, Neotropical fauna.

Zusammenfassung

Sieben neue Arten der Gattung *Oxytrechus* Jeannel, 1927 werden beschrieben: fünf aus Ecuador (*O. andersoni* Giachino & Allegro **n. sp.**, *O. atahualpai* Giachino & Allegro **n. sp.**, *O. bavierai* Giachino & Allegro **n. sp.**, *O. fikaceki* Giachino & Moret **n. sp.** und *O. sciakyi* Giachino & Allegro **n. sp.**) und zwei aus Kolumbien (*O. floresanus* Giachino & Allegro **n. sp.** und *O. ruizianus* Giachino & Allegro **n. sp.**). *Oxytrechus equatorianus* Mateu, 1988 wird wieder als gültige Art eingesetzt. *O. globosus* Mateu, 1991 und *O. convexus* Mateu, 1991 werden wieder beschrieben. Neue Verbreitungsdaten werden angegeben für *O. balli* Allegro, Giachino & Sciaky, 2008, *O. belloi* Giachino, Allegro & Baviera, 2014, *O. llanganatisianus* Mateu, 1988, *O. moreti* Mateu, 1988, *O. onorei* Allegro, Giachino & Sciaky, 2008, *O. pierremoreti* Allegro, Giachino & Sciaky, 2008 und *O. vulcanus* Mateu, 1988. Für die im Gebiet Papallacta-Guamaní (Ecuador, Provinzen Pichincha/Napo) vorkommenden *Oxytrechus*-Arten wird ein Bestimmungsschlüssel vorgelegt.

Contents



## 1 Introduction

The genus *Oxytrechus* Jeannel, 1927 (type species: *O. lallemandi* Jeannel, 1927) was established for three species: *O. arechavaletai* (Putzeys, 1870) from Uruguay, *O. fasciger* (Putzeys, 1870) from Chile and *O. lallemandi* Jeannel, 1927 from Ecuador. Taxonomic and choronymic information about *Oxytrechus* remained scarce during the major part of the 20th century, with only five species from the whole South America listed in the world catalogue of the Trechodinae and Trechinae (Casale & Laneyrie 1982). Since 1986 several contributions by different authors (Casale & Sciaky 1986; Mateu 1988, 1991; Moret 2001, 2005; Etonti & Mateu 1992; Allegro et al. 2008; Giachino et al. 2014) brought the number of known species to 29: 1 from Uruguay, 1 from Chile, 3 from Peru, 17 from Ecuador and 7 from Colombia (Ruiz-Tapiador & Arenas 2017).

Here we provide new taxonomic and distributional data for the *Oxytrechus* species recorded from Ecuador, along with the description of five new species from Ecuador and two from Colombia, based on the examination of abundant material from different collections and/or collectors.

Acknowledgements

We are very grateful to all friends and colleagues that provided us material in study from their private or institutional collections: Robert S. Anderson (CMNC), Cosimo Baviera (Messina, Italy), Cesare Bellò (Treviso, Italy), Petr Bulirsch (Praha, Czech Republic), Achille Casale (Torino, Italy), Sofia Muñoz (Quito, Ecuador), Giuseppe Bartolomeo Osella (Verona, Italy), Luca Picciau (Torino, Italy), Wolfgang Schawaller (SMNS), Riccardo Sciaky (Milano, Italy), Danny Shpeley (Edmonton, Canada), Augusto Vigna Taglianti (Roma, Italy). Special thanks to our friends Achille Casale and Danny Shpeley for useful suggestions to the manuscript.

## 2 Material and methods

This study is based on the examination of 187 *Oxytrechus* specimens. Part of this material was collected during the expedition "Ecuador 2008" carried out under the auspices of the World Biodiversity Association. Another part was collected in 2015–2017 during a joint project of the CNRS, Toulouse University and Pontificia Universidad Católica del Ecuador. The remainder comes from the public and private collections listed hereafter.

The 36 specimens from the expedition "Ecuador 2008" were extracted from soil litter (from 5 to 15 cm deep), first sieved through a 1 cm mesh wire sieve in order to separate larger materials, and then through a second thinner sieve (0.3 to 0.5 cm mesh); the samples of sifted litter were transported to the laboratory in individual cotton bags. The samples were either directly placed in Winkler extractors or "washed" in suitable containers, with subsequent removal of floating material by means of a sieve of 1 mm mesh, and then placed in Berlese funnels for at least 10–12 hours. In both cases the specimens extracted were examined with a binocular microscope and preserved in a mixture of ethanol and acetic acid until they were mounted dry for study. The rest of the material was collected by different methods, including sieving, hand searching, and pitfall trapping.

Morphological analysis was carried out through the examination of the male genitalia mounted in Canada Balsam, illustrated using a Leica Biological Microscope DM2500 equipped with differential interference contrast and Camera Lucida. For the analysis and habitus drawing a Leica MZ 12.5 stereomicroscope equipped with a Camera Lucida was used.

The following acronyms for museums and private collections have been used:

| | |
|---|---|
| CAl | Gianni Allegro Collection, Moncalvo (Asti), Italy |
| CBa | Cosimo Baviera Collection, Messina, Italy |
| CBu | Petr Bulirsch Collection, Praha, Czech Republic |
| CCa | Achille Casale Collection, Torino, Italy |
| CGi | Pier Mauro Giachino Collection, San Martino Canavese (Torino), Italy |
| CMa | Joaquin Mateu Collection (at Museo Regionale di Scienze Naturali), Torino, Italy |
| CMNC | Canadian Museum of Nature Collection, Ottawa, Canada |
| CMo | Pierre Moret Collection, Toulouse University, France |
| CSc | Riccardo Sciaky Collection, Milano, Italy |
| CVi | Augusto Vigna Taglianti Collection, now at Museo Civico di Storia Naturale "G. Doria", Genova, Italy |
| OSAC | Oregon State Arthropod Collection, Oregon State University, Corvallis, USA |
| QCAZ | Museo de zoología, Pontificia Universidad Católica del Ecuador, Quito, Ecuador |
| SMNS | Staatliches Museum für Naturkunde, Stuttgart, Germany |
| UASM | Strickland Museum University of Alberta, Edmonton, Canada |

The following abbreviations for the type material have been used:

| | |
|---|---|
| HT | holotype |
| PT, PTT | paratype(s) |
| PW/PL | pronotum maximum width/pronotum maximum length |

## 3 Systematic account

### 3.1 Species from Ecuador

Given the exceptional concentration of eight *Oxytrechus* species in a transect of only 15 km along the road that crosses the Eastern Cordillera, east of Quito in the Papallacta-Guamaní area (Ecuador, prov. Pichincha/Napo), we will first present these species in a separate section, in order to facilitate their identification.

#### 3.1.1 Species from the Papallacta-Guamaní area, province Pichincha/Napo, Ecuador

At present, including the new species described herein, eight *Oxytrechus* species are known from this area, also known as "Paso de la Virgen" (Fig. 34):

*O. balli* Allegro, Giachino & Sciaky, 2008
*O. belloi* Giachino, Allegro & Baviera, 2014
*O. convexus* Mateu, 1991
*O. equatorianus* Mateu, 1988
(= *O. pichinchanus* Mateu, 1988)
*O. fikaceki* **n. sp.**
*O. globosus* Mateu, 1991
*O. moreti* Mateu, 1988
*O. sciakyi* **n. sp.**

We rectify the status of *O. equatorianus* Mateu, 1988 (= *O. pichinchanus* Mateu, 1988) as a valid species, describe *O. fikaceki* and *O. sciakyi* as new species, and add new details on the distribution of the other species known to live in this area.

#### *Oxytrechus equatorianus* Mateu, 1988, **valid species** (Figs 1, 2, 17, 18)

*Oxytrechus equatorianus* Mateu, 1988: 311.
*Oxytrechus pichinchanus* Mateu, 1988: 311.
*Oxytrechus lallemandi* Jeannel: Moret 2005: 63.
*Oxytrechus lallemandi* Jeannel: Lorenz 2005: 171.

Examined material

HT ♂, 3 PT ♀♀ of *Oxytrechus equatorianus* Mateu, 1988 from: Ecuador, Prov. Napo (Pichincha), Col de Papallacta, antennes 4370 m, 5.IV.86, Pierre Moret leg. (CMa, CMo);

HT ♂, 1 PT ♀ of *Oxytrechus pichinchanus* Mateu, 1988 from: Ecuador, Prov. Napo (Pichincha), Col de Papallacta, 4050–4150 m, 6.XII.84, Pierre Moret leg. (CMa).

4 ♂♂ 5 ♀♀, Ecuador, Paramo di Papallacta, m 4000, 4.IV.1986, A. Casale leg. (CCa, CGi); 1 ♀, Ecuador, Paramo di Papallacta, m 4000, 9.IV.1986, A. Casale leg. (CCa); 1 ♂, Ecuador, Pichincha, La Virgen, m 4004, 2.VIII.2008, W. Rossi (CGi); 7 ♂♂ 3 ♀♀, Ecuador, Pichincha, Col de Papallacta, 5.VIII.1990, Sciaky (CSc, CGi); 5 ♂♂ 1 ♀, Ecuador, Paramo di Papallacta, m 4050, 4.IV.1986, A. Vigna leg. (CVi); 1 ♀, Ecuador, Napo, Passo di Papallacta vers. E, 3960–4100 m, 4.XII.1996, A. Vigna leg. (CVi); 1 ♂, Ecuador, Pichincha, Paso de la Virgen, 4070 m, 0.3331°S 78.2025°W, 25.X.2010, DRM 10.154, D.R. Maddison & M. Reyes (OSAC); 1 ♂, Ecuador, Prov. Pichincha, Guamaní, Paso de la Virgen, 26.X.2015, PM058–04, S0°19'49.0" W78°12'11.1", 4077 m, P. Moret leg. (CMo); 1 ♂, Ecuador, Prov. Pichincha, Guamaní, Paso de la Virgen, 11–III-2017, PM280, S0.330278 W78.203083, 4060 m, P. Moret leg. (CMo); 6 ♂♂ 7 ♀♀, Ecuador, Prov. Pichincha, Guamaní, Paso de la Virgen, 27–II-2017, PM193, S0°19'14.3" W78°11'30.9", 4365 m, P. Moret leg. (CMo, QCAZ).

### Taxonomic note

Mateu (1988) only provided brief descriptions of *O. equatorianus* and *O. pichinchanus*, based on the figures of their aedeagi, but without any drawings of their habitus. Therefore, we considered useful to illustrate here the habitus of both holotypes (Fig. 1 and 2), revealing their almost perfect likeness. Instead, slight differences are visible between the respective median lobes of the aedeagi, here also redrawn from the holotypes: the basal part of the median lobe forms an obtuse angle with the distal part in *O. equatorianus* (Fig. 17), a right angle in *O. pichinchanus* (Fig. 18), and the apical button is slightly thicker in *O. pichinchanus*. However, the examination of a large series of specimens showed that these minor differences fall within the normal range of variability of a single species, which has been confirmed by recent DNA barcoding of specimens fitting the description of each taxon (Faille & Moret in preparation). The synonymy proposed by Moret (2005) is thus confirmed.

On the contrary, the synonymy of *O. equatorianus* with *O. lallemandi* Jeannel, 1927, also proposed by Moret (2005), must be rejected, despite the very close similarity of their external and genital morphology. *O. lallemandi* lives in the Western Cordillera, far from the Guamaní Mountains (loc. typ. Imbabura province, Yana-Urcu de Piñán, 4520 m). Molecular analyses performed on fresh specimens of *O. lallemandi* recently collected on the Cotacachi volcano, near the type locality, reveal unquestionable species-level differences between *O. equatorianus* and *O. lallemandi* (Faille & Moret in preparation).

Mateu (1988), in the original description of *O. pichinchanus*, stated that the sutural stria is complete and evident, and suggested the same in the description of *O. equatorianus* ("striation visible sur les trois premiers intervalles"), whilst in a following contribution (Mateu 1991) he included these species within the ones with obsolete or incomplete sutural stria. Actually, most specimens have a complete and well impressed sutural stria, but in a few cases it is partly effaced and only visible in the apical third.

### Distribution and ecology

Mateu (1988) wrongly gave *O. pichinchanus* the same type locality as *O. equatorianus*: "4370 m, 5–IV-1985", with an additional error regarding the year, 1985 instead of 1986. Actually, the two specimens designated as types of *O. pichinchanus* were collected two years before at a lower elevation: 4050–4150 m.

*Oxytrechus equatorianus* is abundant in the whole páramo zone, always in open land, from 4000 m in dense shrubby vegetation, to 4360 m in the almost desert environment of the superpáramo. It has not been collected so far in woodlands.

## *Oxytrechus moreti* Mateu, 1988
(Figs 3, 19)

*Oxytrechus moreti* Mateu, 1988: 310.
*Oxytrechus moreti* Mateu: Moret 2005: 62.
*Oxytrechus moreti* Mateu: Lorenz 2005: 171.

### Examined material

HT ♂, 2 PT ♂♀ from: Ecuador, Prov. Napo/Pichincha, Col de Papallacta, antennes, 4370 m, 5.IV.86, Pierre Moret leg. (CMa, CMo).

### Taxonomic note

In the original description of this species, Mateu (1988) correctly stated that the sutural stria is complete and evident whilst, in the key included in a following contribution (Mateu 1991), he included it among the species with obsolete or incomplete sutural stria.

### Distribution and ecology

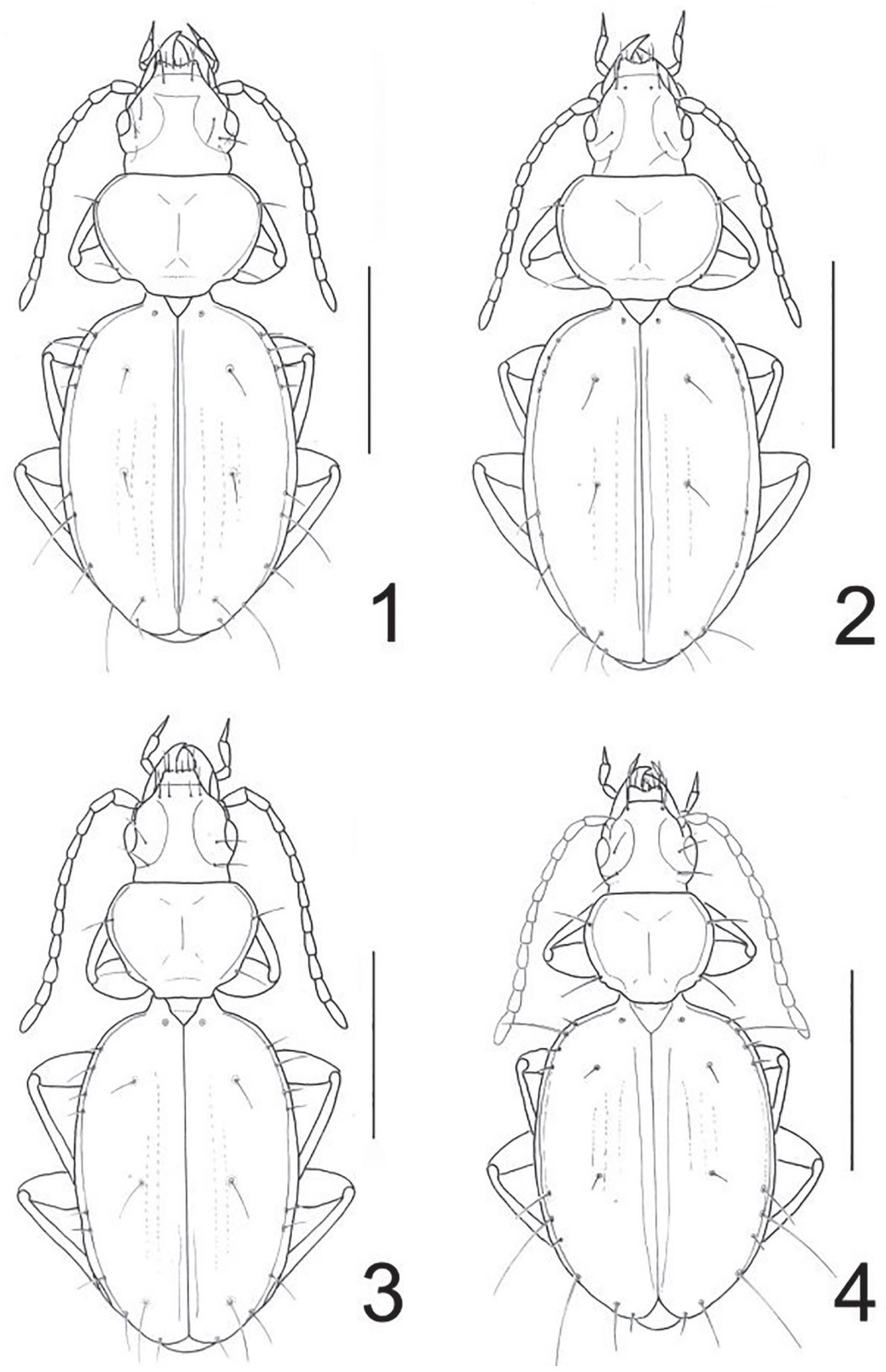
*Oxytrechus moreti* has a very narrow distribution in the superpáramo of the Guamaní mountain area, above 4300 m, and is far less abundant than *O. equatorianus*. The type specimens were obtained by sieving and washing organic material that accumulated beneath a stone in an area where the vegetation cover does not exceed 5% of the ground.

## *Oxytrechus belloi* Giachino, Allegro & Baviera, 2014
(Figs 4, 20)

*Oxytrechus belloi* Giachino, Allegro & Baviera, 2014: 148.

### Examined material

HT ♂, 2 PT ♂♂, and two additional specimens ♂♀, from: Ecuador, Pichincha, c/o Paso de la Virgen, m 3515, S 0°18'46.8" W 78°14'88.1", vaglio paramo, 2.VIII.2008, Ecuador 2008, legg. Baviera, Bellò, Osella & Pogliano (CGi, CAl, CMo).




**Figures 1–4.** *Oxytrechus* spp., habitus. **1** – *O. equatorianus* Mateu HT ♂; **2** – *O. pichinchanus* Mateu HT ♂; **3** – *O. moreti* Mateu HT ♂; **4** – *O. belloi* Giachino, Allegro & Baviera HT ♂. Bar line: 1 mm.

Distribution and ecology

*Oxytrechus belloi* is only known from its type locality, ca. 5 km west of Paso de la Virgen in a subpáramo open-land area, on the western slope of the Guamaní mountain. This area is dryer and more deforested than its eastern counterpart.

## *Oxytrechus globosus* Mateu, 1991 (Figs 5, 21)

*Oxytrechus globosus* Mateu, 1991: 79.
*Oxytrechus globosus* Mateu: Moret 2005: 63.
*Oxytrechus globosus* Mateu: Lorenz 2005: 171.

Examined material

1 ♂, Ecuador, Paramo di Papallacta, m 4050, 9.IV.1986, A. Casale leg. (CCa); 1 ♂, Ecuador, Pichincha, 46 Km e. Quito, 3960 m, 2.III.1976, J.M. Campbell (CAl); 3 ♂♂, Ecuador, Pichincha, 48 Km e. Quito, 3960 m, 7.III.1976, J.M. Campbell (CAl); 15 ♂♂♀♀, Ecuador, Napo, 1 km E Quito-Baeza Pass, 3950 m, 4.XI.1999, mixed *Polylepis* litter, leg. R. Anderson (CMNC).

Note

Mateu (1991) provided a relatively brief description of this species, without giving any habitus drawing. We therefore consider it useful to provide here drawings and a detailed redescription.

Redescription

Total length (from apical margin of labrum to tip of elytra): mm 3.50–3.80. Micropterous; brownish-black, with legs, mandibles, palpi and antennae rufo-testaceous. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on disk of pronotum and elytra, more evident on elytra, consisting of very thin isodiametric meshes on pronotum, transverse on elytra.

Head small and elongated; temples long (shorter than eyes), prominent and narrowing on neck; frontal furrows deep and complete; eyes moderately large and flat, markedly longer than genae; two supraorbital setae on each side and on lines slightly converging backwards. Antennae thin and short, hardly exceeding the elytral base, with the apical segment slightly longer than penultimate.

Pronotum transverse (PW/PL = 1.20), cordiform, convex, widest at the anterior fourth. Sides more arcuate at the anterior third, subrectilinear posteriorly, slightly sinuate before the hind angles, which are obtuse and slightly prominent; front angles rounded and not projecting forwards; basal peduncle prominent, not bordered at the posterior edge; lateral keel relatively large; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of the lateral keel. Two lateral setae on each side, the anterior one just at the widest point, the posterior one at the basal angle.

Elytra ovoid, wide, convex; lateral keel broad, flattened on disk, with salient and almost reflexed borders; shoulders largely rounded, not prominent; external elytral striae completely obsolete, only the second one hardly visible in the apical part, completely obsolete at base; sutural stria distinct, marked. Basal striole absent, recurrent stria and apical carina scarcely evident. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal seventh, the second one just after the middle; umbilicate series regular, humeral group with the pores 2nd to 4th almost equidistant,1st and 2nd closer; preapical pore definitely moved backwards at the level of the 8th pore of the umbilicate series.

Legs short and slender; protibial furrow complete but very superficial; metatibiae straight; two first protarsomeres regularly dilated.

Aedeagus (Fig. 21) robust, relatively stout. Median lobe, in lateral view, markedly curved at base, from slightly bisinuate to gently curved in the central and apical part, with apex stout and distinctly pointing upwards. Basal bulb normal, sagittal carina short but evident. Endophallus with a long, saddle shaped, phanera. Parameres long, reaching the apical third of the median lobe, each provided with 4 long distal setae.

Distribution and ecology

*Oxytrechus globosus* lives in the transition zone between high montane forest and páramo, immediately east of Paso de la Virgen, where it has been collected at 3960–4050 m of altitude, in the litter of *Polylepis* woodland remnants.

## *Oxytrechus sciakyi* Giachino & Allegro **n. sp.** (Figs 6, 22)

Loc. Typ.: Ecuador, Pichincha, Paso de la Virgen near Papallacta.

Type series: HT ♂, Ecuador, Pichincha, Col de Papallacta, 5.VIII.1990, Sciaky (CSc). PTT: 3 ♂♂, 2 ♀♀, La Virgen, 3958m - SM105, GUA6, Ecuador, Pichincha, Guamaní - Paso de la Virgen, 3958m, S0°20.606' W78°12.027' Equateur, 28.VI.2016, S. Muñoz, A. Romero leg.; 1 ♂, same data, DNA extraction code SMNS_L1896 (CGi, CMo, QCAZ, SMNS).

Diagnosis

*Oxytrechus sciakyi* **n. sp.** is closely related to *O. llanganatisianus* Mateu, 1988 from the Sierra de Llanganatis (Tungurahua province), based on the general shape of body and antennae, with antennomeres 6–11 short (see Moret, 2005), and the morphology of the median lobe of aedeagus (Figs 22, 26), which is hardly curved, tapered at apex and subrectilinear. It differs from *O. llanganatisianus* by its smaller size (it is the smallest species so far recorded from Ecuador), by the apex of the median lobe not curved upward and by the copulatory piece with uncinate apex.

Description of the HT ♂

Total length (from apical margin of labrum to tip of elytra): mm 2.26. Micropterous; brownish-black, with legs, mandibles, palpi and antennae rufo-testaceous. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on disk of pronotum and elytra, more evident on elytra, consisting of very thin isodiametric meshes on pronotum, transverse on elytra.

Head small and stout; temples long (shorter than eyes), rectilinear and narrowing on neck; frontal furrows deep and complete; eyes relatively small and convex, longer than genae; two supraorbital setae on each side and on lines slightly diverging backwards. Antennae delicate and short, slightly exceeding elytral base, with the apical segment slightly longer than penultimate.

Pronotum very transverse (PW/PL = 1.34), convex, widest at anterior fourth. Sides more arcuate at anterior fourth, subrectilinear in the central part, gently arcuate posteriorly, not sinuate before the hind angles, which are obtuse and not prominent; front angles rounded and not projecting forwards; basal peduncle prominent, not bordered at the posterior edge; lateral keel relatively narrow; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of the lateral keel. Two lateral setae on each side, the anterior one just at the widest point, the posterior one at the basal angle.

Elytra oval, convex; lateral keel broad, flattened, with salient and almost reflexed borders; shoulders completely rounded, not prominent; external elytral striae completely obsolete, only first three hardly distinct in the central part, completely obsolete at base and apex; sutural stria visible only in posterior half. Basal striole absent, recurrent stria and apical carina hardly distinct. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal fifth, the second one just at the middle; umbilicate series regular, humeral group with the pores 2nd to 4th almost equidistant; preapical pore definitely moved backwards at the level of the 8th pore of the umbilicate series.

Legs short and slender; protibial furrow complete but very superficial; metatibiae straight; two first protarsomeres regularly dilated.

Aedeagus (Fig. 22) long, slender. Median lobe, in lateral view, little curved, subrectilinear in apical part, with apex tapered and not curved upward. Basal bulb normal, sagittal carina small. Endophallus provided with a long, uncinate, phanera. Parameres long, reaching the apical third of the median lobe, each provided with 4 long distal setae.

Etymology

It is a pleasure for us to dedicate this new species to its collector, our friend Riccardo Sciaky, a well-recognized specialist of Carabidae.

Distribution and ecology

At present *Oxytrechus sciakyi* **n. sp.** is only known from the type locality in the vicinity of the mountain pass at Paso de la Virgen (Ecuador, Pichincha/Napo province). Paratypes were collected at 3958 m in the leaf litter of the subparamo zone.

## *Oxytrechus convexus* Mateu, 1991
(Figs 7, 23)

*Oxytrechus convexus* Mateu, 1991: 79.
*Oxytrechus convexus* Mateu: Lorenz 2005: 171.

Examined material

1 ♂, Ecuador, Napo, 4 km W Papallacta, berlese ex *Alnus*, 2.III.1976, J.M. Campbell (UASM).

Note

Mateu (1991) provided a relatively brief description of this species based on a single male, without giving any habitus drawing. We therefore consider it useful to provide here a detailed redescription based on a second male specimen belonging to the same collecting series.

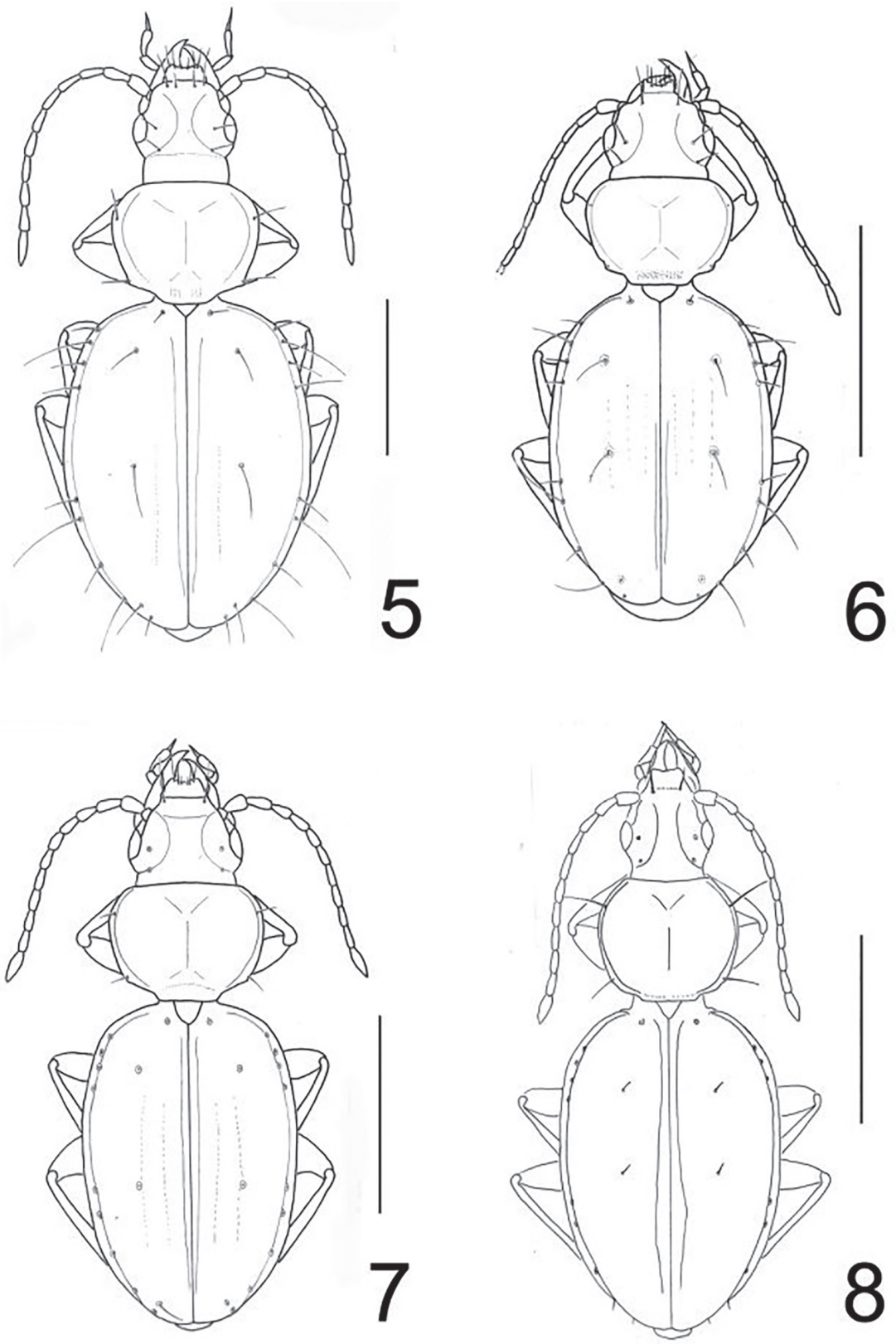
Redescription

Total length (from apical margin of labrum to tip of elytra): mm 2.73–2.90. Micropterous; rufo-testaceous, with legs, mandibles, palpi and antennae paler. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on disk of pronotum and elytra, more evident on elytra, consisting of very thin isodiametric meshes on pronotum, transverse on elytra.

Head small and elongated; temples long (shorter than eyes), prominent and narrowing on neck which is large, robust; frontal furrows deep and complete; eyes large and slightly convex, markedly longer than genae; two supraorbital setae on each side and on subparallel lines, not converging backwards. Antennae delicate and short, hardly exceeding elytral base, with the apical segment slightly longer than penultimate.

Pronotum transverse (PW/PL = 1.31), not cordiform, convex, widest at anterior third. Sides regularly arcuate from anterior angles to basal ones, not sinuate before the hind angles, which are obtuse, not prominent; front angles rounded and not projecting forwards; basal peduncle prominent, not bordered at posterior edge; lateral keel relatively large; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of the lateral keel. Two lateral setae on each side, the anterior one just at anterior fourth, the posterior one at basal angle.

Elytra oval, wide, convex; lateral keel broad, flattened, with salient and almost reflexed borders; shoulders largely rounded, not prominent; external elytral striae completely obsolete, only the first and second ones hardly visible in




**Figures 5–8.** *Oxytrechus* spp., habitus. **5** – *O. globosus* Mateu; **6** – *O. sciakyi* n. sp. HT ♂; **7** – *O. convexus* Mateu; **8** – *O. balli* Giachino, Allegro & Sciaky HT ♂. Bar line: 1 mm.

the central part, completely obsolete in basal and apical ones; sutural stria visible, marked. Basal striole absent, recurrent stria and apical carina scarcely evident. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal sixth, the second one just after the middle; umbilicate series regular, humeral group with pores 2nd to 4th almost equidistant, 2nd and 3rd closer; preapical pore definitely moved backwards just before the level of 9th pore of the umbilicate series.

Legs short and slender; protibial furrow complete but very superficial; metatibiae straight; two first protarsomeres regularly dilated.

Aedeagus (Fig. 23) short, relatively stout. Median lobe, in lateral view, markedly curved at base, gently curved in the central and apical part, with apex stout and more or less pointing up. Basal bulb normal, sagittal carina short and small. Endophallus provided with an apical scaly patch. Parameres long, reaching the apical fourth of the median lobe, each provided with 4 long distal setae.

Note

The form of apex of the median lobe of aedeagus, in the specimen examined by us, differs from that illustrated by Mateu (1991, fig 13). However, we believe that these differences may fall within the normal intraspecific variability, or might be due to the different positioning of the microscopic preparation of Mateu's drawing.

## *Oxytrechus balli* Allegro, Giachino & Sciaky, 2008 (Figs 8, 24)

*Oxytrechus balli* Allegro, Giachino & Sciaky, 2008: 164.

Examined material

2 ♂♂, 1 ♀, Ecuador, Napo, 4 km W Papallacta, berlese ex *Alnus*, 2.III.1976, J.M. Campbell (CGi, CAl, UASM).

## *Oxytrechus fikaceki* Giachino & Moret **n. sp.** (Figs 13, 29)

Loc. Typ.: Ecuador, prov. Napo, 2.9 km NNW of Papallacta, 3490 m, S 0°21'58" W 78°09'49".

Type series: HT ♂, Ecuador, prov. Napo (29), 2.9 km NNW of Papallacta, Res. Ecol. Cayambe-Coca, S 0°21'58" W 78°09'49", 3490 m, 3.XII.2006, Fikáček lg. (CBu). PTT: 1 ♀, Ecuador, prov. Napo (29), 2.9 km NNW of Papallacta, Res. Ecol. Cayambe-Coca, S 0°21'58" W 78°09'49", 3490 m, 3.XII.2006, Fikáček lg. (CGi); 2 ♂♂, 1 ♀, Ecuador, Napo, ca. 1.5 km north Papallacta, Termas de Papallacta, 3250–3400 m, leaf litter near stream margin, 18–21.X.1995, G.E. Ball & D. Shpeley (UASM, QCAZ); 1♀ Ecuador, Prov. Pichincha, Guamaní, Paso de la Virgen, 26.X.2015, Waypoint 44, S0°21'00.9" W78°11'54.5", 3878 m, P. Moret leg. (CMo).

Diagnosis

An *Oxytrechus* closely related to *O. reventadori* Moret, 2005 from the Reventador volcano, based on the body general shape, and more particularly three characters: the antennae with long, slender and cylindrical 6th–11th antennomeres; the pronotum not cordiform, its base not obliquely emarginate at each side before the hind angles (Moret 2005); and the shape of the median lobe of aedeagus, elongate with a hook-like, pointing up apex (Figs 13, 29). It differs from *O. reventadori* by its pronotum more transverse with more pronounced hind angles, and less convex elytra with less prominent shoulders. The median lobe of aedeagus is also different, with a completely straight ventral margin in the apical 2/3, and a different shape of the apical blade in lateral view (Fig. 29).

Description

Total length (from apical margin of labrum to tip of elytra): HT ♂ 2.93 mm, PTT ♀♀ 2.83 – 3.20 mm. Micropterous; rufo-testaceous, with legs, mandibles, palpi and antennae paler. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on the whole dorsal surface, consisting of very thin isodiametric meshes on pronotum and head, transverse on elytra.

Head small and elongated; temples long (as long as eyes), prominent, convex and abruptly narrowing towards the neck which is large, robust; frontal furrows deep and complete; eyes small, with only 8 ommatidia on their longitudinal diameter, slightly convex, markedly longer than genae; two supraorbital setae on each side and on lines posteriorly convergent. Antennae delicate and long, exceeding elytral base, with apical segment longer than penultimate.

Pronotum transverse (PW/PL = 1.31), not cordiform, convex, widest at middle. Sides regularly arcuate from anterior angles to the middle, then almost straight posterad, emarginate just before the hind angles, which are obtuse, not prominent, but evident; front angles rounded and not projecting forwards; basal peduncle scarcely prominent, not bordered at posterior edge; lateral keel relatively large; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of the lateral keel. Two lateral setae on each side, the anterior one at the anterior third, the posterior one just before the basal angle.

Elytra ovoid, moderately wide, convex; lateral keel broad, flattened, with salient and almost reflexed borders; shoulders not prominent; external elytral striae completely obsolete, only the sutural stria complete; first, second and third striae hardly visible in the central part, completely obsolete in basal and apical ones. Basal striole absent, recurrent stria and apical carina scarcely distinct. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal sixth, the second one just near the middle; umbilicate series regular, humeral group with 2nd to 4th pores almost equidistant,

1st, 2nd and 3rd closer; preapical pore definitely displaced backwards just after the level of 9th pore of the umbilicate series.

Legs short and slender; protibial furrow complete but superficial; metatibiae straight; two first protarsomeres regularly dilated in male.

Aedeagus (Fig. 29) long, but not slender. Median lobe, in lateral view, markedly slender at base, abruptly curved in the basal third, subrectilinear in the apical part, with apex moderately stout, subacuminate and pointing up. Basal bulb without sagittal carina or with a very short one. Endophallus provided with a subapical, long, scaly patch. Parameres moderately long and stout, reaching the base of the apical third of the median lobe, each provided with 3 to 4, robust and long, distal setae.

### Etymology

The new species is dedicated to its collector, Martin Fikáček, a well renowned specialist of Hydrophilidae.

### Distribution and ecology

*Oxytrechus fikaceki* **n. sp.** is known from two localities in the surroundings of Papallacta (Ecuador, Napo province), at 3300–3500 m a.s.l., and in one of them it was found in leaf litter near a stream margin. It was also collected at higher elevation (nearly 3900 m), on the eastern slope of the Guamaní mountain pass, at the edge of a *Polylepis* forest remnant. Available information about the habitat of this species points to ecotone environments between forest and open wetlands or pastures.

The complexity of the *Oxytrechus* populations in the Guamaní-Papallacta area convinced us of the utility of an identification key and a comprehensive iconography of the species present in an area within the limits of 7 km from Paso de la Virgen (figs. 1–8; 17–24).

### Key to the *Oxytrechus* species present in the Guamaní-Papallacta area

**1** Antennae longer, with slender and cylindrical 6th-11th antennomeres. Pronotum not cordiform, base not obliquely emarginate at each side before the hind angles, median peduncle scarcely prominent (*reventadori* group) .... ***O. fikaceki* n. sp.**
– Antennae shorter and thicker. Pronotum more or less cordiform, base obliquely emarginate at each side before the hind angles, median peduncle variable but always evident (other species groups) ..... **2**
**2** Sutural stria obsolete, distinct only in the apical part. Pronotum with lateral sides slightly sinuate before basal angles (fig. 3). Median lobe of aedeagus with large sagittal carina (Fig. 19) ..... ***O. moreti*** Mateu
– Sutural stria complete, more or less marked ..... **3**
**3** Larger species, total length usually > 3.2 mm. Endophallus with an evident, saddle shaped, phanera (Fig. 21). . ***O. globosus*** Mateu
– Smaller or medium-size species, with total length ≤ 3.2 mm. Endophallus with phanera or scaly patches ..... **4**
**4** Small-size species, total length ≤ 2.30 mm. Median lobe of aedeagus and endophallus as in Fig. 22 ..... ***O. sciakyi* n. sp.**
– Medium-size species, total length > 2.70 mm ..... **5**
**5** Pronotum less transverse (Figs 4, 8). Endophallus with or without phanera (Figs 20, 24) ..... **6**
– Pronotum more transverse (Figs 1, 2, 5). Endophallus unarmed (Figs 17–18, 21) ..... **7**
**6** Median lobe of aedeagus stout. Endophallus unarmed (Fig. 24) ..... ***O. balli*** Allegro, Giachino & Sciaky
– Median lobe of aedeagus slender. Endophallus with an evident curved phanera (Fig. 20) ..... ***O. belloi*** Giachino, Allegro & Baviera
**7** Median lobe of aedeagus stout (Fig. 21) ..... ***O. globosus*** Mateu
– Median lobe of aedeagus slender (Figs 17, 18) ..... ***O. equatorianus*** Mateu

### 3.1.2 Notes on some other *Oxytrechus* species from Ecuador

#### Group of *Oxytrechus equatorianus*

*Oxytrechus onorei* Allegro, Giachino & Sciaky, 2008

*Oxytrechus onorei* Allegro, Giachino & Sciaky, 2008: 167.

Examined material

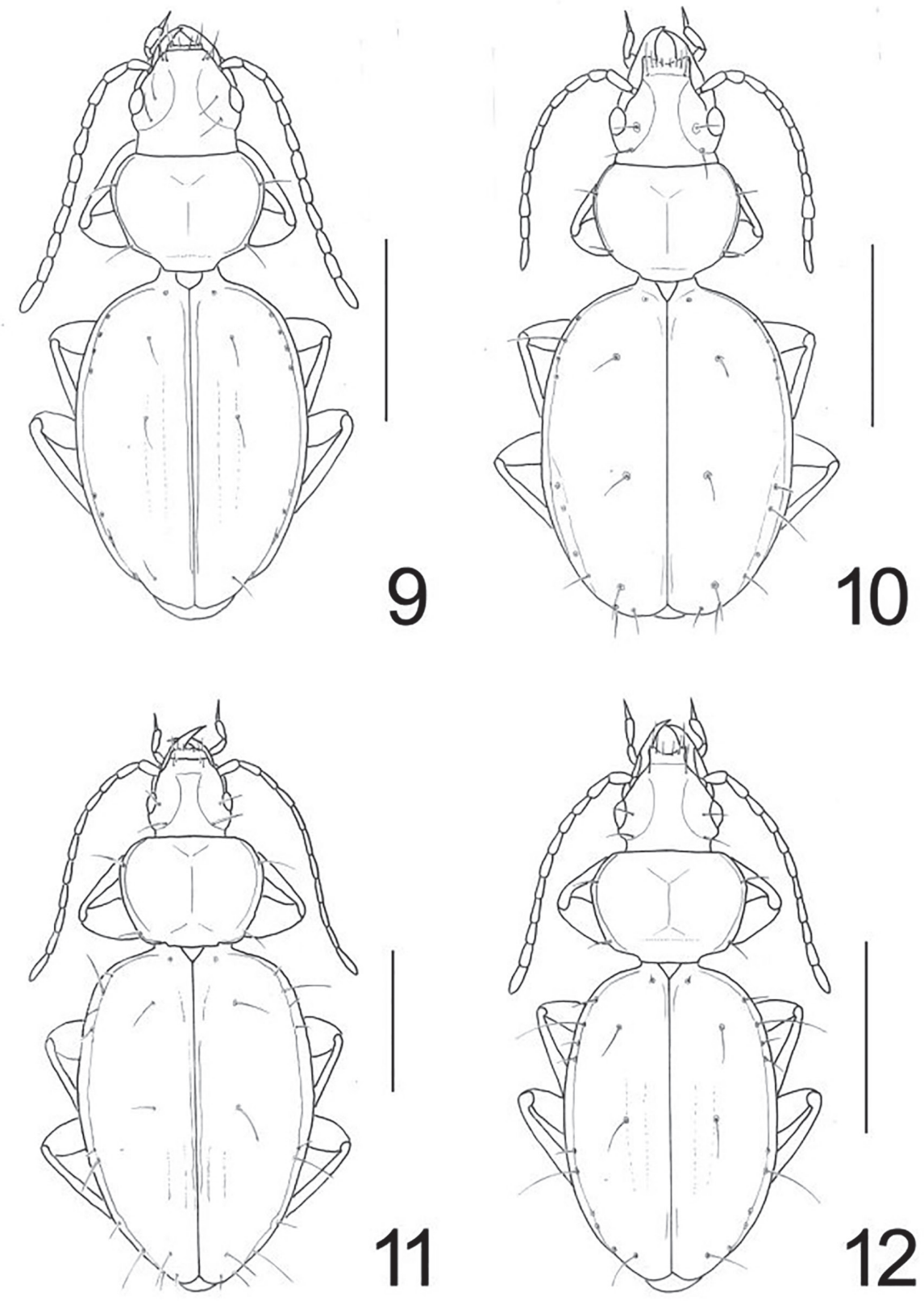
8 ♂♂ 11 ♀♀, Ecuador, Pichincha, Cangahua, m 3375, S0°10.607" W78°7.203", vaglio paramo alto, 3.VIII.2008, legg. Baviera, Bellò, Osella & Pogliano (CAl, CBa, CGi); 1 ♂, Ecuador, Pichincha, Volcan Cayambe, m 4500, 14.VIII.1990, Sciaky (CSc); 2 ♂♂ 1 ♀, Ecuador, Prov. Pichincha, Volcán Cayambe, 30.X.2015, PM073, N0.006962 W78.020278, 4405 m, P. Moret leg. (CMo); 1 ♂, Ecuador, Prov. Pichincha, Volcán Cayambe, 30.X.2015, PM067–3, N0.007500 W78.014748, 4475 m, P. Moret leg. (CMo); 1 ♂, Ecuador, Prov. Pichincha, Volcán Cayambe, 30.X.2015, PM063–3, N0°00'31.5" W78°00'40.6", 4594 m, P. Moret leg. (CMo); 2 ♂♂ 2 ♀♀, Ecuador, Prov. Pichincha, Volcán Cayambe, 18.VII.2016, PM146, S0.008477 W78.012774, 4562 m, P. Moret leg. (CMo); 9 ♂♂ 8 ♀♀, Ecuador, Prov. Pichincha, Volcán Cayambe, 3.III.2017, PM257, N0°00.543' W78°00.603', 4625 m, P. Moret leg. (CMo, QCAZ); 1 ♂ 2 ♀♀, Ecuador, Prov. Pichincha, Volcán Cayambe, 3.III.2017, PM254, S0°00.878' W78°02.527', 4028 m, P. Moret leg. (CMo).

Note

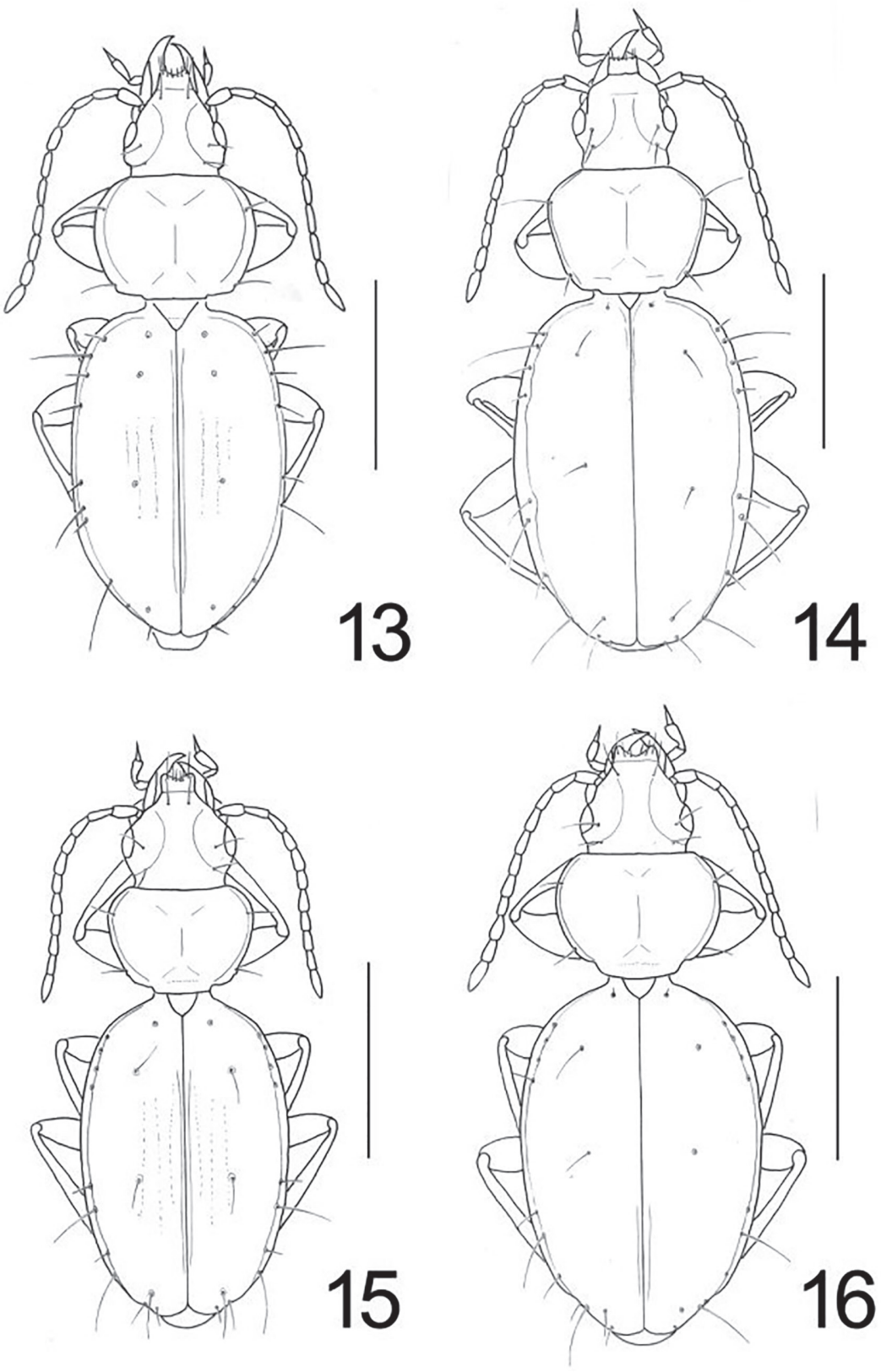
This species has a very broad elevational range, from 3375 m at Cangahua in the lower páramo grassland, to 4700 m in the desert superpáramo of Mt Cayambe.

#### *Oxytrechus vulcanus* Mateu, 1988 (Figs 9, 25)

*Oxytrechus vulcanus* Mateu, 1988: 309.
*Oxytrechus vulcanus* Mateu: Mateu 1991: 82.
*Oxytrechus vulcanus* Mateu: Moret 2005: 63.
*Oxytrechus vulcanus* Mateu: Lorenz 2005: 171.




**Figures 9–12.** *Oxytrechus* spp., habitus. **9** – *O. vulcanus* Mateu; **10** – *O. llaganatisianus* Mateu; **11** – *O. bavierai* n. sp. HT ♂; **12** – *O. atahualpai* n. sp. HT ♂. Bar line: 1 mm.




**Figures 13–16.** *Oxytrechus* spp., habitus. **13** – *O. fikaceki* n. sp. HT ♂; **14** – *O. andersoni* n. sp. HT ♂; **15** – *O. floresanus* n. sp. HT ♂; **16** – *O. ruizianus* n. sp. HT ♂. Bar line: 1 mm.

Examined material

1 ♂, Ecuador, Volcan Chiles, höchste Stelle von Stabt, 23.X.1978, ca. 4000, unter Steinen, Superparamo, Kolumbien-Sammlung Prof. Dr. Sturm, SMNS 2001 (SMNS); 2 specimens, Ecuador, Carchi, Volcán Chiles, 14.III.2017, PM245, N0°48'35.5" W77°56'18.6", 4342 m, P. Moret & M. Gobbi leg. (CMo); 7 specimens, Ecuador, Carchi, Volcán Chiles, 14.III.2017, PM242, N0°48'43.55" W77°56'04.22", 4510 m, P. Moret & M. Gobbi leg. (CMo); 1 ♀, Ecuador, Carchi, Reserva Biológica Guandera, ca 15 km E San Gabriel, 3300 m, 00°35'11"N 77°44'37"W, 220 exc., 1.XI.1999, mixed riparian forest litter, R. Anderson (CMNC); 1 ♀, Ecuador, Carchi, Reserva Biológica Guandera, ca 15 km E San Gabriel, 3300 m, 00°35'11"N 77°44'37"W, 220a., 1.XI.1999, mixed riparian forest litter, R. Anderson (CMNC).

Note

Mateu (1988) provided a relatively brief, correct, description of this species without giving any habitus drawing. We therefore consider useful to provide here drawings of both habitus (Fig. 9) and aedeagus (Fig. 25).

This species lives in the northernmost part of the Ecuadorian Andes, in the Carchi province. Its distribution probably extends across the border into Southern Colombia.

## *Oxytrechus llanganatisianus* Mateu, 1988
(Figs 10, 26)

*Oxytrechus llanganatisianus* Mateu, 1988: 310.
*Oxytrechus llanganatisianus* Mateu: Mateu, 1991: 80.
*Oxytrechus llanganatisianus* Mateu: Moret, 2005: 62.
*Oxytrechus llanganatisianus* Mateu: Lorenz, 2005: 171.

Examined material

4 ♂♂, Ecuador, Prov. Tungurahua. P.N. Llanganatis P26, Cerro Hermoso, S 01°13'29.7" W 078°17'20.7", 4480 m, 17.II.2010, P. Moret (CGi, CMo); 2 ♂♂, Ecuador, Prov. Tungurahua. P.N. Llanganatis P24, Cerro Hermoso, 4420 m, 17.II.2010, P. Moret (CMo).

Note

Mateu (1988) provided a relatively brief, correct description of this species without giving any habitus drawing. We therefore consider useful to provide here drawings of the habitus (Fig. 10) and of the aedeagus (Fig. 26). *Oxytrechus llanganatisianus* is endemic of the Llanganatis Mountains in the Tungurahua province, an isolated, extremely wet, non-volcanic massif of the Eastern Cordillera.

## Group of *Oxytrechus osellai*

## *Oxytrechus bavierai* Giachino & Allegro **n. sp.**
(Figs 11, 27)

Loc. Typ.: Ecuador, Pichincha, Cangahua (NW Oyacachi), 3775 m, S 0° 10.607 / W 78° 7.203

Type series: HT ♂, Ecu - Pichincha - Cangahua, 3775 m, 3.VIII.2008, S 0° 10.607 / W 78° 7.203 vaglio paramo alto, Ecuador 2008, legg. Baviera, Bellò, Osella & Pogliano (CMo). PTT: 1 ♂ 1 ♀, Ecu - Pichincha - Cangahua, 3775 m, 3.VIII.2008, S 0° 10.607 / W 78° 7.203 vaglio paramo alto, Ecuador 2008, legg. Baviera, Bellò, Osella & Pogliano (CBa, CGi).

Diagnosis

*Oxytrechus bavierai* **n. sp.** is probably very close to *O. osellai* Giachino, Allegro & Baviera, 2014, from Cangahua area as well, based on the peculiar aedeagus shape (Fig. 27) (Giachino et al., 2014, fig. 3); it is very distinct by the larger body size, the larger ovoid elytra and the longer antennae.

Description

Total length (from apical margin of labrum to tip of elytra): mm 3.71–3.88 ♂♂; 3.45 ♀. Micropterous; rufotestaceous, with legs, mandibles, palpi and antennae paler. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on disk of pronotum and elytra, more evident on head, consisting in very thin isodiametric meshes.

Head small and elongated; temples long (longer than eyes), prominent, convex and narrowing on neck that is large, robust; frontal furrows deep and complete; eyes large and slightly convex, as long as the genae; two supraorbital setae on each side, placed on lines hardly converging backwards. Antennae delicate and long, exceeding the elytral base, with the apical segment slightly longer than penultimate.

Pronotum transverse (PW/PL = 1.31 ♂; 1.42 ♀), not cordiform, convex, widest at anterior fourth. Sides not regularly arcuate from anterior angles to basal ones, subrectilinear and converging from the anterior fourth to the basal angles, not sinuate before the hind angles, which are obtuse, not prominent, but distinct; front angles smoothed and not projecting forwards; basal peduncle prominent, not bordered at posterior edge; lateral keel relatively narrow; median furrow distinct; basal impressions small and superficial, adjoining the terminal part of lateral keel. Two lateral setae on each side, the anterior one just at anterior fourth, the posterior one before basal angle.

Elytra ovoid, wide, convex; lateral keel broad, flattened, with salient and almost reflexed borders; shoulders largely rounded, not prominent; elytral striae almost completely obsolete, only the first and second ones hardly visible in the sub-apical part; sutural stria hardly visible only in the sub-basal and central part, completely obsolete in the apical one. Basal striole absent, recurrent stria and apical carina scarcely evident. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, the first one at basal sixth, the second one just near the middle; umbilicate series regular, humeral group with pores 2nd to 4th almost equidistant, 2nd and 3rd closer; preapical pore just at the level of 8th pore of the umbilicate series.

Legs short and slender; protibial furrow complete but very superficial; metatibiae straight; two first protarsomeres regularly dilated.

Aedeagus (Fig. 27) robust, elongate. Median lobe, in lateral view, S-shaped, markedly and sharply curved at base, subrectilinear in the central part, sharply bent upwards in the apical part which is enlarged and subtriangular. Basal bulb normal, without sagittal carina. Median lobe, in dorsal view, largely asymmetrical, subtriangular at apex. Endophallus provided with a median, poorly evident, scaly patch. Parameres short and stout, reaching the subapical part of the median lobe, each provided with 4 robust and long distal setae.

### Etymology

It is a pleasure for us to dedicate this new species to one of its collectors, our friend Cosimo Baviera.

### Distribution and ecology

At present, *Oxytrechus bavierai* **n. sp.** is only known from the type locality, the Cangahua area (Ecuador, prov. Pichincha), where it was collected by sieving litter in a páramo formation at 3775 m a.s.l. In the Cangahua area, *O. bavierai* **n. sp.** is in sympatry, but not in syntopy, with *O. osellai*.

## Group of *Oxytrechus solitarius*

### *Oxytrechus atahualpai* Giachino & Allegro **n. sp.** (Figs 12, 28)

Loc. Typ.: Ecuador, Pichincha, Volcan Cayambe, m 4500

Type series: HT ♂, Ecuador, Pichincha, Volcan Cayambe, m 4500, 14.VIII.1990, Sciaky (CSc).

### Diagnosis

This is probably one of the two species of Cayambe volcano cited by Mateu (1988: 313). It is characterized by large, convex eyes and short, very convex temples. Based on the shape of the aedeagus, which is particularly short, stout, with a hypertrophic basal bulb, *O. atahualpai* **n. sp.** seems to be similar to *O. solitarius* Mateu, 1991 from Silvia (Cauca), Colombia. However, it differs from the latter by its short temples, convex and restricted backwards, and by the sutural stria, only visible in the apical area and, shortly, near the scutellum. At the current state of knowledge *O. atahualpai* **n. sp.** appears taxonomically isolated within the genus.

### Description

Total length (from apical margin of labrum to tip of elytra): mm 2.79. Micropterous; rufo-testaceous, with legs, mandibles, palpi and antennae paler. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on disk of pronotum and elytra, more evident on head, consisting in very thin isodiametric meshes on pronotum and head, transversal on elytra.

Head small and elongated; temples short (shorter than eyes), prominent, convex and narrowing on neck that is large, robust; frontal furrows deep and complete; eyes large and slightly convex, markedly longer than genae; two supraorbital setae on each side and on subparallel lines, not converging backwards. Antennae delicate and short, hardly exceeding elytral base, with the apical segment slightly longer than penultimate.

Pronotum transverse (PW/PL = 1.39), not cordiform, convex, widest at anterior third. Sides not regularly arcuate from anterior angles to basal ones, subrectilinear and converging from the anterior third to the basal angles, not sinuate before hind angles, which are obtuse, not prominent, but distinct; front angles rounded and not projecting forwards; basal peduncle prominent, not bordered at posterior edge; lateral keel relatively narrow; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of lateral keel. Two lateral setae on each side, the anterior one just at anterior third, the posterior before the basal angle.

Elytra ovoid, wide, convex; lateral keel broad, flattened, with salient and almost reflexed borders; shoulders largely rounded, not prominent; external elytral striae completely obsolete, only the first and second ones hardly visible in the central part, completely obsolete in basal and apical ones; sutural stria hardly visible only in the basal and apical part. Basal striole absent, recurrent stria and apical carina hardly distinct. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal sixth, the second one just near the middle; umbilicate series regular, humeral group with pores 2$^{nd}$ to 4$^{th}$ almost equidistant, 3$^{rd}$ and 4$^{th}$ closer; preapical pore definitely displaced backwards just after the level of 9$^{th}$ pore of the umbilicate series.

Legs short and slender; protibial furrow complete but superficial; metatibiae straight; two first protarsomeres regularly dilated.

Aedeagus (Fig. 28) short, very stout. Median lobe, in lateral view, markedly stout at base, gently curved in the central and apical part, with apex stout, subacuminate and not pointing up. Basal bulb very enlarged, without sagittal carina. Endophallus provided with a median, long, scaly patch. Parameres short and very stout, reaching the subapical part of the median lobe, each provided with 5 robust and long distal setae.

### Etymology

This new species is dedicated to Atahualpa, the thirteenth and last king of the Inca Empire, before the Spanish conquest.

### Distribution and ecology

At present *Oxytrechus atahulpai* **n. sp.** is only recorded from the type locality, the Cayambe volcano at 4500 m a.s.l. (Ecuador, Pichincha province), in a superpáramo environment. No ecological data are available.

## Group of *Oxytrechus pierremoreti*

### *Oxytrechus pierremoreti* Allegro, Giachino & Sciaky, 2008

*Oxytrechus pierremoreti* Allegro, Giachino & Sciaky, 2008: 162.

#### Examined material

6 ♂♂, Ecuador, Pichincha, Volcán Atacazo, 3600 m, 9.VIII.2008, legg. Baviera, Bellò, Osella & Pogliano (CBa, CGi, CMo); 2 PTT ♀, Ecuador, Pichincha, Volcán Atacazo, 3707 m, 9.VIII.2008, P.M. Giachino (CAl); 1♂ 1♀, Ecuador, Pichincha, Quito to Chiriboga-S. Juan, 3300 m, 29.VII.2008, S 00°17'51.9 W 78°36'39.6", v. su paramo, legg. Baviera, Bellò, Osella & Pogliano (CMo); 1♂, Ecuador, Pichincha, Volcán Atacazo, 3600 m, 9.VIII.2008, legg. Baviera, Bellò, Osella & Pogliano (CAl)

#### Note

The specimens from S. Juan were collected from 3300–3520 m at the lower altitudinal threshold of this species (Allegro et al. 2008).

### *Oxytrechus andersoni* Giachino & Allegro **n. sp.** (Figs 14, 30)

Loc. Typ.: Ecuador, Pichincha, ca 27,5 km NW Quito, Campamento Pichán, 3350 m, S 00°07'31" W 78°33'56"

Type series: HT ♂, Ecuador, Pichincha, ca 27,5 km NW Quito, Campamento Pichán, 3350 m, S 00°07'31" W 78°33'56", R. Anderson, 22.X.1999 202 cloud forest litter (CMNC). PTT: 3 ♂♂ 1 ♀, Ecuador, Pichincha, ca 27,5 km NW Quito, Campamento Pichán, 3350 m, S 00°07'31" W 78°33'56", R. Anderson, 22.X.1999 202 cloud forest litter (CMNC, CGi, CMo).

#### Diagnosis

An *Oxytrechus* closely related to *O. pierremoreti* Allegro, Giachino & Sciaky, 2008 from the Volcán Atacazo based on body general shape, in particular the shape of the pronotum (Allegro et al. 2008) and the general shape of the median lobe of aedeagus (fig 30). It differs from *O. pierremoreti* by the more transverse pronotum and by the different shape, in lateral view, of the median lobe of aedeagus, with apical blade large, more bent upwards (fig 30).

#### Description

Total length (from apical margin of labrum to tip of elytra): mm 3.16–3.36 ♂♂; 2.9 ♀. Micropterous; rufo-testaceous (with head and pronotum darker than elytra); legs, mandibles, palpi and antennae paler. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on elytra, more distinct on pronotum and head, consisting of very thin transverse meshes.

Head small and elongated; temples long (as long as eyes), prominent, rectilinear and narrowing on neck that is large, robust; frontal furrows deep and complete; eyes large and slightly convex, markedly longer than genae; two supraorbital setae on each side and on subparallels lines, not convergent posteriorly. Antennae delicate but relatively short, hardly exceeding elytral base, with the apical segment slightly longer than penultimate.

Pronotum transverse (PW/PL = 1.26–1.28 ♂♂; 1.29 ♀), subcordiform, convex, widest at the base of anterior third. Sides, subrectilinear from anterior pronotal seta, both anteriorly and posteriorly; not sinuated or emarginated before the hind angles, which are rounded, not prominent and not distinct; front angles rounded and not projecting forwards; basal peduncle hardly prominent, not bordered at the posterior edge; lateral keel narrow; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of the lateral keel. Two lateral setae on each side, the anterior one just at anterior third, the posterior one just before the basal angle.

Elytra ovoid, wide, convex; lateral keel broad, flattened, with salient and almost reflexed borders; shoulders largely rounded, not prominent; elytral striae completely obsolete, only the sutural stria hardly visible at anterior fourth. Basal striole absent, recurrent stria and apical carina scarcely distinct. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal seventh, the second one just near the middle; umbilicate series regular, humeral group with pores 2nd to 4th almost equidistant, 1st and 2nd closer; preapical pore definitely displaced backwards just at the level of 8th pore of the umbilicate series.

Legs short and slender; protibial furrow complete and distinct; metatibiae straight; two first protarsomeres regularly dilated in male.

Aedeagus (Fig. 30) delicate, slender. Median lobe, in lateral view, scarcely and evenly arcuate from base to apex, which is sharply bent upwards. Apical blade regularly curved, before downwards and after upwards; apex dorsally wide and truncate. Basal bulb with a large sagittal carina. Endophallus unarmed. Parameres moderately long and slender, reaching the base of the apical fourth of the median lobe, each provided with 3–5, robust and long, distal setae.

#### Etymology

This new species is dedicated to its collector, Robert S. Anderson, a well renowned Canadian specialist of Curculionoidea.

Distribution and ecology

*Oxytrechus andersoni* **n. sp.** is only recorded from the type locality, Campamento Pichán, at 27.5 km NW of Quito (Ecuador, Pichincha province), where it was collected by sifting litter of cloud forest, at 3350 m a.s.l. No other ecological data are available.

## 3.2 Species from Colombia

### *Oxytrechus floresanus* Giachino & Allegro **n. sp.** (Figs 15, 31)

Loc. Typ.: Colombia, Páramo del Ruiz, Valle de las Flores.

Type series: HT ♂, Kol., Páramo del Ruiz, Valle de los Flores, 9.X.1978, unter Steinen an Hang, Kolumbien-Sammlung Prof. Dr. Sturm, SMNS 2001 (SMNS).

Diagnosis

An *Oxytrechus* closely related to *O. bousqueti* Mateu, 1991 from Silvia Cauca, based on the general shape of the median lobe of aedeagus (Fig. 31). It differs from *O. bousqueti* by its larger size (2.8 mm vs 2.4–2.5 mm in *bousqueti*) and by the different curvature, in lateral view, of the median lobe of aedeagus, with more rounded apex (Fig. 31).

Description of HT ♂

Total length (from apical margin of labrum to tip of elytra): mm 2.80. Micropterous; rufo-testaceous (with head darker than pronotum and elytra); legs, mandibles, palpi and antennae paler. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on pronotum, more distinct on elytra and head, consisting of very thin transversal meshes on pronotum and elytra, isodiametric on head.

Head large, not elongated; temples short (shorter than eyes), prominent, subrectilinear and narrowing on neck that is large, robust; frontal furrows deep and complete; eyes large and convex, markedly longer than genae; two supraorbital setae on each side and on subparallels lines, not posteriorly convergent. Antennae delicate but relatively short, hardly exceeding elytral base, with the apical segment slightly longer than penultimate.

Pronotum transverse (PW/PL = 1.41), convex, widest just at the base of anterior fourth. Sides subrectilinear posteriorly to anterior pronotal seta, regularly curved anteriorly; not sinuated or emarginated before hind angles, which are rounded, not prominent and hardly evident; front angles rounded and not projecting forwards; basal peduncle scarcely prominent, not bordered at posterior edge; lateral keel narrow; median furrow superficial; basal impressions small and superficial, adjoining the terminal part of lateral keel. Two lateral setae on each side, the anterior one just at anterior fourth, the posterior one before basal angle.

Elytra ovoid, wide, convex; lateral keel moderately broad, flattened, with salient and almost reflexed borders; shoulders largely rounded, not distinct; external elytral striae completely obsolete, only first to third striae hardly visible in the median part, sutural stria obsolete in the anterior and posterior parts. Basal striole absent, recurrent stria and apical carina scarcely evident. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at basal fifth, the second one after middle; umbilicate series regular, humeral group with 2nd to 4th pores almost equidistant, 1st and 2nd closer; preapical pore definitely moved backwards after the level of 8th pore of the umbilicate series.

Legs short and slender; protibial furrow complete and evident; metatibiae straight; two first protarsomeres regularly dilated in male.

Aedeagus (Fig. 31) delicate, slender. Median lobe, in lateral view, scarcely and regularly arcuate from base to apex, which is rounded; apical blade stout. Basal bulb with a large sagittal carina. Endophallus provided with a subapical, long, scaly patch. Parameres moderately long and stout, reaching the base of the apical fifth of the median lobe, each provided with 3, robust and long, distal setae.

Female unknown.

Etymology

From the name of the type locality "Valle de las Flores".

Distribution and ecology

At present *Oxytrechus floresanus* **n. sp.** is only recorded from the type locality, Valle de los Flores, Páramo del Ruiz (Colombia), where it was collected under stone along the valley slope. No other ecological data are available.

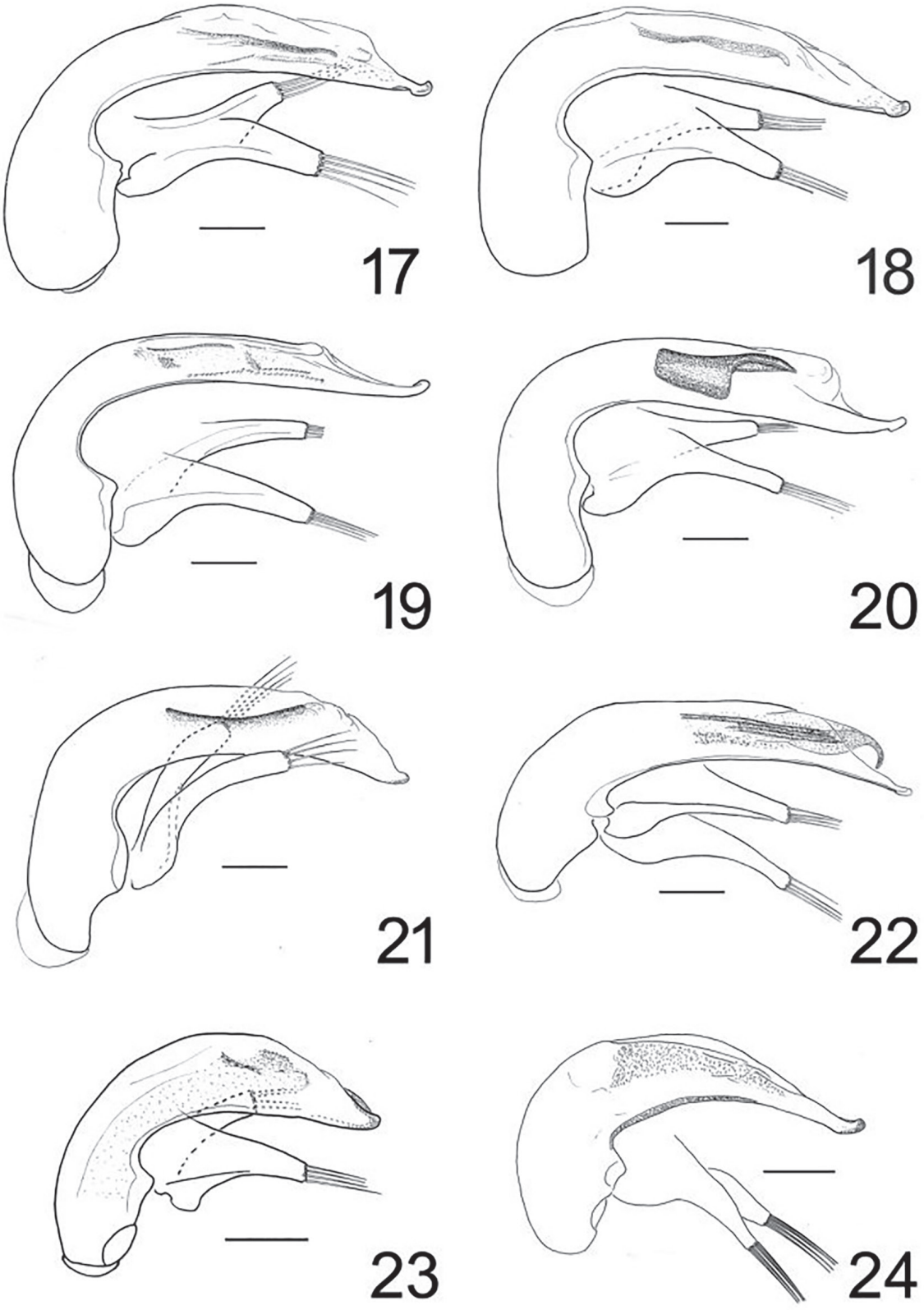
### *Oxytrechus ruizianus* Giachino & Allegro **n. sp.** (Figs 16, 32)

Loc. Typ.: Colombia, Nevado del Ruiz, páramo near Laguna Verde.

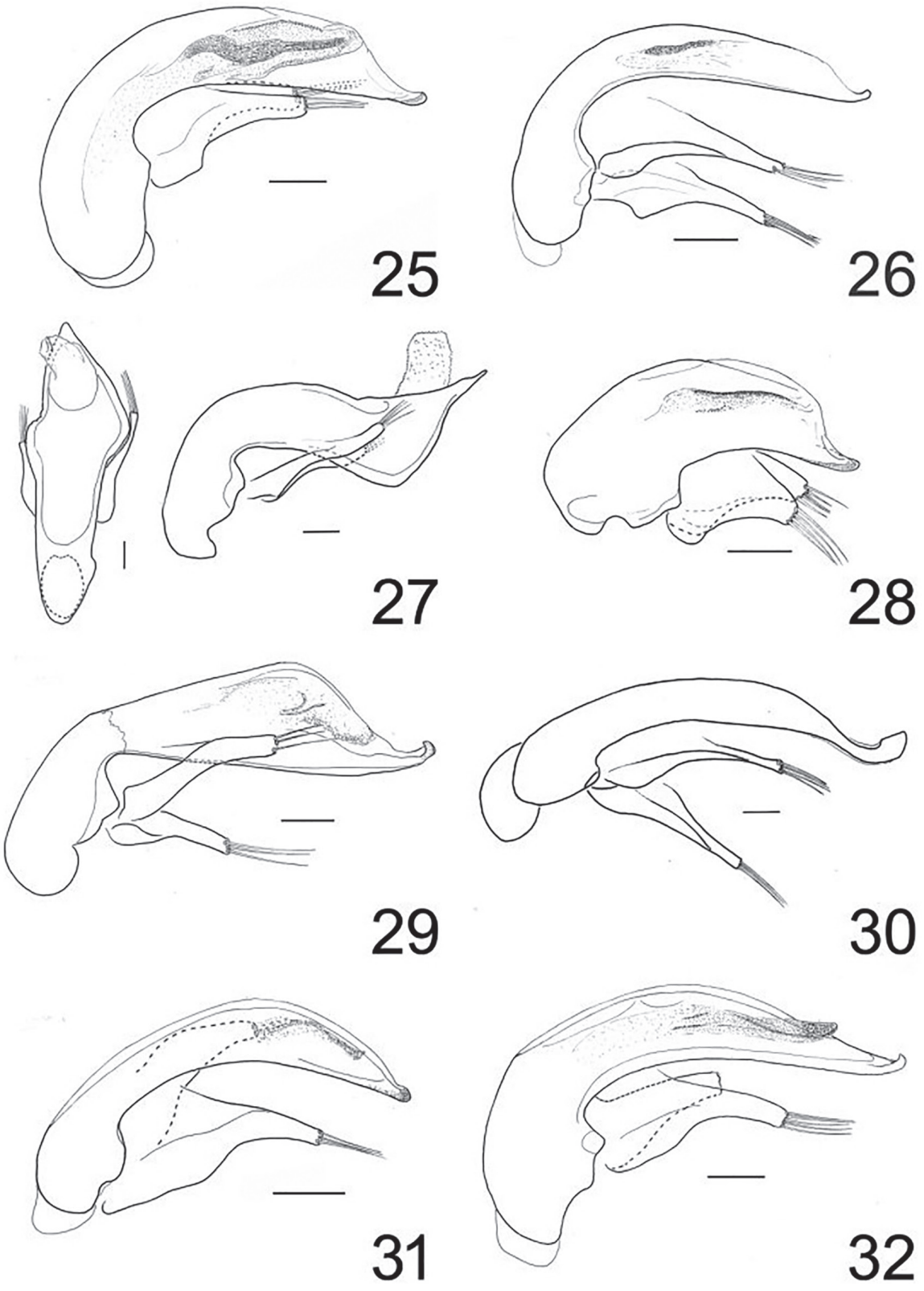
Type series: HT ♂, Kol., Ruiz, Paramo bei Laguna Verde Bodenpt., 8.IX.1978, 1–7 cm unter Moos u. Gras, Kolumbien-Sammlung Prof. Dr. Sturm, SMNS 2001 (SMNS).

Diagnosis

An *Oxytrechus* closely related to *O. campbelli* Mateu, 1991 based on the shape of median lobe of aedeagus, the effaced sutural stria and elytral lateral keel progressively restricted in the basal part from shoulders towards scutellum. It differs from *O. campbelli* by the more curved, in lateral view, median lobe of aedeagus, with a bigger basal bulb and more elongated copulatrix lamella.




**Figures 17–24.** *Oxytrechus* spp., aedeagi in left lateral view. **17** – *O. equatorianus* Mateu HT ♂; **18** – *O. pichinchanus* Mateu HT ♂; **19** – *O. moreti* Mateu HT ♂; **20** – *O. belloi* Giachino, Allegro & Baviera HT ♂; **21** – *O. globosus* Mateu; **22** – *O. sciakyi* n. sp. HT ♂; **23** – *O. convexus* Mateu; **24** – *O. balli* Giachino, Allegro & Sciaky HT ♂. Bar line: 0.1 mm.




**Figures 25–32.** *Oxytrechus* spp., aedeagi in left lateral view. **25** – *O. vulcanus* Mateu; **26** – *O. llaganatisianus* Mateu; **27** – *O. bavierai* n. sp. HT ♂; **28** – *O. atahualpai* n. sp. HT ♂; **29** – *O. fikaceki* n. sp. HT ♂; **30** – *O. andersoni* n. sp. HT ♂; **31** – *O. floresanus* n. sp. HT ♂; **32** – *O. ruizianus* n. sp. HT ♂. Bar line: 0.1 mm.

This is the second Columbian species of the species group of *O. lallemandi* Jeannel, 1927 (sensu Mateu 1991).

Description of the HT ♂

Total length (from apical margin of labrum to tip of elytra): mm 2.23. Micropterous; brownish-black, with legs, mandibles, palpi and antennae rufo-testaceous. Teguments smooth, shiny, glabrous, with microsculpture hardly visible on disk of pronotum and elytra, consisting of very thin isodiametric meshes.

Head relatively large and stout; temples short (shorter than eyes), subrectilinear and narrowing on neck; frontal furrows deep and complete; eyes relatively small and hardly convex, longer than genae; two supraorbital setae on each side and on lines slightly converging backwards. Antennae delicate and short, slightly exceeding elytral base, with the apical segment slightly longer than penultimate.

Pronotum very transverse (PW/PL = 1.34), convex, widest at anterior third. Sides regularly arcuate, not sinuate before hind angles, which are obtuse, rounded and not prominent; front angles smoothed and not projecting forwards; basal peduncle prominent, not bordered at posterior edge; lateral keel narrow; median furrow superficial;

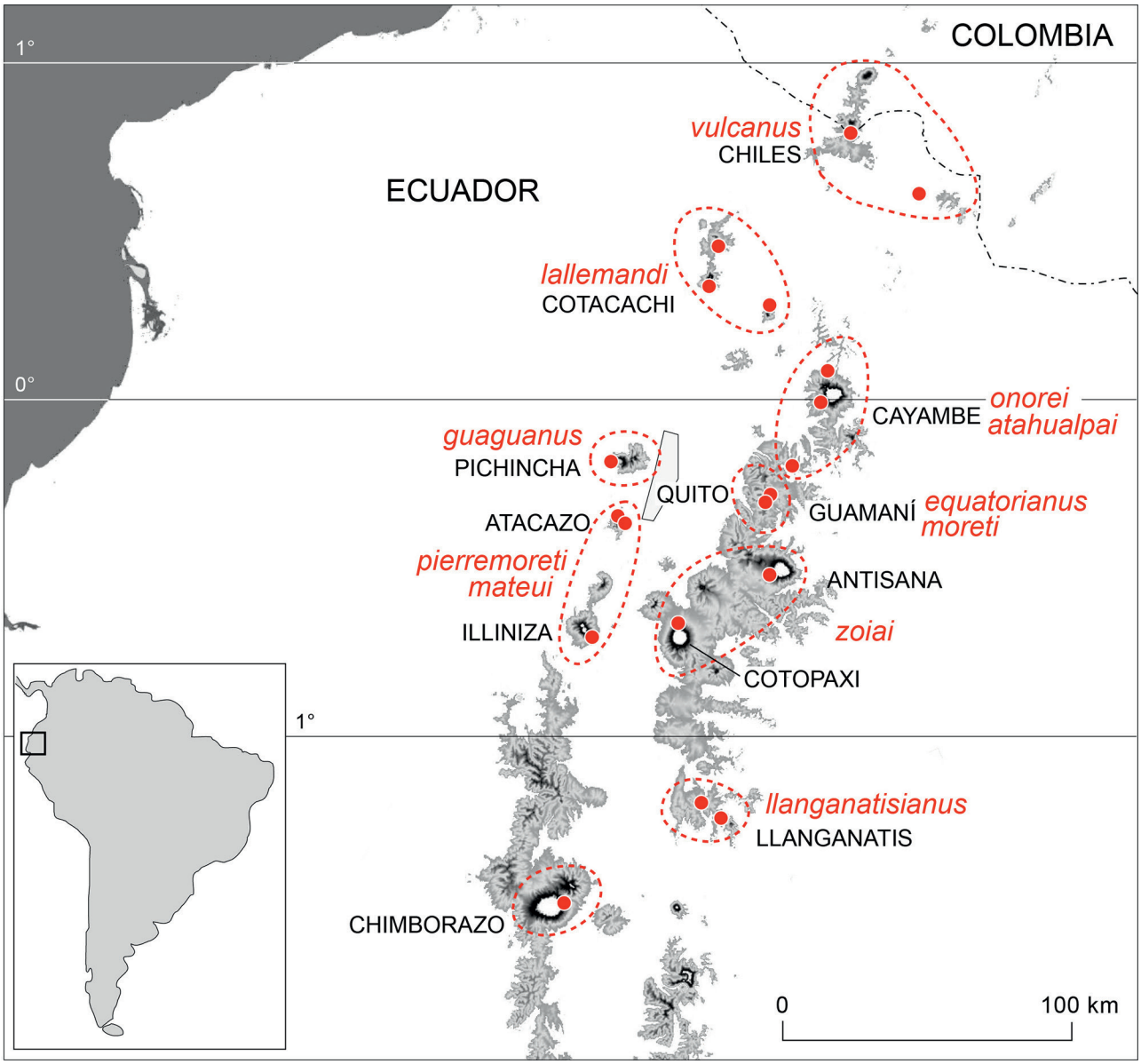



**Figure 33.** Distribution in Northern Ecuador of the *Oxytrechus* species that live in the páramo ecosystem above 3900 m.

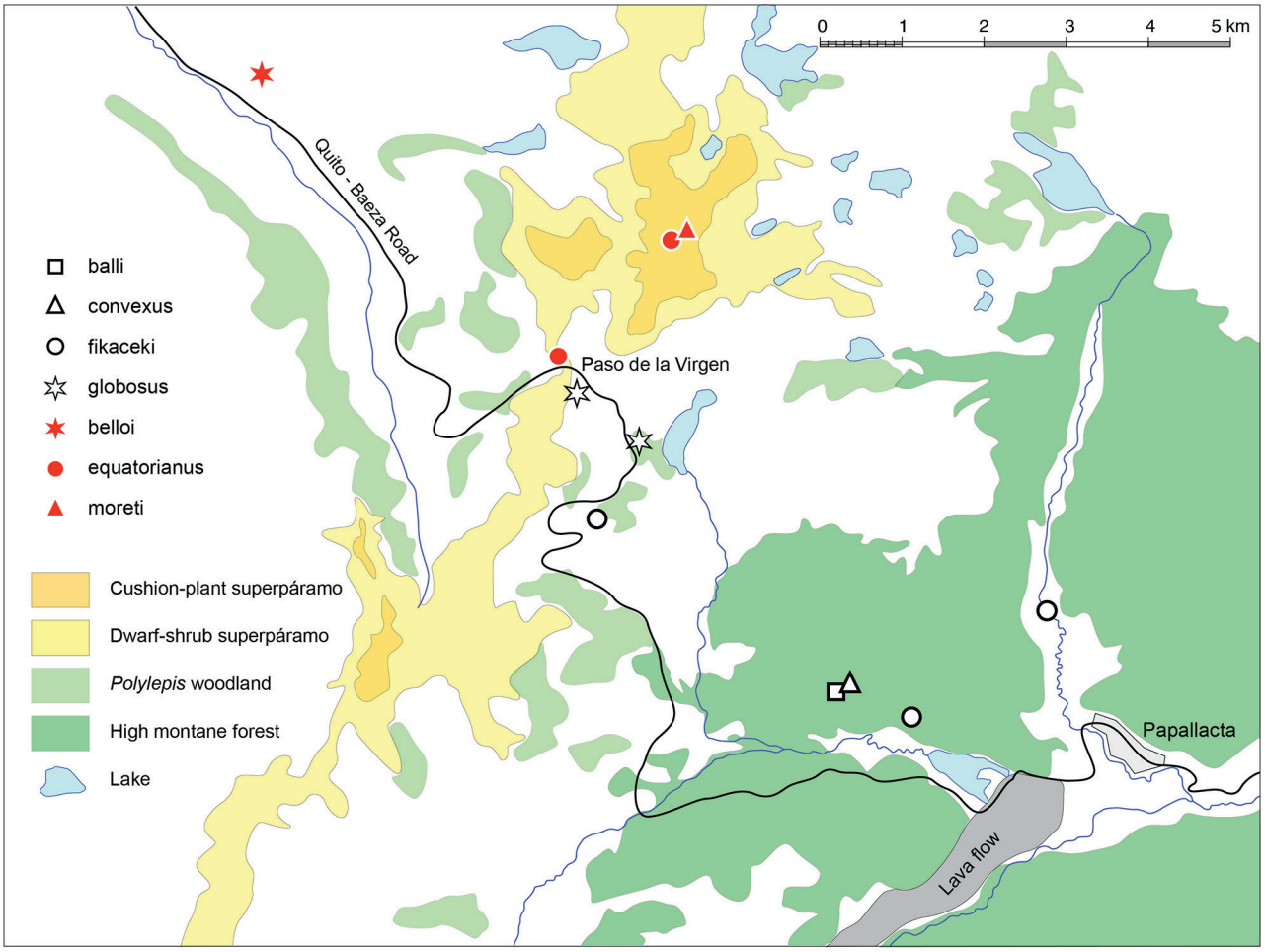



**Figure 34.** Distribution of *Oxytrechus* species in the Guamaní – Papallacta area. White symbols: forest and forest edge dwellers; red symbols: páramo and open land dwellers. Phytogeographic map adapted from LAUER et al., 2003.

basal impressions small and superficial, adjoining the terminal part of lateral keel. Two lateral setae on each side, the anterior one just at the anterior fifth, the posterior one before the basal angle.

Elytra oval, wide, convex; lateral keel narrow, flattened, with salient and almost reflexed borders, progressively restricted in the basal part from shoulders towards scutellum; shoulders completely rounded, not prominent; all elytral striae completely obsolete; sutural stria visible only in posterior third. Basal striole absent, recurrent stria and apical carina scarcely evident. Chaetotaxis: juxtascutellar pore present, two discal pores relatively large, fovea-like, the first one at the base of anterior seventh, the second one just at middle; umbilicate series regular, humeral group with 2nd to 4th pores almost equidistant; preapical pore definitely moved backwards at the level of the 9th pore of the umbilicate series.

Legs short and slender; protibial furrow lacking; metatibiae straight; two first protarsomeres regularly dilated.

Aedeagus (Fig. 32) long, slender. Median lobe, in lateral view, little curved, gently curved in apical part, with apex gently curved upward. Basal bulb large, sagittal carina small. Endophallus provided with a long, subapical, tongue-like, phanera. Parameres long, reaching the apical third of the median lobe, provided with 5 long distal setae.

Female unknown.

### Etymology

From the name of the volcano Nevado de Ruiz, which is the type locality of this new species.

### Distribution and ecology

At present *Oxytrechus ruizianus* **n. sp.** is only recorded from the type locality, a páramo near Laguna Verde, on the

slopes of the volcano Nevado de Ruiz (Colombia), where it was collected 1–7 cm deep under moss and grass. No other ecological data are available.

## 4 Discussion

The examination of the material object of this contribution revealed an unsuspected richness of microendemic species of *Oxytrechus*, localized in different mountain areas of Ecuador and Colombia.

In the tropical alpine páramo ecosystem, above the timber line, *Oxytrechus* shows a highly fragmented distribution pattern. Each species is restricted to one volcano or to one massif, within a surface area that does not exceed 40 km in diameter (Fig. 33). Conversely, each páramo area possesses one or two microendemic *Oxytrechus* species. The high montane forest ecosystem has a different and more diverse *Oxytrechus* fauna, typically living in the leaf litter above the ground. The geographic ranges of these woodland species are less well known, but they appear to be small as well. Only a few species, namely *O. onorei*, *O. pierremoreti,* and *O. vulcanus*, are present both in the páramo and in the montane forest.

Several new species have been collected in areas easily accessible from Quito that had been surveyed many times over the last 40 years. A typical example is the area of Papallacta-Paso de la Virgen (Ecuador, provinces of Pichincha and Napo), where eight different species are now recorded (Fig. 34), some of which belong to the same group of species. The high number of new species found in already investigated areas, leads us to suppose that many more species are still awaiting discovery. In addition to the description of seven new species for science, further evidence for a redefinition of species groups based on the morphology of the aedeagus is provided. The former systematic approach, based on a few external characters, which has proved to be quite labile and unstable, needs a complete revision. An aid to the construction of a robust phylogenetic system will come from the biomolecular analyses that are presently underway (Moret & Faille in preparation).

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