



A new cave-dwelling species of *Quaestus* Schaufuss, 1861 from the Montes de Pas, Northern Spain (Coleoptera: Leiodidae: Leptodirini)

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Abstract

Quaestus (*Quaesticulus*) *pasensis* **sp. nov.** is described from several caves in the Churrón-Millajo Cave karst system (Municipal Districts of Luena and Vega de Pas, Cantabria, Spain), a part of the karst region of Ocejo (Montes de Pas). The new species may be easily recognized by the distinct structures of the male and female genitalia (spermathecal complex), and especially by the peculiar shape of antennae. The taxonomic position of the new species is discussed, particularly its differences and similarities with morphologically and geographically proximate species, and affinities with two closely related species, *Q.* (*Quaesticulus*) *minos* (Jeannel, 1909) and *Q.* (*Quaesticulus*) *autumnalis* (Escalera, 1898). Biological and ecological data are provided. A key to the species of the subgenus *Quaesticulus* Schaufuss, 1861 is included.

Key words: Coleoptera, Leptodirini, *Quaestus* (*Quaesticulus*) *pasensis*, new species, taxonomy, identification key, cave dwelling fauna, North Spain

Resumen

En este trabajo se describe *Quaestus* (*Quaesticulus*) *pasensis* **sp. nov.** de varias cuevas del sistema kárstico de la Cueva de El Churrón-Millajo, en los Términos Municipales de Luena y Vega de Pas (Cantabria, España), que se localiza cerca de la región kárstica de Ocejo (Montes de Pas). Se discute su posición taxonómica señalando las diferencias y semejanzas que existen entre las especies próximas morfológica y geográficamente, de las cuales se puede separar fácilmente por las diferentes estructuras en el macho y de la genitalia femenina (complejo espermático), y de modo muy especial por la peculiar forma de las antenas. También se discuten las afinidades con las especies más próximas *Quaestus* (*Quaesticulus*) *minos* (Jeannel, 1909) y *Q.* (*Q.*) *autumnalis* (Escalera, 1898). Por último, se incluyen datos biológicos, ecológicos y una clave para las especies del subgénero *Quaesticulus* Schaufuss, 1861.

Palabras clave: Coleoptera, Leptodirini, *Quaestus* (*Quaesticulus*) *pasensis*, nueva especie, taxonomía, clave de identificación, fauna troglobia, Norte de España

Introduction

All species of the genus *Quaestus* Schaufuss, 1861 are colonizing caves in the northern part of the Iberian Peninsula, where each is endemic in one or few karstic massifs located in the Cantabrian Mountains, except *Q.* (*Quaesticulus*) *cisnerosii* (Pérez-Arcas, 1872) that lives in caves outside of this region, in a small karstic massif situated in the center of Spain (Salgado 1976, 1993). The genus *Quaestus* currently includes six

subgenera (Salgado *et al.* 2008). One of them, the subgenus *Quaesticulus* Schaufuss, 1861 includes twelve species, together with the new species described here (*Q. pasensis* sp. nov.). The characters that define the subgenus *Quaesticulus*, as well as the distribution and taxonomic position of the included species have been defined in various studies (Salgado 2000, 2001, Salgado *et al.* 2008).

The purpose of this paper is to describe a new species of *Quaestus* from the Cantabrian Mountains, to establish two groups of species of the subgenus *Quaesticulus* and to add new data on distribution of the geographically close species, *Q. (Quaesticulus) minos* (Jeannel, 1909) and *Q. (Q.) autumnalis* (Escalera, 1898). A recently published molecular phylogeny of Leptodirini (Ribera *et al.* 2010) did not include *Q. pasensis*, but, based on unpublished analyses of a larger dataset, *Q. pasensis* is nested inside *Quaestus* group of genera and forms a monophyletic group with two other species, *Q. minos* and *Q. autumnalis* (Ribera, pers. comm.)

Material and methods

The specimens of the new species were collected manually or using aspirator and preserved in ethanol, 70% or absolute (for molecular studies that are currently under way). Illustrations were made from cleared specimens mounted on plastic microslides. The aedeagus and spermathecal complex were removed and placed in 10% KOH for six hours, after which the preparations were dehydrated by passing them through an ethanol series (60%–96%) for a few minutes and then in xylene for approximately 12 hours. Immediately after this the preparations were mounted in Canada balsam on transparent rectangular acetate paper plates pinned together with corresponding specimens.

We used the following acronyms for the institutions or particular collections where paratypes are deposited:

CZUL	Colección de Zoología de la Universidad de León, Spain (Luis M. Fernández)
JFCL	Javier Fresneda private collection, Lleida, Spain
JMSC	José María Salgado private collection, Vigo (Pontevedra), Spain
MCNA	Museo Regional de Ciencias Naturales de Álava, Vitoria, Spain (Juan M. Marcos)
MNCN	Museo Nacional de Ciencias Naturales de Madrid, Spain (Mercedes Paris)
MNHN	Muséum National d'Histoire Naturelle, Paris, France (Thierry Deuve)
MZBS	Museo de Zoología de Barcelona, Spain (Oleguer Escolà)
PMGC	Pier Mauro Giachino private collection, Torino, Italy

All geographic coordinates are given in UTM system (MGRS), followed by altitude above sea level.

Subgenus *Quaesticulus* Schaufuss, 1861

The following characters define the subgenus *Quaesticulus*: apices of elytra rounded, not divergent; sutural striae of elytra long and visible; metafemora of males without small tooth on the posterior margin (except *Q. adnexus* Schaufuss, 1861); internal sac of the aedeagus without robust sclerotized pieces and with a stylet lacking the basal plate; spermatheca with a short spermathecal duct and spermathecal membranous gland. This subgenus can be divided into two groups based on the length / width ratios of antennomeres 8 and 11. The species are distributed between the two groups as follows:

adnexus group (9 species): *Quaestus adnexus* (Schaufuss, 1861), *Q. angustitarsis* (Español, 1950), *Q. autumnalis* (Escalera, 1898), *Q. canis* (Salgado, 1992), *Q. cisnerosii* (Pérez-Arcas, 1872), *Q. noltei* (Coiffait, 1965), *Q. pachecoi* (Bolívar, 1915), *Q. bustilloi* Salgado & Fresneda, 2009 and *Q. sharpi* (Escalera, 1898).

filicornis group (3 species): *Quaestus filicornis* (Uhagón, 1881), *Q. minos* (Jeannel, 1909) and *Q. pasensis* sp. nov.

Key to species of the subgenus *Quaesticulus*

1. 11th antennomere less than one and a half times as long as 10th; 8th antennomere at least two and a half as long as wide (*filicornis* group) 2
- 1'. 11th antennomere more than one and a half times as long as 10th; 8th antennomere at most twice as long as wide (*adnexus* group)..... 4
2. Body length 3–3.5 mm; antennae almost as long as body; 2nd antennomere as long as or almost as long as 3rd; mesoventral carina anteriorly blunt and serrate, medially with narrow ventral edge; parameres not surpassing tip of median lobe of aedeagus; insertion pores of the apical setae of parameres very close *Q. minos*
- 2'. Body length 2.25–3 mm; antennae shorter than body; 2nd antennomere clearly shorter than 3rd; mesoventral carina anteriorly not serrate, medially with wide or narrow ventral edge; parameres reaching or surpassing tip of median lobe of aedeagus; insertion pore of the most basal of the apical setae of paramere distant from the other two 3
3. 8th and 10th antennomeres of almost equal length; 8th antennomere three times as long as wide; ventral edge of mesoventral carina wide medially; parameres widely surpassing tip of median lobe, middle seta of paramere club shorter and more robust than the other two; internal sac of aedeagus bearing a group of robust spines near the mid region....
..... *Q. filicornis*
- 3'. 8th antennomere clearly shorter than 10th; 8th antennomere two and a half times longer than wide; ventral edge of mesoventral carina narrow medially; parameres just reaching tip of median lobe, all setae of paramere club equally thick and long; internal sac of aedeagus lacking robust spines near mid region *Q. pasensis* **sp. nov.**
4. 11th antennomere at least twice as long as 10th; 8th antennomere transverse or almost transverse; insertion pores of apical setae of parameres very close 5
- 4'. 11th antennomere less than twice as long as 10th; 8th antennomere clearly longer than wide; insertion pore of basal seta distant from two others 8
5. Body length 2.2–2.55 mm; 11th antennomere twice as long as 10th; male protarsus dilated, as wide or almost as wide as the apex of protibia; spermathecal lobes weakly differentiated 6
- 5'. Body length 1.5–2.2 mm; 11th antennomere more than twice as long as 10th; male protarsus very weakly dilated, clearly narrower than the apex of protibia; spermathecal lobes well differentiated 7
6. 8th to 10th antennomeres slightly longer than wide; internal sac of aedeagus without groups of spines; ventral spine of 8th female urosternite three times as long as wide..... *Q. pachecoi*
- 6'. 8th to 10th antennomeres transverse; internal sac of aedeagus with two groups of well-developed symmetrical spines; ventral spine of 8th female urosternite twice as long as wide *Q. bustilloi*
7. Body length 1.5–1.95 mm; 8th antennomere transverse; posterior edge of male metafemur medially with small tooth; median lobe of aedeagus pointed apically; parameres shorter than median lobe, apical club not differentiated; spermatheca with basal lobe wider and longer than apical lobe *Q. adnexus*
- 7'. Body length 2–2.2 mm; 8th antennomere slightly longer than wide; posterior edge of male metafemur without tooth; median lobe of aedeagus arcuate apically; parameres as long as median lobe, with apical club differentiated; spermatheca with basal lobe as wide and long as apical lobe *Q. canis*
8. 8th–10th antennomeres transverse or almost transverse; parameres wide and robust basally and medially, with apical setae very short *Q. sharpi*
- 8'. 8th–10th antennomeres clearly longer than wide; parameres narrow, with apical setae long or very long 9
9. Male protarsus clearly narrower than maximum width of protibia 10
- 9'. Male protarsus as wide as or wider than maximum width of protibia..... 11
10. Ventral edge of mesoventral carina without longitudinal sulcus; parameres not surpassing apex of median lobe of aedeagus, with weakly discernible club, each with very long and undulate setae..... *Q. autumnalis*
- 10'. Ventral edge of mesoventral carina with longitudinal sulcus; parameres widely surpassing apex of median lobe of aedeagus, with differentiated elongate club, each with long and slightly curved setae..... *Q. angustitarsis*
11. Antennae as long as half body length; 3rd–6th antennomeres almost equal; insertion pores of apical and middle setae of parameres closer to each other than to that of basal seta which is slightly longer than the other two; shield of internal sac weakly developed *Q. cisnerosii*
- 11'. Antennae clearly surpassing half body length; 3rd and 5th antennomeres slightly longer than 4th and 6th; insertion pores of setae of parameres equidistant and equally long; shield of internal sac well developed..... *Q. (Q.) noltei*

***Quaestus (Quaesticulus) pasensis* Salgado, Labrada & Luque, new species**

(Figs. 1–7)

Type material. Holotype (♂) and **allotype** (♀): **SPAIN: Cantabria:** Luena: El Churrón Cave (The Churrón-Millajo Cave karst system, 30TVN2988980475, 255 m), 27-VI-2007, Ocejo, leg. C.G.Luque (CZUL).

Paratypes: SPAIN: Cantabria: Luena: 25♂♂, 30♀♀, same data as the holotype, (3♂♂, 3♀♀ MNHN; 3♂♂, 3♀♀ MZBS; 4♂♂, 4♀♀ JFCL; 4♂♂, 4♀♀ JMSC; the rest CZUL); 8♂♂, 8♀♀, El Churrón Cave, 23-VIII-2008, leg. C.G.Luque & L.Labrada (CZUL); 40♂♂, 38♀♀, Rellano Cave (30TVN2897080570, altitude 270 m), 23-VIII-2008, Ocejo, leg. C.G.Luque & L.Labrada (3♂♂, 3♀♀, in MNCN; 3♂♂, 3♀♀ MCNA; 4♂♂, 4♀♀, PMGC; the rest in CZUL); 2♂♂, 3♀♀, Picón de Riolango Cave (30TVN2983880286, altitude 265 m), 25-X-2008, Riolango, leg. C.G.Luque & L.Labrada (CZUL); 2♂♂, 4♀♀, La Resaca Cave (30TVN3000181278, altitude 320 m), 10-I-2009, Ocejo, leg. C.G.Luque & L.Labrada (CZUL); Vega de Pas: 2♂♂, 4♀♀, La Millajo Cave (The Churrón-Millajo Cave karst system, 30TVN3031081276, altitude 320 m), 10-I-2009, Guzparras, leg. C.G.Luque & L.Labrada (CZUL).

Diagnosis. 10th antennomere almost as long as 11th; all antennomeres slender and much longer than wide; male protarsus somewhat wider than apex of protibia; elytra bearing sutural striae; median lobe of aedeagus pointed, internal sac of aedeagus exhibiting small scales and a short, slender stylet, without basal plate; spermathecal complex with short and fine spermathecal duct, somewhat dilated anteriorly.

Description. *Holotype, male.* Body length 2.44 mm; maximum width 1.30 mm. Uniformly ovoid body tapering posteriad; pronotum and elytra convex, completely covered with short, fine, sparse and recumbent yellowish pilosity (Fig. 1).

Punctures on head extremely fine and superficial, seem almost non-existent giving tegument very shiny reddish brown appearance. Antennae long, surpassing half of body length; antennomeres long and cylindrical, 1st, 2nd, 7th, 9th and 10th are slightly dilated apically, all at least twice as long as wide; 11th antennomere the longest, slightly longer than 10th, 10th is slightly shorter than 9th; 4th almost as long as 3rd; 3rd, 5th and 6th are equally long (Table 1).

TABLE 1. Measurements of the holotype (male) of *Quaestus pasensis* sp. nov. Length (L) and maximum width (W) of antennomeres 1st to 11th (all measurements in mm).

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
L	0.145	0.162	0.107	0.100	0.107	0.107	0.133	0.091	0.140	0.136	0.167
W	0.051	0.047	0.036	0.036	0.036	0.036	0.047	0.036	0.047	0.047	0.056

Pronotum strongly transverse, widest at base, almost twice as wide as long, as wide as anterior part of elytra; lateral margins uniformly arcuate, posterior corners blunt and slightly prolonged posteriorly, angle slightly obtuse; tegument with very fine superficial punctation. Mesoventral carina as in group 2C (Salgado 1996: see Figures), high, laminar and long, reaching metaventrite; anterior edge of carina weakly curved, slightly prominent, ventral edge straight and narrow; the strongly rounded vertex forms an obtuse angle.

Elytra elongated, 1.44 times as long as wide, widest near basal ¼, somewhat wider than pronotum (1.1 ratio); lateral margins uniformly curved to strongly rounded apex. Sutural striae well developed.

Legs long and slender. Foretarsus with 1st–4th tarsomeres dilated, 1st tarsomere 1.13 times as wide as apex of tibia; protarsus elongate, one and a half times longer than wide; mesotibia somewhat arcuate and metatibia slightly undulate.

Aedeagus (Figs. 2, 3) 0.49 mm long; in lateral view (Fig. 3) widely arcuate, forming obtuse angle near the middle; in dorsal view (Fig. 2) median lobe with uniformly arcuate lateral margins and weakly pointed apex. Ventral lamina of tegmen wide and rounded, well sclerotized, shorter than basal lamina. Parameres slender, almost reaching apex of median lobe, apical club weakly dilated and subrectangular, with three fairly long setae, two apically with insertion pores very close to each other and one basally, clearly distant from the other two (Fig. 4). Internal sac with short slender stylet lacking basal plate and surrounded by small scales; in apical half with narrow poorly visible reinforcing bands (Fig. 5).



FIGURE 1. Habitus of *Quaestus pasensis* **sp. nov.**, holotype.

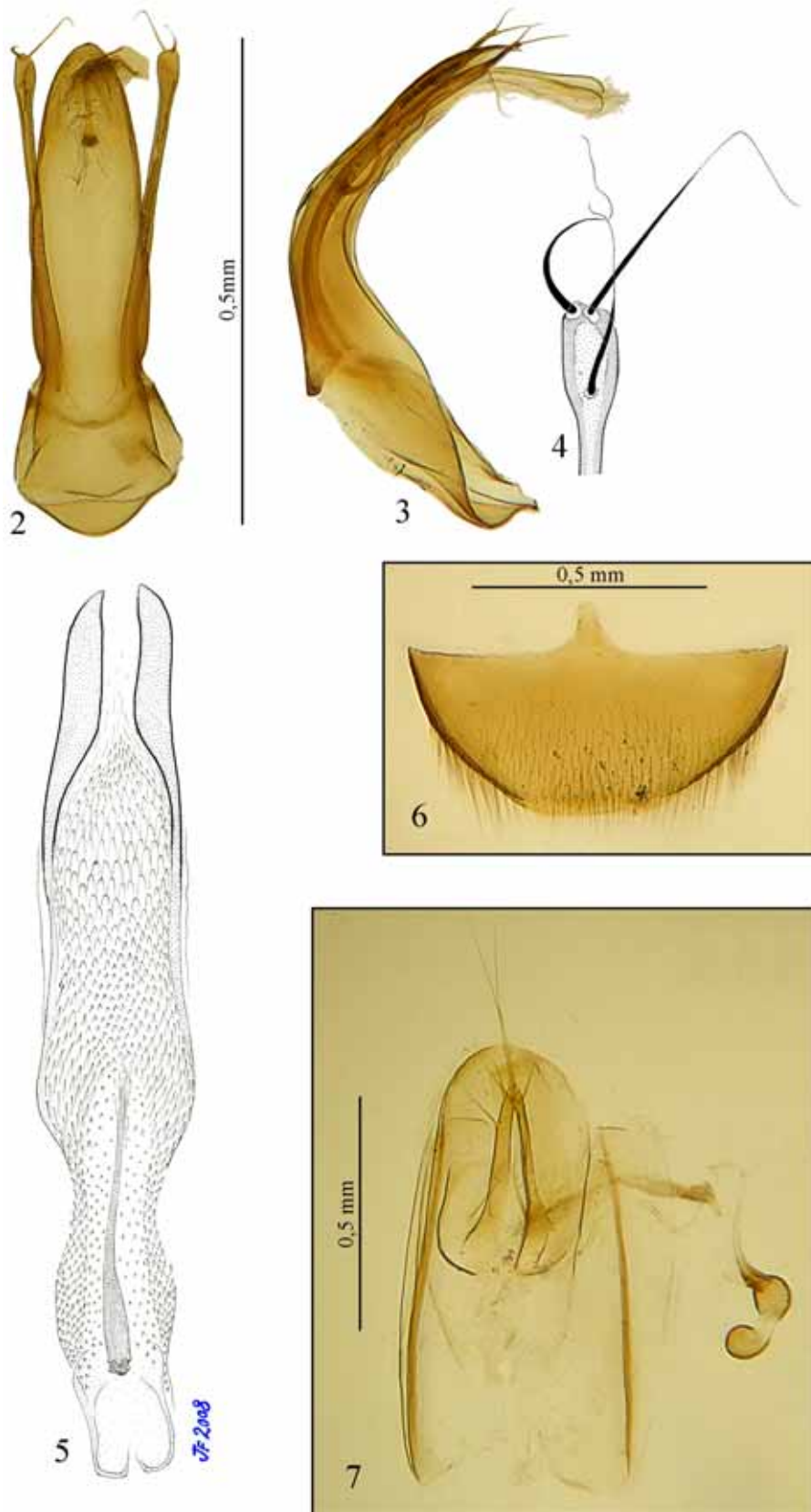
Allotype, female. Body length 2.28 mm. Similar to male, except 1st–4th protarsomeres not dilated and antennae slightly shorter, with antennomeres wider than in male (Table 2).

TABLE 2. Measurements of the allotype (female) of *Quaestus pasensis* **sp. nov.** Length (L) and maximum width (W) of antennomeres 1st to 11th (all measurements in mm).

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
L	0.138	0.147	0.100	0.096	0.100	0.100	0.113	0.076	0.113	0.109	0.151
W	0.047	0.040	0.033	0.033	0.033	0.033	0.040	0.033	0.040	0.040	0.051

Spiculum ventrale of 8th urosternite short and fine, sides almost parallel and apex rounded (Fig. 6).

Spermathecal complex distinct, 0.14 mm long, bilobed, basal lobe ovoid, longer and wider than spherical apical lobe, both lobes well-sclerotized; the part joining lobes membranous, as long as apical lobe; spermathecal duct short and thin, 3-4 times as long as spermatheca, widened at beginning, posterior part directly joined to dorsal face of bursa copulatrix; spermathecal gland small, rounded and membranous usually not easily discernible, opens into widened anterior part of the spermathecal duct (Fig. 7).

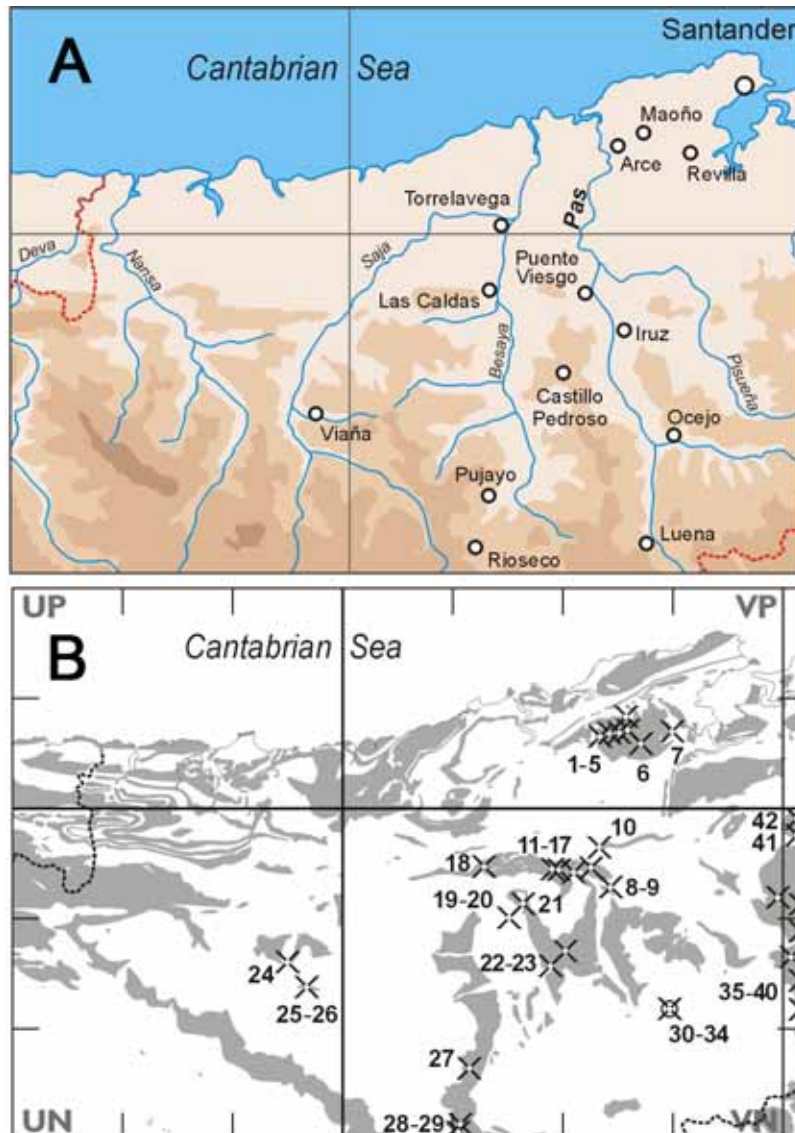


FIGURES 2–7. Details of *Quaestus pasensis* **sp. nov.** 2: aedeagus in dorsal view; 3: aedeagus in lateral view; 4: apical club of the right paramere; 5: sclerotized structures of internal sac; 6: ventral spine of 8th female urosternite; 7: spermathecal complex.

Variability. Body length of the paratypes ranges from 2.25 to 2.50 mm.

Discussion. *Quaestus pasensis* belongs to the subgenus *Quaesticulus* Schaufuss, 1861, based on the following characters: elytra bearing sutural stria, internal sac without developed sclerotized formations and with stylet lacking basal plate, spermathecal duct short with spermathecal gland small and membranous (Salgado *et al.* 2008).

Within *Quaestus* the new species belongs to section IV (originally established by Jeannel(1924)), characterized by two characters: 11th antennomere slightly longer than 10th, and all antennomeres clearly longer than wide. Section IV includes two additional species: *Q. minos* (Jeannel, 1909) and *Q. filicornis* (Uhagón, 1881). The new species differs from them in the shape of antennae, protarsi, mesoventral carina and the structure of the aedeagus; in *Q. minos* and *Q. filicornis* the antennae are longer, protarsi are wider, mesoventral carina is stronger, the parameres and stylet of the aedeagus are longer and more robust.



FIGURES 8. Location of the caves inhabited by *Quaestus autumnalis* (1–29), *Q. pasensis* sp. nov. (30–34) and *Q. minos* (35–42). (A) Geographical map of the area; (B) Distribution of the caves. Grey areas indicate rock outcrops containing limestone. Scale 1:500,000. Squares 10 x 10 km. For cave names, coordinates and altitudes see Appendix.

Externally, the new species is most similar to *Q. autumnalis* (Escalera, 1998), a member of section III (Jeannel, 1924). *Quaestus pasensis* can be separated from *Q. autumnalis* based on the following characters: 1) in *Q. autumnalis* all antennomeres robust (slender in *Q. pasensis*) and 11th antennomere almost twice as long as 10th (subequal in *Q. pasensis*); 2) in *Q. autumnalis* ventral edge of mesoventral carina medially expanded

(narrow throughout in *Q. pasensis*); 3) in *Q. autumnalis* protarsus always narrower than apex of protibia (clearly wider in *Q. pasensis*); 4) *Q. autumnalis* apex of median lobe blunt (pointed in *Q. pasensis*) and setae of parameres very long and undulate (much shorter and not undulate in *Q. pasensis*).



FIGURE 9. Detailed map of study area indicating location of the five caves inhabited by *Quaestus pasensis* sp. nov. (courtesy of the “Niphargus” Speleological Club). UTM grid 250 x 250 m.

Quaestus pasensis is restricted to a small karstic area of some 1 km², and clearly isolated geographically from its most proximate species, *Q. autumnalis* towards the north-west and *Q. minus* towards the north-east by a strip of overthrusts. Fig 8B indicates the locations of the caves inhabited by the three species and clearly demonstrates gaps between the three species areas. The distribution area of *Q. pasensis* appears to be restricted to the karst-fissured aquifer systems in the Upper Jurassic carbonate rocks within the Ocejón karst system that stretches through the municipal districts of Luena and Vega de Pas.

Sampling was done in five caves: El Churrón, Relleno, Picón de Riolango, La Resaca and La Millajo (Fig. 9). El Churrón is about 2.5 km long and it is the most important cave explored in the western part of the Pas Mountains. The cave is situated on a fault inscribed on a tectonical alignment controlled by a system of fractures in a general N 50–70° W and N 160–170° E direction. The other four caves are shorter, the longest of them being the Picón de Riolango Cave located at a roadside and consisting of a network of short galleries about 60 m long.

In all caves where *Q. pasensis* has been recorded it coexists with *Q. sharpi nigricans* (Jeannel, 1924), a subspecies widely distributed in the north eastern karstic area of Cantabria province and reported from almost one hundred caves (Salgado, 1976, 1994). *Quaestus pasensis* was found only in samples from the central to the deepest parts of the caves (in greater numbers), whereas the specimens of *Q. sharpi nigricans* were collected in small series particularly near the cave entrances.

Quaestus pasensis was always collected in accumulations of organic matter. In El Churrón Cave, it has been found in wet remains of rotten wood; in the four other caves in old and mouldy bat manure. This species reaches the dark zone of the caves, near very wet areas; it has been found in deep zones where the air humidity is near saturation point, 95 to 99 %, and temperatures are between 10 and 14 °C.

Etymology. The specific name is derived from the Pas Mountains (Cantabria, Spain), the karst region where the species occurs.

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APPENDIX. A list of caves with UTM coordinates and altitude (sorted by municipal district) inhabited by *Quaestus autumnalis* (1–29), *Q. pasensis* **sp. nov.** (30–34) and *Q. minos* (35–42) (Fig. 8 A–B).

***Quaestus autumnalis*:** Piélagos: 1. Calero Cave (Arce, 30TVP2498005950, 40 m); 2. Romilano Cave (Velo, 30TVP2493306106, 33 m); 3. Camino Cave (Velo, 30TVP2552006116, 100 m); 4. Santián Cave (Velo, 30TVP2540206140, 80 m); Santa Cruz de Bezana: 5. Cura Cave (Maoño, 30TVP2586207500, 90 m); Camargo: 6. Cantera Cave (Peña del Río, Escobedo, 30TVP2768005680, 80 m.); 7. Mapa Cave (Revilla, 30TVP3036007009, 7 m); Santiurde de Toranzo: 8. Cantopino Cave (Pando de Soto-Iruz, 30TVN2423093430, 180 m); 9. Piz Cave (Pando de Soto-Iruz, 30TVN2413593325, 147 m); Castañeda: 10. Cueto Cave (Socobio, 30TVN2355696128, 65 m); Puente Viesgo: 11. Jomayor Cave (Corrobárceno, 30TVN2285794612, 134 m); 12. Castillo Cave (Puente Viesgo, 30TVN2178093940, 190 m); 13. El Churrón del Calero Cave (Puente Viesgo, 30TVN2180094050, 85 m); 14. Soldados Cave (Sierra del Dobra, 30TVN1983594450, 432 m); 15. Búho Cave (The Búho-Ruiseñor-Murciélagos Cave karst system, Sierra del Dobra, 30TVN1874194703, 414 m); 16. Murciélagos Cave (The Búho-Ruiseñor-Murciélagos, Sierra del Dobra, 30TVN1883294670, 350 m); 17. Ruiseñor Cave (The Búho-Ruiseñor-Murciélagos Cave karst system, Sierra del Dobra, 30TVN1854594550, 400 m); Los Corrales de Buelna: 18. Cantera Cave (Caldas de Besaya, 30TVN1316594660, 75 m); San Felices de Buelna: 19. Hornos de la Peña Cave (Tarriba, 30TVN1652090553, 225 m); 20. Hornucos de la Peña Cave (Tarriba, 30TVN1645790578, 205 m); 21. Callejonda Cave (Tarriba, 30TVN1631691132, 260 m); Anievas: 22. Los Moros Pit (Villasuso, 30TVN193785, 400 m); Corvera de Toranzo: 23. Remolín Cave (Castillo Pedroso, 30TVN2113786347, 370 m); Cabuérniga: 24. Prao Pablón or Perro Cave (Viaña, 30TUN9613983521, 367 m); 25. Portalón or Cuevona Cave (Viaña, 30TUN9537686201, 286 m); 26. Cobejo or Cobezo Cave (Viaña, 30TUN9647583305, 360 m); Arenas de Iguña: 27. Casa de la Vieja Cave (San Vicente de León, 30TVN1123081939, 340 m); Santiurde de Reinosa: 28. Arrigueras Cave (Rioseco, 30TVN1213069688, 655 m); 29. Guazmacín or Juan Marín Cave (Santiurde de Reinosa, 30TVN0980568154, 780 m).

***Quaestus pasensis* sp. nov.:** Luenta: 30. El Churrón Cave (The Churrón-Millajo Cave karst system, Ocejo, 30TVN2988980475, 255 m); 31. Picón de Riolango Cave (Ocejo, 30TVN2983880286, 265 m); 32. Rellano Cave (Ocejo, 30TVN2897080570, 270 m); 33. La Resaca Cave (Ocejo, 30TVN3000181278, 320 m); Vega de Pas: 34. La Millajo Cave (The Churrón-Millajo Cave karst system, Guzparras, 30TVN3031081276, 320 m).

***Quaestus minos* (Jeannel, 1909):** Vega de Pas: 35. Len del Cañao Cave (Empresucas, 30TVN4189281124, 960 m); San Roque de Riomiera: 36. La Cuivuca Cave (La Concha, 30TVN4210383779, 840 m); 37. Cocino Cave (Alto del Mojón, 30TVN4176886136, 720 m); 38. Covallarco Cave (The Cobijón-Covallarco Cave karst system, Carcaval, 30TVN4052289764, 400 m); Miera: 39. Las Regadas Cave (La Concha, 30TVN4128391191, 550 m); 40. Sopeña Cave (Sopeña, 30TVN3987191525, 680 m); Riotuerto: 41. Prao de Cesáreo Cave (Extremera, 30TVN4160597132, 250 m); 42. Canónigo Cave (Rucandio, 30TVN4253099480, 85 m).