

**A peculiar new species of *Blennidus* Motschulsky subgenus *Agraphoderus* Bates
from the Andes of the Cordillera Blanca (Peru)
(Coleoptera: Carabidae: Pterostichini)**

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Abstract. *Blennidus (Agraphoderus) huascarani* sp. nov. is described from the Andes of Peru (Dept. Ancash, Cordillera Blanca). Type locality: Quebrada Putaca, Punta Olimpica Pass, S 9°08'19"/W 77°30'18", 4600 m a.s.l. This species differs from the other subgenus *Agraphoderus* species by its depressed habitus, slender legs and the morphology of the aedeagus. Illustrations of the habitus, the median lobe of the aedeagus, the right paramere and the gonocoxite are shown. The sites where the species was collected are illustrated, too. Finally, considerations of the adaptive meaning of some peculiar morphological characters as well as of the most likely closely related taxa are reported.

INTRODUCTION

Currently 113 species belonging to the genus *Blennidus* Motschulsky are known from South America (Lorenz 2005), mostly inhabiting the high altitude Andean grasslands from North Colombia to Chile. According to Moret (2005) they can be arrayed in the following four subgenera: *Blennidus* s. str., *Jasinskiellus* Moret, *Sierrobis* Straneo and *Agraphoderus* Bates, the latter including the species formerly attributed to *Ogmopleura* Tschitschérine. As a matter of fact, a revision of the genus is warmly needed, as the group is probably not monophyletic (Will in litt.) and the character which mainly founds the subgeneric placement, i.e. the presence/absence of a sulcus and/or punctures on the abdominal sterna IV-VI, is largely inconsistent and variable even among species which are clearly related based on the similarities of their external morphology and, above all, of their genitals.

At the present status of knowledge, the subgenus *Agraphoderus* is the richest in species and includes the micropterous ones which present a transversal sulcus and/or puncture rows only laterally on the abdominal sterna IV-VI, with a gap in the middle. Actually, in some species only very superficial, hardly visible, lateral impressions are present, as well as some sparse and very tiny punctures. In terms of the external morphology these species appear rather uniform, showing a 'harpaloid' habitus (Straneo 1993), sharing also some common and peculiar features of the genitals like the enlargement of the basal half of the aedeagus, just above the insertion of styles. Their habitat and altitudinal distribution is very similar, too, as all species are known from the Andean grasslands at an altitude range of 3300-4800 m a.s.l..

During two stays on the mountains of the Cordillera Blanca, Peru, in November-December 2005 and in June-July 2008, I had an opportunity to collect abundant materials of Carabidae, some of which already published (Allegro et al. 2008). The area explored (Dept. of Ancash: Provinces of Huaráz, Asunción, Yungay and Fitzcarrald) is partially included in the Huascarán National Park. On these occasions I collected a rich series of Pterostichine specimens which markedly differ, on account of some morphological as well as aedeagal features, from the taxa already known. Awaiting a revision that may shed light upon the subgeneric ranking inside *Blennidus*, I decided to tentatively attribute this new notable species to *Blennidus* subgenus *Agraphoderus*. This work describes it and discusses its attributes in relation with the likely closely related taxa.

MATERIALS AND METHODS

Materials of the genus *Blennidus* obtained from the following museums and private collections were examined:

- CAI G. Allegro, private collection, Moncalvo, Italy;
CCa A. Casale, private collection, Torino, Italy;
CGi P. M. Giachino, private collection, Torino, Italy;
CSc R. Sciaky, private collection, Milano, Italy;
MSNM Museo Civico di Storia Naturale, Milano, Italy (Straneo Collection);
ZIRA Zoological Institute of Russian Academy of Sciences, Sankt-Petersburg (Russia)

Locality labels of the examined material are quoted in the original version. The drawings of the habitus and of the genitalia were made by means of a camera lucida connected to a Motic K-500L stereo microscope.

TAXONOMY

Blennidus huascarani sp. nov.

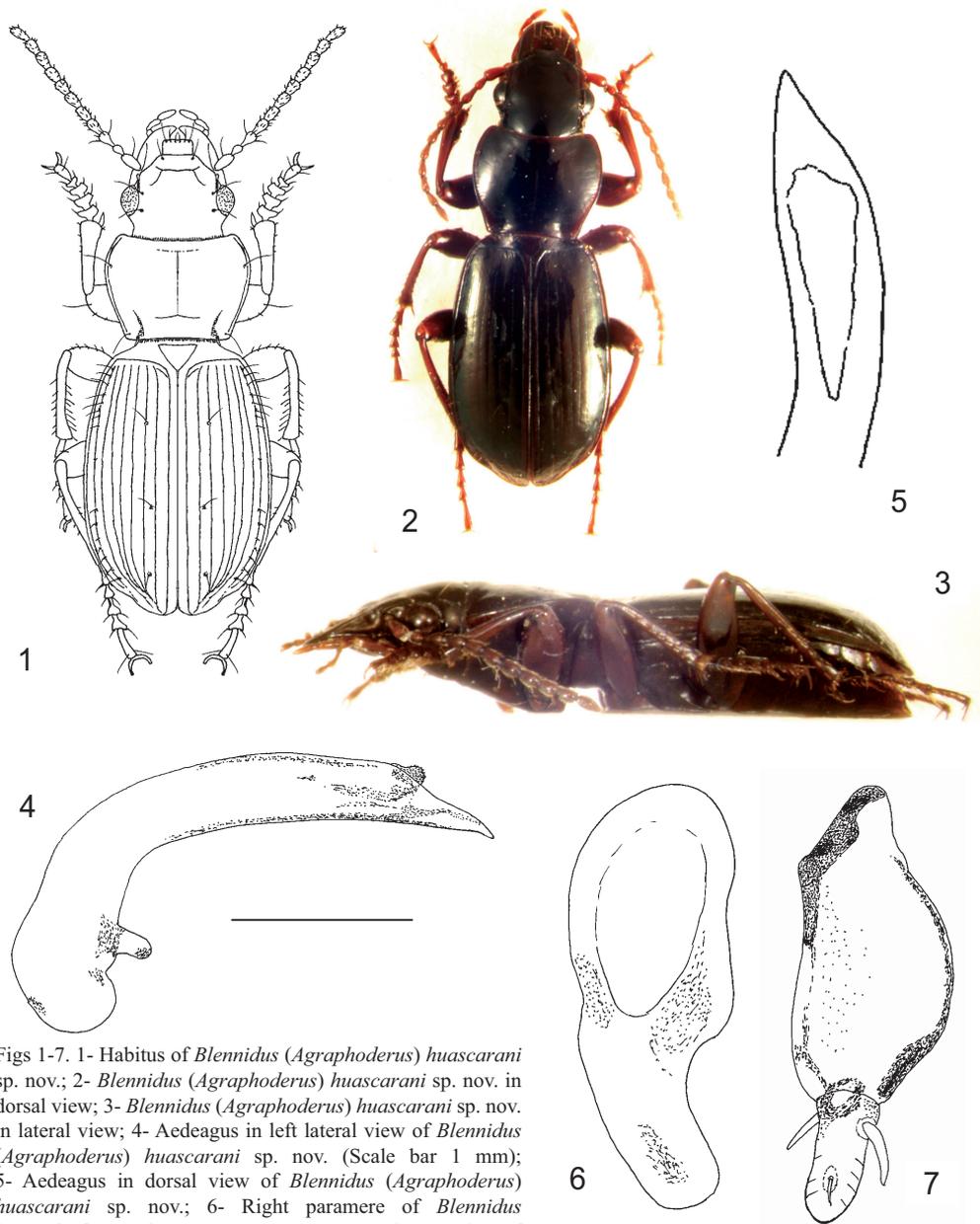
(Figs 1-7)

Type locality. Peru, Ancash, Cordillera Blanca, Quebrada Putaca, Punta Olimpica Pass, lagoon m 4600 [approximate coordinates 9°08'19"S - 77°30'18"W].

Type material. HT (♂): Peru, Dip. Ancash, Punta Olimpica, 4600 m, laguna, 5.vii.2008, Gianni Allegro legit (CAI). Paratypes: (17 ♂♂, 12 ♀♀): same data as HT; (4 ♂♂, 1 ♀): Peru, Dip. Ancash, Punta Olimpica, 4600 m, laguna, 6.xii.2005, Gianni Allegro legit; (1 ♂): Peru, Dip. Ancash, San Luis, 4200 m, Huachucocha, 16.xi.2005, Gianni Allegro legit; (1 ♂): Peru, Dip. Ancash, San Luis, 4200 m, Huachucocha, 29.vi.2008, Gianni Allegro legit (CAI, CGi, CSc, CCa, MSNM).

Description. Habitus as in Figs 1 and 2; body depressed in lateral view (Fig. 3). Overall length of the holotype 9.3 mm (♂♂ 8.3-9.7; ♀♀ 9.2-10.3). Dorsal surface dark brown, moderately shiny with delicate microsculpture in transversal meshes, more evident on elytra. Antennae, legs and mouth parts brown-reddish. Brachypterous.

Head large, eyes convex, temples as long as 1/3 of eyes. Clypeus bisetose; labrum transverse, 6-setose. Frontal impressions well marked, posteriorly diverging to 1st supraocular seta. Supraorbital ridges hardly reaching the anterior supraorbital puncture. Frons between eyes smooth and shiny. Terminal labial palpomere with hardly visible, very thin and sparse



Figs 1-7. 1- Habitus of *Blennidus (Agraphoderus) huascarani* sp. nov.; 2- *Blennidus (Agraphoderus) huascarani* sp. nov. in dorsal view; 3- *Blennidus (Agraphoderus) huascarani* sp. nov. in lateral view; 4- Aedeagus in left lateral view of *Blennidus (Agraphoderus) huascarani* sp. nov. (Scale bar 1 mm); 5- Aedeagus in dorsal view of *Blennidus (Agraphoderus) huascarani* sp. nov.; 6- Right paramere of *Blennidus (Agraphoderus) huascarani* sp. nov.; 7- Gonocoxite of *Blennidus (Agraphoderus) huascarani* sp. nov.



Fig. 8. Peru, Ancash, Cordillera Blanca. The lagoon (4600 m a.s.l.) below the Punta Olimpica Pass, loc. typ. of *Blennidus (Agraphoderus) huascarani* sp. nov.

Fig. 9. Peru, Ancash, Cordillera Blanca. The Huachucocha lagoon (4200 m a.s.l.), near San Luis.



hairs; penultimate palpomere bisetose and with an apical seta. Median tooth of mentum prominent and excavate at apex. Antennae long, extended beyond base of pronotum in males, shorter in females, hardly reaching base of pronotum.

Pronotum wider than long (width/length=1.30). One basal impression on each side deep, impunctate and externally diverging towards base. Mid longitudinal line well impressed between anterior and posterior submarginal sulci, which are scarcely evident. Lateral margins narrowly bordered on overall length, rounded and weakly sinuate at basal 3rd. Anterior and posterior margins unbordered. Fore angles scarcely prominent; hind angles obtuse. Two lateral setae on each side, one at hind angles and one at about 3/4 from base. Disk shiny and flat. Prosternal process glabrous, cuneate and not margined at apex.

Elytra oval, scarcely dilated in the posterior half, flattened on disk and depressed at base. Scutellar stria usually impressed between striae 1 and 2. No setigerous punctures near base.

Sides rounded and markedly sinuate near apex; lateral border narrow. 3-4 setae on each elytra, the 1st at basal 5th and in the 3rd interval or on 3rd stria, the following adjoining the 2nd stria. Striae moderately impressed but evident until apex, very weakly punctured. Intervals flat or hardly convex.

Metepisterna short, as long as wide. Abdominal sterna IV-VI glabrous except for the pair of central setae; a very shallow lateral impression and sparse, delicate and hardly visible punctures are present. Sternum VII with a pair of apical setae in males and 2 pairs in females.

Legs slender (hind leg/body length = 0.70); mesotibiae distally crenulate at the external edge. Metatrochanters slender and hardly longer than half femours. 5th tarsomeres with one pair of setae superiorly and 3 pairs underneath. Male tarsomeres 1-3 strongly dilated, triangular and truncate at inner side.

Aedeagus long and slender (length 2.7 mm), with moderately enlarged basal bulb and median lobe long, almost rectilinear in lateral view, only distally slightly bent downwards (Fig. 4); median lobe bent to left in dorsal view and with a pointed, triangular apical lamella (Fig. 5). Ostium long, in dorsal position. Internal armature poorly sclerotized, with two small echinulate lobes partially projecting from ostium. Left paramere in discal shape, the right one narrow, almost straight and apically spatulate (Fig. 6). Gonocoxites slender and rounded at tip, almost rectilinear; the two major spines are inserted nearly at base (Fig. 7), the subapical one at about 2/3 from base.

Differential diagnosis. In comparison with all other species of the subgenera *Agraphoderus* and *Jasinskiellus*, the pronotum and the elytral disk are more flattened; the legs are longer and slenderer. It differs from subgenus *Sierrobius* species by the absence of a complete transversal sulcus on abdominal sterna IV-VI; from *Blennidus* s. str. by the wing reduction and the shorter metepisterna. The median lobe of the aedeagus is long and apically pointed.

Etymology. Derived from the noun, in the genitive case, of Mt. Huascarán, the highest mountain in Peru (6768 m), dominating the Huascarán National Park which includes the type locality of the new species.

Generic placement. In spite of some peculiar characters such as the flattened body and the slender legs, which can be interpreted as apomorphic and as adaptations to wedge-pushing behaviour (Evans 1977), the new species shares the fundamental characters distinguishing *Blennidus* subgenus *Agraphoderus*, including the enlarged basal bulb of the aedeagus, and so is placed in these genus and subgenus. Anyway, on account of the peculiar shape of the median lobe of the aedeagus, which differs from the one of any other known *Agraphoderus* from Peru, the affinities of *Blennidus huascarani* sp. nov. appear uncertain.

Distribution and ecology. *Blennidus huascarani* sp. nov. has been so far recorded only from two sites in the Cordillera Blanca (Dept. of Ancash): Quebrada Putaca below the Punta Olimpica Pass, in the Huascarán National Park, and San Luis (Prov. of Fitzcarrald), about 15 km far from each other. All the specimens were collected under stones laying on humid soil

near two lagoons (4600 and 4200 m a.s.l. respectively): the higher site (loc. typ.) is a glacial area characterized by coarse detritic sediments (Fig. 8), the lower one is a typical Andean grassland (Fig. 9).

Discussion. The overall phylogeny of South American Pterostichines has not yet been settled and *Blennidus*, in particular, needs further efforts in order to understand the distribution and systematics of the subgeneric taxa. Anyway, there is enough evidence that *Blennidus huascarani* sp. nov. can be placed, awaiting a general revision, in the subgenus *Agraphoderus* on account of the external morphology and of the structure of the aedeagus. Looking for its most closely related taxa, the shape of the aedeagus makes this species rather isolated among the Peruvian *Agraphoderus*: in fact, the external morphology of the median lobe is actually uncommon and decidedly different from the basic pattern shown by the other *Agraphoderus* species from the Cordillera Blanca (Straneo 1993). Surprisingly, a few species from Ecuador show a similar aedeagal structure: in the *Blennidus (Agraphoderus) ecuadorianus* Straneo, 1991 group, aedeagi with a moderately enlarged basal bulb and a long and slender median lobe can be observed, and in the group of *Blennidus (Agraphoderus) pichincha* Bates, 1891 slender aedeagi with a pointed apical lamella are present (Moret, 2005). These species must likely be considered as the closest relatives of *B. huascarani*, which therefore may represent a geographically isolated species with northern affinities.

As far as the habitus is concerned, *B. huascarani* shows external characters which are very rare among *Agraphoderus*. *B. ecuadorianus* displays relatively slender appendices and subdepressed elytra and, among the Peruvian *Agraphoderus*, *Blennidus (Agraphoderus) bordoni* (Straneo, 1993) possesses slender legs but a convex and stumpy body. Finally, *Blennidus (Agraphoderus) filicornis* (Straneo, 1993) presents a very slender habitus together with subdepressed elytra; this species, which is described by the author as a representative of the Peruvian fauna, should actually be attributed to the Chilean fauna on account of the typical locality of the holotype and of some features of its external morphology.

The peculiar habitus of *B. huascarani* can be probably related to habitat conditions, as this species inhabits a high altitude (4600 m a.s.l.) glacial area, characterized by coarse glacial drifts and perennial high soil humidity due to snow fusion (Fig. 8). In fact, a depressed body shape, as well as slender legs and trochanters have been related to good wedge-pushing abilities (Evans 1977), frequently shown by crevice-dwelling carabids. These characters can be interpreted as apomorphic and owing to habitat selection, since they evolved several times in many disparate taxa among Pterostichini (Will 2004). Moreover, Moret (pers. com. 2010) observed a tendency to slenderness in *Dyscolus* species inhabiting humid or riparian habitats.

In the glacial drifts of the typical locality *B. huascarani* was collected in large numbers, whilst only a few specimens of another *Blennidus (Agraphoderus)* species, probably not yet described, were found. On the contrary, in the second site of the typical series, an Andean grassland with finer soils at lower altitude (4200 m a.s.l.) (Fig. 9), *B. huascarani* was rare and the second *Blennidus* species was very common. Differently from *B. huascarani*, the latter presents a normally convex and stumpy body, with short legs (hind leg/body length = 0.60). Checking for the altitude data of the typical series of the Peruvian as well as Ecuadorian

already known species, there is evidence that most of them, with rare exceptions, were collected below the limit of 4300 m a.s.l., one of the exceptions regarding *B. bordoni*, which is characterized by slender appendices too. Unfortunately no information is available on the pedological features of their typical localities.

Following these considerations, *B. huascarani* can be probably considered as a geographically isolated taxon, adapted to high altitude glacial conditions in rocky or coarsely structured soils.

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