Up to the glaciers: new elevational record and updated distribution of *Platycoelia parva* Kirsch, 1885, in equatorial Andes (Coleoptera, Scarabaeidae, Rutelinae)

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Abstract. – *Platycoelia parva* Kirsch, 1885 (Coleoptera: Scarabaeidae: Rutelinae: Anoplognathini: Platycoelina) is a species associated with montane grasslands in the Ecuadorian Andes, mostly above 2,500 m. Adults are traditionally consumed by local populations during the emergence period. This article presents new data on the distribution of this species in Ecuador and southern Colombia. It has been recently observed as high as 4,980 m in the cryosphere of the Antisana volcano, and an adult has been found in its pupal chamber at 4,860 m, which represents a record elevation for Scarabaeidae in the tropical Andes.

Résumé. – **Jusqu'aux glaciers : nouvelles données sur l'altitude et la distribution de *Platycoelia parva* Kirsch, 1885, dans les Andes équatoriales (Coleoptera, Scarabaeidae, Rutelinae)**. *Platycoelia parva* Kirsch, 1885 (Coleoptera : Scarabaeidae : Rutelinae : Anoplognathini : Platycoeliina) est une espèce de Rutelinae inféodée aux prairies d'altitude des Andes équatoriales, au-dessus de 2500 m. Les adultes sont consommés par les populations locales en période d'émergence. Cet article présente des données nouvelles sur la distribution de cette espèce en Équateur et dans le sud de la Colombie. Elle a été récemment observée à 4980 m sur le glacier du volcan Antisana, et un adulte a été trouvé dans sa loge nymphale à 4860 m, ce qui constitue une altitude record pour les Scarabaeidae dans les Andes tropicales.

Keywords. – Faunistics, Ecuador, elevational range, cryosphere, periglacial environment.

Platycoelia is one of the most diverse Andean genera of Rutelinae with 63 known species, 19 of which are found in Ecuador, frequently at high elevations (Smith, 2003, 2009; Paucar-Cabrera, 2005). *Platycoelia parva* Kirsch, 1885, is a convex, oval species that can reach up to 23 mm in length. Its colour is olive green or lime green; some individuals can be darker, brownish yellow or brownish green, sometimes with light yellow stripes on the elytra. *Platycoelia parva* can be distinguished from other species in the genus by its depressed frons, complete frontoclypeal suture, medial notch

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in the mentum, pygidium exposed below the elytra, densely setose metasternum, mesothoracic process that projects apically beyond the mesocoxa, presence of an abdominal spiracle strongly protuberant, and male parameres with rounded, not expanded, apexes (Smith, 2003).

The species was described on material collected by the German geologist Alphons Stübel between 1866–1877 in "Quito and Riobamba, 2900 m. alt." (Kirsch, 1885: 222). Smith (2003) designated as lectotype a male specimen labelled "Ecuador", with no further locality data. Smith also considered as paralectotype a female labelled "Páramo Bordoncillo 3,300 m", which does not fit Kirsch's indications, as Páramo Bordoncillo is situated in southern Colombia, not in Ecuador, and far from Quito and Riobamba. The same species was redescribed shortly afterwards by Bates (1891) under the name *Leucopelaea nigricauda* Bates, 1891 (synonymy: Smith, 2003), on material collected in 1880 by the alpinist Edward Whymper on the Cotopaxi volcano at 12,000 feet (3,658 m). *Platycoelia parva* has been recorded from the Andean Cordillera throughout Ecuador and in the abovementioned locality of southern Colombia. There is also an old record from Peru, without locality data (Smith, 2003).

Smith (2003) reported that adults of *P. parva* emerge during the rainy seasons from November to February, as observed for other rutelines (Paucar-Cabrera, 2005). During this period, mass emergence events usually coincide with thunderstorms (Whymper, 1892; Onore, 1997). In Ecuador, *P. parva*, known as the "catso verde", has been reported to be used as food in areas around the paramo of Antisana, a high Andean area east of Quito (Onore, 1997). In other areas of the Ecuadorian Andes, especially around Quito at ~2,800 m, a closely related species, the "catso blanco" (*P. lutescens* Blanchard, 1851), is also consumed by local people (Onore, 1997; Smith & Paucar-Cabrera, 2000; Agila *et al.*, 2021). Other beetle species are also used as food, but the green and white "catsos" have been said to have a better flavour (Onore, 1997).

According to the latest publications on the distribution of *P. parva* (Smith, 2003; Paucar-Cabrera, 2005; Carvajal *et al.*, 2011), the highest elevation at which this species has been recorded is 4,200 m. The aim of this note is to complete the distribution area of this species with new data, especially regarding its elevational range.

Materials and methods

Besides field observations in 2020, 2024 and 2025, we used published literature and museum specimens to obtain distributional data of *P. parva* in Ecuador. The species was identified using the taxonomic key by Smith (2003). Males were dissected for examination of the parameres for an accurate identification.

Specimens from new localities are deposited in the following entomological collections: **CPM**, Pierre Moret collection, Toulouse University, France; **QCAZ**, Museo de la Pontificia Universidad Católica del Ecuador, Quito, Ecuador; **ZSFQ**, Museo de Zoología de la Universidad San Francisco de Quito, Cumbayá, Ecuador.

Results

Updated distribution data. – The available data on the distribution of *Platycoelia parva* are summarized in table I and in the map of figure 1. *Platycoelia parva* is a typically montane species, widespread in grasslands of the equatorial Andes. The bulk of findings, most of them in the twentieth century, range between 2,600–4,000 m.

Regarding the lower limit of the elevational range of the species, the most reliable data suggest that it lies between 2,000–2,400 m, on both sides of the Cordillera.

Two records at ~1000 m, which would imply the presence of this species at much lower elevation in the tropical forest environment of the Amazonian side of the Andes, were removed from our dataset. The first one is a male from the Natural History Museum of London (BMNH), collected by Clarence Buckley between 1869–

Table I. – Localities of *Platycoelia parva* Kirsch. New records are referred to with the acronym of the museum where voucher specimens are housed.

Province	Locality	Elevation (m)	Latitude	Longitude	Reference
Azuay	El Cajas	4,019	-2.795641	-79.221039	QCAZ
Bolívar	Cashca Totoras	2,800	-1.717417	-78.978056	QCAZ
Bolívar	Tililag	3,800	-1.619438	-78.852953	CPM
Cañar	Shical	3,200	-2.383333	-79.016667	QCAZ
Carchi	El Ángel	3,983	0.731205	-77.951887	QCAZ
Chimborazo	Volcán Chimborazo	-	-	-	Smith, 2003
Chimborazo	Riobamba	2,900	-1.645372	-78.692972	Kirsch, 1885
Chimborazo	Mocha	3,284	-1.422483	-78.656279	Campos Ribadeneira, 1926
Cotopaxi	Volcán Cotopaxi	3,660	-0.618150	-78.467398	Bates, 1891; Smith, 2003
Cotopaxi	El Boliche	3,000	-0.619722	-78.573642	Campos Ribadeneira, 1926
Cotopaxi	Latacunga	2,774	-0.934031	-78.614575	Smith, 2003
Cotopaxi	Razuyacu	4,000	-0.747647	-78.711907	QCAZ
Cotopaxi	Rumiñahui	3,500	-0.585950	-78.507983	QCAZ
Cotopaxi	Sigchos	3,029	-0.613021	-78.881861	Carvajal & Villamarín, 2011
Cotopaxi	Padrewasi	3,444	-1.192630	-78.962180	ZSFQ
Imbabura	Chachimbiro	2,700	0.459073	-78.247284	CPM
Loja	Loja	2,072	-3.996845	-79.201666	Smith, 2003
Napo	Antisana	4,858	-0.484735	-78.157779	CPM
Napo	Antisana	4,980	-0.490278	-78.153056	ZSFQ
Napo	Antisana	4,200	-0.469303	-78.116667	QCAZ
Napo	Hacienda Antisana	4,070	-0.512257	-78.216426	Bates, 1891
Napo	Oyacachi	3,200	-0.212936	-78.088362	QCAZ
Napo	Papallacta	3,141	-0.377676	-78.140888	Smith, 2003
Pichincha	Alóag	2,892	-0.468649	-78.585459	Smith, 2003
Pichincha	El Chaupi	3,564	-0.598436	-78.679049	QCAZ
Pichincha	La Cocha	2,800	-	-	QCAZ
Pichincha	Pasochoa	3,000	-0.465637	-78.480706	QCAZ
Pichincha	Volcán Pichincha	-	-	-	Smith, 2003; QCAZ
Pichincha	Quito	2,800	-0.220164	-78.512327	Smith, 2003; QCAZ
Tungurahua	Baños	2,462	-1.408854	-78.425903	Smith, 2003
Tungurahua	Pisayambo	3,700	-1.118323	-78.370916	CPM
Nariño (Colombia)	Bordoncillo	3,300	1.150237	-77.097448	Smith, 2003

Fig. 1. – Distribution map of *Platycoelia parva* in Ecuador and southern Colombia. Yellow dots: previously published records; red dots: new records. Zoomed-in sectors on the right of the image highlight the highest (4,980 m) and lowest (2,900 m) new records.

1878 (Vane-Wright, 1991). As for many beetles from Buckley's collection, the only mention on the locality label is "Macas", the capital of the Morona-Santiago province, at 1,030 m. This locality —then a very small town— was used by Buckley as a base of operations, so the exact elevation at which this specimen was collected is unknown. The second one is a specimen from QCAZ, which according to its label was collected at 1,000 m at kilometer 139 of the so-called Salcedo–Tena road (Cotopaxi and Napo provinces). However, these data are not compatible, as the road in question is only 60 km long, actually it does not reach Tena, and from beginning to end it passes through elevations of over 2,000 m.

Observations at high elevation on the Antisana volcano. – *Platycoelia parva* was observed on the southwestern slope of Antisana volcano (fig. 2), the fourth highest mountain in Ecuador (summit elevation: 5,758 m), on four occasions between 2020 and 2025, in the páramo (4,100–4,400 m) and up to the level of the glaciers (4,850–4,980 m).

Observation #1 (P.M.): 20.I.2020, páramo and superpáramo on the southwestern slope of Antisana, along the road to the Los Crespos glacier, 4,100–4,400 m. Dozens of individuals were observed flying clumsily between 1–3 m above the ground, at dusk between 18:30 and 19:00. None were visible at 20:30. Weather conditions: dry weather the previous days; overcast and drizzling the night of the observation, with lightning in the distance, indicative of a stormy episode.

Observation #2 (P.M.): 21.I.2020, 2020, 0°29.387'S, 78°09.455'W, 4,858 m, near glacier 12 (Crespos Sur). While moving rocks in search of Carabidae, a dead individual

Fig. 2. – Observations of *Platycoelia parva* on the Antisana volcano (Ecuador). – **A**, Glacier 12 between 4,800–5,000 m. – **B**, Individual in its pupal chamber at 4,858 m. – **C**, Individual found partly frozen, but still alive, on the glacier at ~4,800 m.

was found in its pupation chamber under a rock (fig. 2B). It was in situ, whole but dead for some time, with dislocated leg joints due to bacterial action. The environment was a rocky one, typical of the upper fringe of the "upper superpáramo" (Sklenář & Balslev, 2005), with lichens and few vascular plants (Sklenář *et al*., 2021): *Baccharis caespitosa*, *Senecio nivalis*, *Xenophyllum rigidum* (Asteraceae), *Cerastium floccosum* (Caryophyllaceae) and *Draba ovata* (Brassicaceae).

Observation #3 (N.A.): 20.XI.2024, glacier 12 (Crespos Sur). A first individual was found at 4,980 m, on the route to the summit. It was semi-submerged in the water of a cryoconite, with part of a wing hardened and frozen. A second individual was found on the edge of a crevasse on glacier 12, in the terminal zone (~4,800 m). The individual

had part of its appendages caught in the ice and was semi-sunken in the water (fig. 2C). It was held until the ice melted, then placed in a jar and carried for about 20 minutes downslope, where movements were observed, and the individual was verified to be alive. The movements were made with great difficulty. The individual was released in the páramo.

Observation #4 (N.A.): 11.I.2025, glacier 12 (Crespos Sur). One individual was observed in the terminal zone of the glacier. It showed no signs of life.

Discussion

The presence of *Platycoelia parva* at almost 5,000 m, in the middle of a glacier, is obviously an accidental event. After the mass emergence of adults, which usually coincides with thunderstorms during the rainy season, large numbers of individuals take flight in the high-Andean grassland (the páramo). This phenomenon has already been observed between 3,000–3,800 m for *P. parva* and another partly sympatric species, *Platycoelia lutescens* Blanchard, 1851 (Whymper, 1892: 137; Onore, 1997; Smith & Paucar-Cabrera, 2000; Smith, 2003). Our observation of massive flight in January 2020 was at a higher elevation (4,100–4,400 m). Given the flight clumsiness of this species, it is likely that a small fraction of the beetles was carried by updrafts and ended up falling on the glacier. Existing literature contains many observations of fallout of winged insects, especially Hemiptera and Diptera, on glaciers and snowfields (Edwards, 1987; Hotaling *et al.*, 2021). Historically, it was precisely in Ecuador where this phenomenon was first documented, with the mention of Diptera and Lepidoptera in the snow of Chimborazo (Humboldt, 1808; Whymper, 1892: 113-4).

Notably, in the case we study here, the fall of such large scarab beetles on glaciers or snowfields had never been recorded before. This could suggest that the life cycle of *P. parva* takes place at increasingly higher elevations, which raises the risk of falling on a nearby glacier. This hypothesis is supported by the finding of a dead imago in its pupal chamber at 4,860 m, implying that the larva of *P. parva* can find the nutrients it needs even at this elevation, despite the sparse vegetation cover. Considering that the life cycle should take at least one year, as is known for other species in the genus (Neita-Moreno & Morón, 2017), environmental conditions had to be suitable for the complete development from larva to pupa and then to adult. It is known that in the tropics, some Rutelinae feed not only on roots but also on decomposed organic matter (Paucar-Cabrera, 2005). Additionally, observations made between 4,900–5,000 m show that adults of *P. parva* are able to survive freezing temperatures, although their metabolism slows down and the long-term effects are not known.

Global warming seems to be the most likely cause of the upward expansion of the elevational range of this species, in line with the results of several studies conducted in the Andes of Ecuador on carabid beetles (Moret *et al.*, 2016) and vascular plants (Sklenář *et al.*, 2021; Moret *et al.*, 2021). However, further research is needed to determine whether the establishment of this species on glacier margins remains a local phenomenon, perhaps favoured by microclimatic conditions, or whether it is a general trend reproduced on other mountains in the equatorial Andes.

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London) and for sharing the complete information on *P. parva* used in his *Platycoelia* monograph. The specimens deposited in ZSFQ were legally collected in Ecuador under the research permits MAAE-ARSFC-2022-2203 and MAATE-ARSFC-2024-0919 issued by the Ministerio del Ambiente, Agua y Transición Ecológica de Ecuador.

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