PATAGONOPRAOCIS, A NEW GENUS OF PRAOCINI FROM PATAGONIA (COLEOPTERA: TENEBRIONIDAE)

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Abstract.— The genus *Patagonopraocis* **gen. nov.** (Pimeliinae: Praocini), distributed in the Patagonian steppes and xerophilous woodlands in the Andes foothills, is revised. *Patagonopraocis* consists of three new species: *P. magellanicum* **sp. nov.**, *P. puncticollis* **sp. nov.** and *P. minor* **sp. nov.** Descriptions of the genus and its three species are provided. Main diagnostic characters for *Patagonopraocis* are in external morphology, sexual dimorphism and male genitalia. A key to species, habitus photographs, illustrations of external morphology, genitalic features and distribution map are included.

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Key words.— Coleoptera, Tenebrionidae, Praocini, *Patagonopraocis*, Patagonia, new genus, new species, distribution.

INTRODUCTION

The genus Patagonopraocis gen. nov. belongs to the Praocini, a Neotropical tribe of Pimeliinae with 139 species arranged in 12 genera prior to this study, endemic to arid and semiarid lands of southern South America (Kulzer 1958, Flores 2000, 2001). Patagonopraocis comprises three species restricted to southern Argentina and Chile, between 40° South and 52° South, inhabiting cool steppes and xerophilous woodlands in the foothills of the Andes, in Patagonian subregion biogeographic province (Morrone 2001). Species of the Neotropical tribes Nycteliini, Praocini and Scotobiini are dominant among the tenebrionid fauna in the Patagonian steppes (Kuschel 1969). Endemic genera or subgenera of Praocini in this area are Platesthes Waterhouse 1845, Praocis (Hemipraocis) Kulzer, 1958, Praocis (Praonoda) Kulzer, 1958, the monotypics Asidelia Fairmaire, 1905 and Neopraocis Kulzer, 1958 (Flores 2004) and Patagonopraocis gen. nov.

Our examination of undetermined specimens from the Field Museum of Natural History (Chicago, USA), Instituto Argentino de Investigaciones de las Zonas Áridas (Mendoza, Argentina), Instituto de la Patagonia, Universidad de Magallanes (Punta Arenas, Chile), and Fundación e Instituto Miguel Lillo (San Miguel de Tucumán, Argentina) led us to the discovery of three new species of Praocini. More recently we conducted a field trip to Patagonia and found more specimens that belong to these new species, extending their geographical distribution. After an examination of characters of these new species, we demonstrate that these deserve recognition as a separate genus, which we name *Patagonopraocis*. The inclusion of these three species in any other known genus of Praocini would imply a completely different concept and redefinition of that genus.

The objectives of this study are to describe *Patago-nopraocis* using characters from external and internal morphology and genital features, to describe the three new species, and their geographic distribution.

MATERIAL AND METHODS

Type specimens are deposited in the following collections (we follow Arnett *et al.* 1993 where possible for collections codens):

- FMNH Field Museum of Natural History, Chicago, USA
- HNHM Hungarian Natural History Musem, Budapest, Hungary
- IADIZA Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina
 - IMLA Fundación e Instituto Miguel Lillo, San Miguel de Tucumán, Argentina

- IPUM Instituto de la Patagonia, Universidad de Magallanes, Punta Arenas, Chile
- LEULS Laboratorio de Entomología Ecológica, Universidad de La Serena, La Serena, Chile
- MACN Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina
- MNNC Museo Nacional de Historia Natural, Santiago, Chile
- NHMB Natural History Museum, Basel, Switzerland.

Body length was measured dorsally, along the midline, from anterior margin of labrum to elytral apex. For paraproct/ coxite length the ratio proposed by Doyen (1993) was used; for basal lamina of tegmen/ lateral styles length, and median lobe/ tegmen length the ratios proposed by Flores (1996) were used. Dissection methods are those used by Tschinkel and Doyen (1980) for genital structures and by Flores (1997) for internal skeletal anatomy. Terminology of foreleg was taken from Doyen (1984: Fig. 41). Drawings were made with a camera lucida adapted to a stereoscopic microscope. Exact label data are cited only for the type material, and that on separate labels indicated in brackets. For the distribution of the species we used the biogeographic classification of Morrone (2001). The distributions of the two species inhabiting the Patagonian steppes follow the biogeographic districts proposed by Morrone et al. (2002) within the Central Patagonia biogeographic province (Morrone 2001). The remainder species, which inhabits xerophilous woodlands in the foothills of the Andes, fits in the Subandean Patagonia biogeographic province (Morrone 2001).

TAXONOMY

Patagonopraocis gen. nov.

Type species. Patagonopraocis magellanicum sp. nov., present designation.

Etymology. The name refers to the occurrence of its species throughout the Patagonian region and from *praocis*, pertaining to the tribe Praocini; gender masculine.

Diagnosis. Recognized among other Praocini by the following combination of characters: maxillary palps with last segment axe-shaped; clypeal suture as horizontal groove, clypeus lower than frons; length of antennomere 11 exceeding length of 10; pronotum with anterior angles acute, lateral margin simple and remote from disc; prosternum without apophysis, edge on anterior margin; mesosternum, metasternum, mesepisternum and metepisternum with punctures; elytron lacking carinae, surface punctate; anterior quarter of epipleuron three times as wide as posterior half; distance between mesometacoxae not exceeding half mesocoxal length; ventral femoral surface with setae arising from punctures; width of distal margin of protibiae in male equal to ¹/₃ protibial length, in female exceeding ½ protibial length but not exceeding half protibial length; apical process of protibiae in male longer than half protarsomere 1 length but shorter than protarsomere 1 length, in female equal to length of protarsomere 1+2; basal lamina of tegmen long (B/E >1.0); lateral styles of tegmen ventrally bisinuate; paraprocts long ($2.0 < P/C \le 3.0$).

Description. Length 5.7–8.4 mm; elongate to oval, convex; body with short or medium setae. Colour of body black to light brown, antennae, legs dark brown. Surface of pronotum shiny, elytra dull.

Head. Prognathous; labrum with anterior margin concave, not broadened, labrum widest at mid point; clypeus with large and small punctures, the former with a setae, the latter without setae, anterior margin concave, extending anterior to lateral expansion of frons; clypeal suture as horizontal groove, clypeus lower than frons; frons with round punctures; mentum subtrapezoidal, with setae; maxillary palps with last segment axe-shaped; eyes oval; antennae equal in length in both sexes; length of antennomere 11 exceeding length of 10; apical tomentose sensory patches on antennomere 9 in two areas subequal in size; on antennomere 10 in a semicircular; on antennomere 11 on distal third.

Thorax. Prothorax flexible; pronotum without wrinkles, with round punctures, seta arising at center, separated by a distance much greater than diameter of a puncture; anterior angles acute, anterior margin concave, width of posterior margin exceeding width of anterior margin, lateral margin simple, slender, remote from disc, posterior margin convex, not exceeding width of base of elytra, joined in central half to elytra, posterior angles not overlapping elytral humeri; disc of pronotum convex, higher than lateral margins; prosternum without apophysis, not extended over mesosternum, with edge on anterior margin; proepisternum and prosternum with protuberances; mesosternum inclined forward, separated from prosternum; mesosternum, metasternum, mesepisternum and metepisternum with punctures; scutellum visible.

Elytron convex, without carinae; surface punctate; lateral margin rounded; epipleuron conspicuous throughout, with edge, anterior margin reaching elytral humeri and posterior angle of pronotum, punctate and pubescent, anterior quarter three times as wide as posterior half.

Legs. Procoxal separation equal to ¹/₃ procoxal width; mesocoxal and metacoxal separations not exceeding mesocoxal and metacoxal width; distance between meso- metacoxae not exceeding half mesocoxal length; metacoxal cavity closed laterally by metasternum and sternum 3. Ventral femoral surface with setae arising from punctures. Protibiae explanate, apical process concave from behind, inner margin armed with row of contiguous spines, outer margin convex, sinuate, without spines (Figs 1–5). Ventral surface of tarsi bearing abundant decumbent setae.

Internal skeletal anatomy. Proendosternite with posterior arms short, directed posterad. Mesendosternite with horizontal arms short, with long, slender dorsal arms. Metendosternite with arms long, fused with mesocoxal inflexions, extending beyond mesocoxal inflections about one third distance to tergum.

Sexual dimorphism: width of distal margin of protibiae in male equal to ¹/₃ protibial length (Figs 1, 2, 4), in female exceeding ¹/₃ protibial length but not exceeding half protibial length (Figs 3, 5); apical process of protibiae in male longer than half protarsomere 1 length but shorter than protarsomere 1 length (Figs 1, 2, 4), in female equal to length of protarsomere 1+2 (Figs 3, 5).

Male genitalia (Figs 6–11). Rods of sternum IX close at basal third; distance between rods of sternum IX not exceeding width of aedeagus. Dorsal membrane of proctiger concave, with two sclerotized areas. Basal lamina of tegmen long (B/E >1.0). Lateral styles of tegmen distally close, with apex narrow, with setae on lateral margins (Figs 7, 9, 11), with proximal margin ventrally bisinuate, widest at base, projecting dorsally over median lobe; base of basal lamina of tegmen concave. Median lobe moderate (0.75< L/T \leq 1.00), sheath-shaped, with apex rounded, not narrowed proximally (Figs 6, 8, 10).

Female genitalia (Fig. 12). Spiculum with arms "V"shaped. Paraprocts long ($2.0 < P/C \le 3.0$), glabrous; coxites with short setae, basal lobe of coxite not extended over paraproct, baculi of coxite horizontal; midventral sclerite distally broadened. Proctigeral baculus equal to length of paraproct baculus; apicodorsal lobe of proctiger extending about ¼ length of coxite. Vagina saccate. Spermathecal accesory gland longer than vagina, with duct annulate and thick. Spermatheca with 3–4 basal tubes shorter than vagina, all similar in width and branching pattern.

Geographic distribution. The species of *Patagonopraocis* occur from 40° South to 52° 30′ South in southern Argentina (Neuquén, Río Negro, Chubut, and Santa Cruz) and in southern Chile (Magallanes), reaching to Tierra del Fuego island.

Habitat. The species of Patagonopraocis occur in the xerophilous cool steppes and xerophilous woodlands east to the Andes in Patagonian subregion (Morrone 2001), from sea level to an altitude of 1750 m. We have collected specimens of Patagonopraocis minor sp. nov. in Chubut province (Argentina), 20 km W Rio Senger, under stones in steppes of Mulinum spinosum (Apiaceae), in Santa Cruz province (Argentina), 35 km W Gobernador Gregores, under stones in schrubland of Nassauvia glomerulosa (Asteraceae), and specimens of *P. magellanicum* sp. nov. in the margin of the Strait of Magellan (Chile) under stones in grassland of Festuca gracillima (Poaceae) (Roig 1998). In the habitat of these two species the annual rainfall ranges from 100 to 600 mm (Paruelo et al. 1998). The species Patagonopraocis puncticollis sp. nov. inhabits xerophilous woodlands of Austrocedrus chilensis (Cupresaceae), where the annual rainfall ranges from 700 to 1700 mm (Roig 1998).

Key to species of Patagonopraocis

- Antennae reaching ¾ of lateral margin of pronotum; pronotum with punctuation more dense on lateral thirds, lateral margin with short silky setae (Figs 13, 16); elytron with humeri raised; ventral surface of femora with setae of equal lenght on all femora.....
- 2. Lacking groove between eye and frons; pronotum widest at base, anterior margin with edge slender, lateral margin arcuate and serrulate with abundant setae, posterior angles pointed, pronotum with punctures of equal diameter to elytral punctures (Figs 14, 17)

Patagonopraocis puncticollis sp. nov. (Figs 1, 6–7, 13, 16)

Diagnosis. Clypeus without lateral depressions; pronotum with round punctures two to four times the diameter of elytral punctures, more dense on lateral thirds, with a smooth area at center, lateral margin arcuate and smooth, with sparse short setae, posterior angles pointed; pronotum widest at base; prosternum with distance between anterior margin and procoxae longer than half procoxal length but shorter than procoxal length.

Description. Length 7.1-8.4 mm. Dorsal surface of body black, venter dark brown, antennae, legs dark brown (Fig. 13). Head. Clypeus without lateral depressions; clypeal suture without setae; frons with sparse big punctures separated by distance much greater than diameter of a puncture; groove between eye and frons on dorsal margin of eye; antennae reaching ³/₄ of lateral margin of pronotum. Thorax. Pronotum with round punctures two to four times the diameter of elytral punctures, more dense on lateral thirds, with a smooth area at center; anterior margin without edge; pronotum widest at base; lateral margin arcuate, smooth, with sparse short setae, posterior angles pointed (Fig. 16); proepisternum with shallow horizontal grooves on mesad half; prosternum with distance between anterior margin and procoxae longer than half procoxal length



Figures. 1–12. Body details and male and female genitalia of *Pataganopraocis* spp. (1–5) Fore tibia and tarsus viewed from front; (1) male of *P. puncticollis*; (2–3) male and female of *P. magellanicum*; (4–5) male and female of *P. minor* (a – apical process). (6–11) Male genitalia in dorsal and ventral views: (6–7) *P. puncticollis*; (8–9) *P. magellanicum*; (10–11) *P. minor* (bl – basal lamina of tegmen, ls – lateral styles of tegmen, ml – median lobe); (12) ovipositor (ventral view), spiculum and internal female reproductive tract of *P. magellanicum* (c – coxite, o – oviduct, p – paraproct, s – spermatheca, sag – spermathecal accesory gland, sp – spiculum, v – vagina). Scale bars 1 mm.

but shorter than procoxal length. Elytron arched, with humeri raised. Legs. Ventral surface of femora with setae of equal length on all femora; tibiae with sparse short setae; male with first protarsomere two times or longer as long as second protarsomere (Fig. 1). Male genitalia (Figs 6–7). Basal lamina of tegmen widest at base; lateral styles of tegmen with setae on distal ¹/₄.

Etymology. Named *puncticollis* to emphasize the big punctures covering the dorsal surface of pronotum.

Types material. Holotype, male: [Chapelco/ 1.750 msl/ Neuquén, Argentina/ 6.II.1972/ Leg. M. Gentili] [*Patagonopraocis/ puncticollis* n.sp./ HOLOTYPUS male/ Det. G. Flores and/ M. Chani-Posse 2005] (IADIZA). Five paratypes: [Neuquén, (Argentina)/ Chapelco/ 22.I.1963] 1 male (IADIZA); [Neuquén, (Argentina)/ Chapelco/ 7.III.1964] 1 male (MACN); [R.

Arg. Neuquén Dpto./ Lácar Lago Hermoso/ 10.XI.1991/ Col. G. Debandi] 1 male (IADIZA); [Argentina, Chubut/ Esquel/ La Hoya, 800–1350 m/ 24.II.1979/ Misión Científica Danesa] 2 males (FMNH).

Distribution. Argentina (Chubut, Neuquén and Río Negro provinces) (Fig. 19), in the Subandean Patagonian biogeographic province.

Patagonopraocis magellanicum sp. nov. (Figs 2–3, 8–9, 12, 14, 17)

Diagnosis. Clypeus with two lateral depressions; pronotum with round punctures of equal diameter to elytral punctures, of equal density throughout, lateral margin arcuate and serrulate, with abundant long setae,

posterior angles pointed; pronotum widest at base; prosternum with distance between anterior margin and procoxae shorter than half procoxal length.

Description. Length 5.7–7.1 mm. Body black to light brown, antennae, legs dark brown to light brown (Fig. 14). Head. Clypeus with two lateral depressions; clypeal suture with setae; frons with many big punctures separated by distance smaller than diameter of one puncture; lacking groove between eye and frons; antennae reaching middle of lateral margin of pronotum. Thorax. Pronotum with round punctures of equal diameter to elytral punctures, of equal density throughout; anterior margin with edge, slender; pronotum widest at base; lateral margin arcuate and serrulate, with abundant long setae, posterior angles pointed (Fig. 17); proepisternum with shallow horizontal grooves on mesad half; prosternum with distance between anterior margin and procoxae shorter than half procoxal length. Elytron arched, with humeri not raised. Legs. Ventral surface of femora with setae longer in pro- and mesofemora; tibiae with abundant short setae; male with first protarsomere 1.5 times as long as second protarsomere, female with first protarsomere two times as long as second protarsomere (Figs 2-3). Male genitalia (Figs 8–9) with basal lamina of tegmen widest at proximal third; lateral styles of tegmen with setae on distal 1/5.

Etymology. Named after the type locality, Strait of Magellan.

Types material. Holotype, male: [(Chile) Magallanes/ Punta Espora/ 1977/ Col. J. Petersen] [*Patagonopraocis/ magellanicum* n.sp./ HOLOTYPUS male/ Det. G. Flores and/ M. Chani-Posse 2005] (MNNC). Allotype, female: [(Chile) Magallanes/ Punta Espora/ 9.XII.1976–10.I.1977/ Col. T. B. N° 2] (MNNC). Three paratypes (2 males, 1 female) with the same data as allotype (IPUM); 39 paratypes: [Punta Espora/ Magallanes (Chile)/ 1977/ Leg. Lanfranco] (9 males, 16 females FMNH, 1 male, 1 female HNHM, 1 male, 1 female LEULS, 1 male, 1 female MACN, 1 male, 1 female MNNC, 1 male, 1 female NHMB). Remarks: The locality Punta Espora is in Tierra del Fuego island, in the margin of the Strait of Magellan.

Other material examined. [CHILE, XII Region/ Punta Delgada, Estrecho/ de Magallanes 2 m/ 13.I.2005 G. Flores-S. Roig] [52° 27.331' S, 69° 32.903' W] (2 males IADIZA). These specimens were found in poor condition but we use these to demonstrate that this species inhabits both margins of the Strait of Magellan.

Distribution. Chile (Region XII) (Fig. 19), in the Fuegian district within the Central Patagonia biogeographic province.



Figures. 13–18. Habitus and pronotum of Pataganopraocis spp. (13, 16) P. puncticollis; (14, 17) P. magellanicum; (15, 18) P. minor.

Patagonopraocis minor sp. nov. (Figs 4–5, 10–11, 15, 18)

Diagnosis. Clypeus with two lateral depressions; pronotum with round punctures two to four times the diameter of elytral punctures, of equal density throughout, lateral margin concave, smooth, with sparse long setae, posterior angles rounded; pronotum widest behind mid point; prosternum with distance between anterior margin and procoxae longer than half procoxal length but shorter than procoxal length.

Description. Length 5.8-6.1 mm. Dorsal surface of body black to dark brown, venter dark brown, antennae, legs dark brown (Fig. 15). Head. Clypeus with two lateral depressions; clypeal suture with setae; frons with many big punctures separated by a distance smaller than diameter of one puncture; deep groove between eye and frons on dorsal margin of eye; antennae reaching the middle of lateral margin of pronotum. Thorax. Pronotum with round punctures two to four times the diameter of elytral punctures, of equal density throughout; anterior margin without edge; pronotum widest behind mid point; lateral margin concave, smooth, with sparse long setae, posterior angles rounded (Fig. 18); proepisternum with shallow horizontal grooves on entire surface; prosternum with distance between anterior margin and procoxae longer than half procoxal length but shorter than procoxal



Figure 19. Geographical distribution of the species of Pataganopraocis.

length. Elytron arched, humeri not raised. Legs. Ventral surface of femora with setae longer in pro, mesofemora; tibiae with sparse short setae; male with first protarsomere 1.5 times as long as second protarsomere, female with first protarsomere two times as long as second protarsomere (Figs 4–5). Male genitalia (Figs 10–11) with basal lamina of tegmen widest at distal third; lateral styles of tegmen with setae on distal ¼.

Etymology. Named *minor* because it is the smallest species of the genus.

Types material. Holotype, male: [R. Argentina/ Chubut – 20 km W/ Alto Río Senguer cami-/ no Lago Fontana/ 5.II.1980/ Willink-Fidalgo/ Claps-Domínguez] [*Patagonopraocis/minor* n.sp./ HOLOTYPUS male/ Det. G. Flores and/ M. Chani-Posse 2005] (IMLA). Allotype, female: [Argentina, Santa Cruz/ Dto. Río Chico 426 m/ 35 km W G. (Gobernador) Gregores/ 9.I.2005 G. Flores-S. Roig] [48° 49' 54" S, 70° 32' 56" W] (IADIZA). Paratypes: [Argentina, Chubut/ Dto. Río Senguer 693 m/ 20 km W Alto Río Senguer/ 7.I.2005 G. Flores-S. Roig] [45° 04.20' S, 71° 01.39' W] 2 males (1 IADIZA, 1 MACN); one paratype female with the same data as allotype (FMNH).

Distribution. Argentina (Chubut and Santa Cruz provinces) (Fig. 19), in the Central district within the Central Patagonia biogeographic province.

DISCUSSION

It is remarkable that, although Patagonian steppes were visited early by entomologists (Darwin 1845, Curtis 1845), *Patagonopraocis* species have not been collected before. This is probably due to these beetles are the smallest tenebrionids in the Patagonia (5.7–8.4 mm), scarce in the field, and found under stones or into the web of the black widow spiders (*Latrodectus* spp.). Early collectors may have focused attention on the bigger species of Nycteliini, Praocini, and Scotobiini (Tenebrionidae).

Patagonopraocis belongs to the Tenebrionidae subfamily Pimeliinae by lacking defensive glands, having the aedeagus rotated 180°, with the medial lobe dorsal to the tegmen and lacking external membranes between the abdominal sternites V and VI and VI and VII (Watt 1974, Doyen 1993). Within Pimeliinae, Patagonopraocis is placed within the Asidine clade (Doyen 1993) by having multiple, long, slender spermathecal tubes which open as a fascicle into the base of the accesory gland duct or into the vagina near the duct. Within the Asidine clade of Doyen (1993), Patagonopraocis belongs to the subclade of South American tribes Nycteliini, Physogasterini and Praocini by having metendosternite arms fused with mesocoxal inflexions. Patagonopraocis is placed in the tribe Praocini according to the definition of that tribe by Kulzer (1958), although three changes in that tribal concept should be mentioned: 1) some genera exhibit sexual dimorphism, such as Antofagapraocis Flores (Flores 2000),

Platesthes Waterhouse (Flores 2004), and *Patagonopraocis* and 2) the antennomere 11th can be larger than 10th.

Flores (2001) found new character states at tribal level to define the Praocini. One of these is the distance between meso– metacoxae, which in Praocini exceeds half the mesocoxal length. However, in species of *Patagonopraocis* this distance does not exceed half mesocoxal length, which is unique to *Patagonopraocis* within Praocini. *Patagonopraocis* has been defined by the combination of characters listed in the diagnosis, but the sexual dimorphism exhibited by its species is unique to this genus within Praocini, consisting of: 1) width of distal margin of protibia in the male equal to ¹/₃ protibial length, in the female exceeding ¹/₃ protibial length but not exceeding half protibial length, and 2) apical process of protibia in the male longer than half protarsomere 1 length but shorter than protarsomere 1 length, in the female equal to length of protarsomere 1+2.

The most recent key provided for the genera of Praocini is that by Kulzer (1958), modified by Flores (2000) at couplet 2 to key out *Falsopraocis* Kulzer together with *Antofagapraocis*, and by Flores (2001) at couplet 2b to key out *Praocidia* Fairmaire and *Pilobaloderes* Kulzer, which follows in couplet 2c. *Patagonopraocis* keys out at couplet 7 of Kulzer (1958), which should be modified as follows:

- 7. Maxillary palps with last segment axe-shaped ... 7a
- 7a. Pronotum with anterior angles rounded; distance between meso- and metacoxae exceeding half meso-coxal length *Praocis* Eschecholtz
- Pronotum with anterior angles acute; distance between meso- and metacoxae not exceeding half mesocoxal length Patagonopraocis gen. nov.

ACKNOWLEDGEMENTS

We gratefully acknowledge Philip P. Parrillo (FMNH), María Virginia Colomo (IMLA) and Vicente Pérez D'Angelo (IPUM) for the loan of *Patagonopraocis* material; Sergio Roig-Juñent, Federico C. Ocampo and Andrew B.T. Smith for their help in the field trip to Patagonia in January 2005; Rolf L. Aalbu for suggestions improving this paper. This study was supported by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina, and by a grant of the BBVA Foundation, Spain: "Diseño de una red de reservas para la protección de la biodiversidad en América del Sur Austral utilizando modelos predictivos de distribución con taxones hiperdiversos". Field trip was supported by NSF-Biodiversity Surveys and Inventories (BS&I, USA) Scarabaeoidea of Southern South America (granted to Andrew B.T. Smith and Federico C. Ocampo) and by the grant of the BBVA Foundation, Spain.

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