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SYSTEMATICS

Taxonomic Review of *Platycoelia lutescens* (Scarabaeidae: Rutelinae: Anoplognathini) and a Description of its Use as Food by the People of the Ecuadorian Highlands

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ABSTRACT *Platycoelia lutescens* Blanchard (Scarabaeidae: Rutelinae: Anoplognathini), a species that occurs in the Andes Mountains of South America, is redescribed. *Platycoelia albescens* (Bates) and *P. baronis* (Ohaus) are considered new synonyms of *P. lutescens.* A lectotype is designated for *P. albescens.* The use of this species as a food source by the people of the Ecuadorian highlands is discussed.

RESUMEN Se redescribe a *Platycoelia lutescens* Blanchard (Scarabaeidae: Rutelinae: Anoplognathini), especie presente en la cordillera de los Andes en Sudamérica. *Platycoelia albescens* (Bates) y *P. baronis* (Ohaus) son consideradas nuevos sinonimos de *P. lutescens.* Se designa lectotipo para *P. albescens.* Se discute el uso de esta especie como recurso alimenticio en ciertos poblados de los Andes ecuatorianos.

KEY WORDS Scarabaeidae, Rutelinae, *Platycoelia,* entomophagy, Ecuador

Platycoelia lutescens BLANCHARD is a species of scarab beetle that occurs in the highlands of Colombia, Ecuador, and Perú. This species is easily recognized relative to other Andean scarabs by the cream color and large size (≈2 cm). *Platycoelia lutescens* is seasonally abundant, and label data indicated that it was sold in the Ecuadorian markets as food. In this article, we redescribe the adult of *P. lutescens* and place *P. albescens* (Bates) and *P. baronis* (Ohaus) as synonyms. We also extend the known range of this species into southern Colombia.

The genus *Platycoelia* was erected by Dejean (1833) for one species [*P. flavostriata* (Latreille 1813)] occurring in the Andes Mountains of South America. Blanchard (1851) described *P. lutescens* using a specimen (or specimens) from Cuzco, Perú. One year before his death, Bates (1891) described the genus *Leucopelaea* and the species *L. albescens* using 13 specimens from Cotopaxi and Machachi, Ecuador. Evidently, Bates was not acquainted with Blanchard's *P. lutescens.* In his description, Bates (1891) made no reference to *P. lutescens* (proposed 41 yr previously), or, if he believed that the species differed, he might have transferred the species to *Leucopelaea.* Arrow (1899) first questioned the validity of the genus *Leucopelaea* and hypothesized that Bates may not have been familiar with a similar genus, *Callichloris* Burmeister (now a junior synonym of *Platycoelia*). In his revision of the New World Anoplognathini, Ohaus (1905) transferred *P. lutescens* to the genus *Leucopelaea* and added the new species *L. baronis.* Ohaus (1905) described *L. baronis* using specimens from Ecuador. He stated that *L. albescens* and *L. baronis* occurred in Ecuador and that *L. lutescens* occurred in Ecuador and Perú. Ohaus (1908) later mentioned that *L. lutescens* was found near Quito, Ecuador. In the Genera Insectorum for Rutelinae, Machatschke (1965) synonymized the genus *Leucopelaea* with *Platycoelia,* thus transferring *L. lutescens, L. albescens,* and *L. baronis* to the latter genus. Additionally, Machatschke (1965, 1972) incorrectly designated *Platycoelia lutescens* as the type species for the genus *Leucopelaea. Leucopelaea albescens* is the type species for *Leucopelaea* by monotypy. Because of the confusion over the correct identity of *P. lutescens,* we are redescribing it below.

Platycoelia lutescens Blanchard

Platycoelia lutescens Blanchard 1851: 227. Type not seen. There is no doubt that the specimens we examined are *P. lutescens* based on Blanchard's (1851) original description and Ohaus' (1905) redescription.

Leucopelaea albescens Bates 1891: 30. Lectotype male at the Natural History Museum, London, England, labeled (a) "Co-type" (round with red circle), (b) "92–24," (c) "Cotopaxi Ecuador. 12000 feet. Ed. Whymper," (d) "Leucopelaea Albescens" (in Bates' handwriting), (e) LEUCOPELAEA ALBESCENS BATES DET: A.B.T. SMITH 1999, LECTOTYPE (red Lectotype label), (f) PLATYCOELIA LUTESCENS BLANCHARD ♂ DET: A.B.T. SMITH 1999" (white

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determination label). **Lectotype here designated.** The location of the remaining 12 specimens from Bates' original type series is unknown. **NEW SYNONYMY.**

Leucopelaea baronis Ohaus 1905:123. Male holotype from the Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany labeled (a) "Ecuador Baron," (b) "Leucopelaea Baronis Type Ohs." (orange type label), (c) "LEUCOPELAEA BARONIS OHAUS HOLOTYPE" (red holotype label), (d) "Zool. Mus. Berlin," (e) "PLATYCOELIA LUTESCENS BLANCHARD ♂ DET: A.B.T.SMITH 1999" (white determination label). Two male and two female paratypes are all labeled "Ecuador Baron" and have an orange "Leucopelaea Baronis Cotype Ohs" label and a yellow "LEUCOPELAEA BARONIS OHAUS PARATYPE" label. One specimen labeled "Ecuador E. Deville" also had an orange "Leucopelaea Baronis Cotype Ohs" label but this is an invalid type designation because the original description mentioned only specimens collected by Baron (Ohaus 1905). NEW SYNONYMY.

Description. MALE (Fig. 1): Length 16.1–24.3 mm. Width 10.2–13.6 mm. Color dorsally and ventrally cream-colored when alive, often turning tan or testaceous when dead. *Head.* Dorsal surface glabrous. Frons impunctate or sparsely punctate at base, moderately punctate toward apex, punctures moderate (0.034–0.085 mm) in size. Frontoclypeal suture complete, weakly bisinuate. Clypeus densely punctate (base) to rugopunctate (apex), punctures moderate (0.034–0.085 mm) in size; apex broadly rounded, moderately reflexed. Labrum with apex vertically produced with respect to clypeus, moderately produced at middle with triangular tooth. Maxillary surface pilose; maxillary palpus apex with 2–3 laterally elongated teeth that are sometimes worn and obsolete. Mentum with surface pilose; apex quadrate and weakly notched at middle. Antenna 10-segmented, club slightly shorter than segments 1–7. *Pronotum.* Widest at middle, basomedially protuberant toward base with posteriorly projecting pilosity adjacent to scutellum. Surface glabrous with sparse, small punctures. Marginal bead present laterally and at apical and basal angles, incomplete apicomedially and basomedially. *Scutellum.* Surface glabrous, impunctate. Shape parabolic, 1.4 times wider than long medially. *Elytra.* Surface glabrous, with feebly impressed longitudinal striae reaching neither apex nor base. Intervals impunctate; intervals 1, 3, and 5 slightly raised toward apex. Epipleuron with ventral surface flat, tapering from humeral angle to sternite 2–3, beaded from sternite 2–3 to apex. *Pygidium.* Width at base 1.7 times as long as length. Surface punctate; punctures small, sparse, setose in apical half; setae long, reddish. *Venter.* Sternum and epimeron with moderate to dense setae; setae long, reddish. Mesosternal process small, projecting to subapex of mesocoxae. Sternites laterally moderately pilose, medially sparsely pilose; setae long, reddish. Spiracles on lateral edge of sternites 4 and 5 with margins extruded as a short cylinder. *Legs.* Coxae, trochanters, and femora with moderate to dense pilosity; setae long, reddish. Protibia with three teeth in apical half; first and second teeth subequal in size, third tooth small, often worn and obsolete, removed slightly from apical teeth. Protarsus with modified claw thickened, flattened when compared with other claw, apex weakly bifurcate (Fig. 2). Protarsomere 5 with weak, internal, medial tooth (Fig. 2). Unguitractor plate cylindrical, produced beyond apex of protarsomere 5, with 2 setae at apex and at subapex (Fig. 2). Mesotibia weakly flattened in lateral view, sides subparallel, apex weakly divergent, external edge with 1 carina in apical third, apex with 7–10 spinules. Metatibia weakly flattened in lateral view, sides subparallel, apex weakly divergent, external edge with 1 carina in apical third, apex with 10–18 spinules. Meso- and metatarsus with external claws laterally flattened with respect to ventral tooth; ventral tooth variable in size (subequal to apex or smaller than apex) and placement (at subapex or at middle). *Parameres* (Fig. 3): Symmetrical in caudal view. Phallobase 1.4 times longer than length of parameres.

FEMALE. Length 17.5–30.3 mm. Width 10.7–16.8 mm. As male except in the following respects. *Legs.* Third protibial tooth broadly acute, rarely worn down and obsolete. Protarsomere five lacks internal tooth (Fig. 4). Modified protarsal claw laterally flattened and with a ventral tooth (Fig. 4). Metatibia with inner spurs blunter and shorter. Female genitalia not diagnostic.

Diagnosis. This species is distinguished from all other species in the genus *Platycoelia* by the following combination of characters: dorsally cream-colored to tan, mesosternal process small with apex not protruding past the mesocoxae, pronotum glabrous, and spiracles on lateral edge of sternites 4 and 5 each with margins extruded as a short cylinder.

Distribution (Fig. 5). Andes Mountains from southern Colombia to southern Perú. Recorded from 1,800 to 4,000 m. Occurs in paramo and other grassland habitats.

Locality Data. Two hundred and seven specimens examined from United States National Museum, Washington, DC (David Furth, Gloria House); Museo de Zoología, Pontificia Universidad Católica del Ecuador, Quito, Ecuador (Giovanni Onore); Henry and Anne Howden Collection, Ottawa, Ontario, Canada; Carnegie Museum of Natural History, Pittsburgh, PA (Robert Davidson); California Academy of Sciences, San Francisco, CA (Roberta Brett); The Natural History Museum, London, England (Malcolm Kerley); Mary Liz Jameson Collection, Lincoln, NE; Los Angeles County Museum of Natural History, Los Angeles, CA (Brian Brown); Museum für Naturkunde der Humboldt-Universität zu Berlin, Berlin, Germany (Manfred Uhlig, Hella Wendt); Zoologische Abteilung des Ungarischen Naturwissenschaftlichen Museums, Budapest, Hungary (Otto Merkl); Collection de François Génier, Aylmer, Québec, Canada; Insect Collection, Museum of Comparative Zoology, Cambridge, MA (Philip Perkins); Brett C. Ratcliffe Collection, Lincoln, NE; Daniel J. Curoe Collection, Palo Alto, CA.

Fig. 1. Male *P. lutescens.*

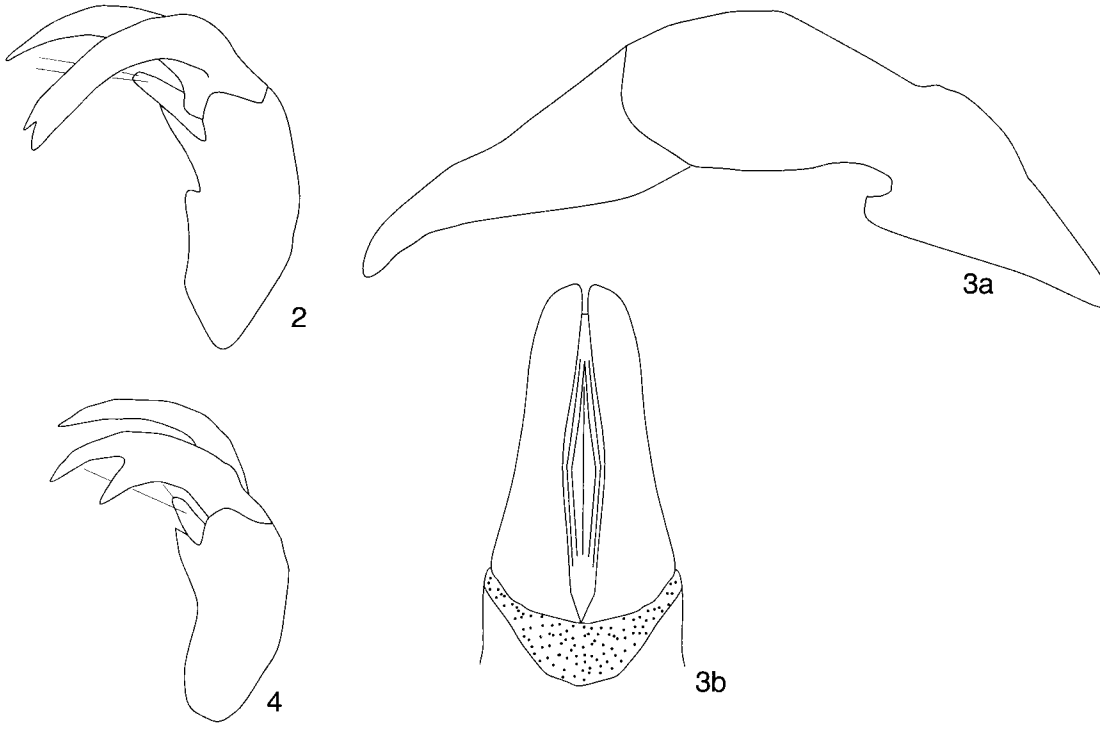

Fig. 2–4. *P. lutescens.* (2) Male foreclaw. (3) Lateral (a) and caudal (b) views of parameres and phallobase. (4) Female foreclaw.

COLOMBIA (5). NARIÑO (5): Cumbal, Pasto.

ECUADOR (198). BOLÍVAR (4): Totoras. CAÑAR (3): El Tambo. COTOPAXI (17): El Boliche, Latacunga, Limpiopungo, Parque Nacional Cotopaxi. ESMERALDAS (2): Mayronga. IMBABURA (7): Otavalo. PICHINCHA (142): Aloág, Cayambe (9.9 km NW), Chillogallo, Conocoto, Cumbaya, Ilaló, Nono, Palmeras, Píntag, Quito, Tambillo, no data. TUNGURAHUA (5): Baños, Píllaro. NO DATA (18).

PERÚ (2). PUNO (1): No data. NO DATA (1).

NO DATA (2).

Doubtful locality labels include four specimens labeled "Guayquil, Ecuador" and one specimen labeled Archidona. We considered these "Ecuador, no data" because these localities are too low in elevation to support populations of this species. One specimen labeled "Chili" is also doubtful and we consider it a "No Data" specimen.

Temporal Data. January (10), February (9), March (2), April (1), May (1), June (4), August (1), September (2), October (24) November (16), December (11).

Remarks. Although *P. lutescens* was described from Cuzco, Perú, we saw only two specimens from that country. The scarcity of specimens of *P. lutescens* from Perú in collections is probably a result of two factors: (1) the areas of Perú where this species occurs are severely under-collected and (2) *P. lutescens* is an ephemeral species that emerge as adults all at once and then quickly die off, and are therefore easily missed (see also comments by Whymper 1891). After careful examination of the available specimens we concluded that the Perú populations were the same species as the Ecuador and Colombia populations.

As seen from the description, *P. lutescens* is variable in size and color. The size variation in this species is not unusual, and it is also seen in other species in the genus such as *P. humeralis* Bates, which occurs from México City to Panamá. Although the individuals at either extreme of the size range are generally found at different localities, the size of individuals at any given locality can also vary. The variable color of *P. lutescens* may be partially caused by how the specimens died and were preserved. The natural color of the live specimens is also variable. Many species of *Platycoelia* have more than one color form (often light green or yellow). Some species of *Platycoelia* are yellow, but *P. lutescens* is easily separated from these by its tan or cream color. In his review of *Leucopelaea,* Ohaus (1905) stated that the three species (*L. lutescens, L. albescens,* and *L. baronis*) were very similar and differed only in size, color, elytral sculpturing, and form of the maxilla. Ohaus (1905) included detailed descriptions of the maxilla (sculpturing, number of teeth, setae) of the three species and included illustrations to highlight the differences. In our examination of the large series of specimens (including type specimens of *L. albescens* and *L. baronis*), we conclude that the maxilla of some individuals are different (in sculpturing, number of teeth, and setae) because they are

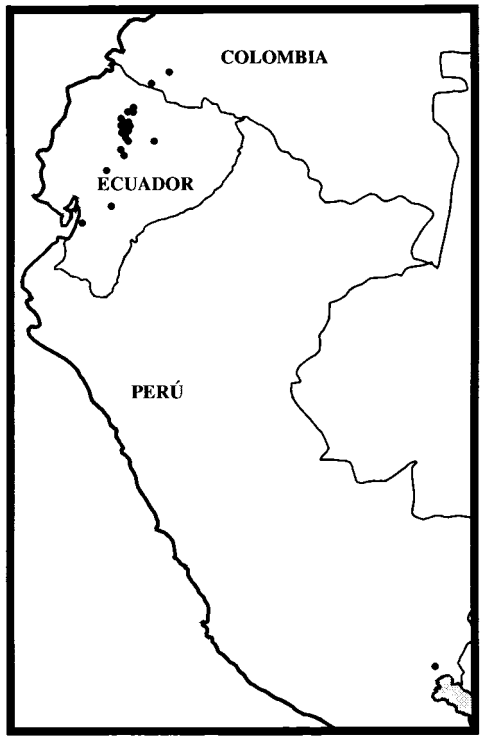

Fig. 5. Distribution of *P. lutescens* in Colombia, Ecuador, and Perú.

variable within a population or worn down because of use. Our examination of the elytral sculpturing indicates that it varies within a population and is not, therefore, a useful character. After the observations summarized above and an extensive search for other characters (mainly the form of the mouthparts, head, pronotum, elytra, venter, legs, and male and female genitalia) separating the three species formerly in the genus *Leucopelaea,* we conclude that they are all the same species, and we here synonymize the three names (therefore the oldest name, *P. lutescens,* is the valid name). We did not conduct a formal phylogenetic analysis of *Platycoelia.* However, there are many similarities (for example, the form of the antenna, foretibia, claws, mesosternal process, and male and female genitalia) between *P. lutescens* and other members of *Platycoelia* (namely: *P. nigricauda* Bates, *P. parva* Kirsch, and *P. bordoni* Martínez). These similarities strongly suggest to us that *P. lutescens* is a derived member of *Platycoelia,* and without a phylogenetic hypothesis, we do not support the use of *Leucopelaea* as a valid genus because this would likely result in the remaining *Platycoelia* being paraphyletic. Therefore, until such time as a monophyletic *Leucopelaea* and *Platycoelia* can be demonstrated through phylogenetic analysis, we agree with Machatschke (1965) in considering them as synonyms.

Table 1. Number of people interviewed in each economic class, age category, and sex

Age	Lower economic class			Middle and upper economic class		
	Female	Male	Total	Female	Male	Total
8–10	2	2	4	1	1	2
20–30	2	2	4	3	2	5
31–55	8	4	12	7	4	11
56–80	3	1	4	4	2	6
Total	15	9	24	15	9	24

Use of *P. lutescens* as a food source in Ecuador

Platycoelia lutescens, a beetle commonly called "catso blanco" in the Ecuadorian Andes, is considered a traditional food source in and around Quito. The origin of this tradition remains uncertain, but elderly people interviewed for this research remembered that their grandparents consumed these white beetles. In his article on the edible insects of Ecuador, Onore (1997) commented that archaeological records in the museums of Quito indicated that the practice of entomophagy was very old and certainly predated European colonization.

Interviews were done in October and November of 1998 in and around the city of Quito, Ecuador, primarily in the areas of La Marín, El Pintado, Santa Clara, and in smaller villages located in the surrounding valleys of Sangolquí and El Tingo. Of the people interviewed, 24 were in the lower economic class (Table 1). These people were selling beetles, vegetables, or typical food in the market, and one was a student. Also, 24 people belonging to middle and upper economic classes were interviewed (Table 1). These interviewees were students, teachers, government employees, and others who worked at their homes. Approximately 20 voucher specimens were collected of *P. lutescens* at El Pintado, Quito, on 10 November 1998 and deposited at the Zoology Museum at the Pontificia Universidad Católica del Ecuador in Quito. A.P.C. ate a sample of the beetles to experience the taste.

In the city of Quito (population 1.3 million, 2,800 m in elevation), large numbers of *P. lutescens* adults emerge at the end of October and the beginning of November, when winter rains begin. Whymper (1891, 1892) stated that during his travels in Ecuador, he saw many *P. lutescens* (then *Leucopelaea albescens*) "dead as well as living (that) were spread over the ground for a distance of several miles" on a sandy plain to the northwest of Cotopaxi. He observed a mass emergence of the species that probably made gathering them for food much more lucrative. The best emergence days near Quito were rainy days and the temperature exceeded 10°C. Beetle hunters converged on the meadows that were still present in areas south of the city (for example in El Pintado, La Ecuatoriana, Ecuatoriana, and Guajaló) and began collecting beetles at 0400 hours. The success of the task is closely related to the rain and the sound of thunder (Onore 1997). The vibration caused by rain hitting the ground and thunder may trigger adult emergence.

Fig. 6. Preparation of *P. lutescens.* The elytra, wings, and legs have been removed.

Platycoelia lutescens can be found by the hundreds among the grass and they are easily captured. Hunters put them in plastic bags or jars to take them to the market. Beetle hunters say that it used to be very easy to find *P. lutescens* around houses, but that increased urban development in these areas has caused the destruction of grasslands and meadows, and beetle numbers have declined as a result. Now it is necessary to go to the hills where pastures can still be found to capture *P. lutescens.*

Preparation and cooking of *P. lutescens* takes 2–3 d. The beetles are placed in wheat or corn flour for a whole day. This procedure is required to "fatten up" the beetles and possibly to induce defecation. The legs, elytra, and wings are removed (Fig. 6), and the insects are soaked in salt water for 1–2 d. This seems to help reduce the characteristic bitter flavor of these beetles. The insects are fried in vegetable oil or pork fat and a mixture of onion, tomato, and salt. When they are slightly toasted and golden-colored, the beetles are ready to be served. Some people serve them with white onions and toasted corn seeds (Fig. 7), whereas others just add boiled rice. A.P.C. sampled the cooked beetles and found them to have a crunchy cuticle, a soft and oily body, and a bitter flavor. Also, when the beetles are alive they have a characteristic odor like sweet, fermented milk that remains in the cooked beetles.

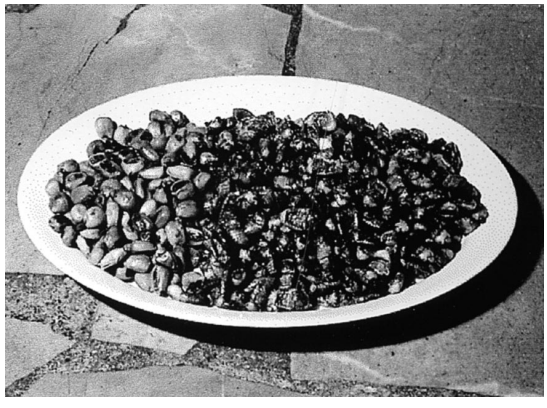

Fig. 7. A typical style of serving *P. lutescens* (on right) with corn (on left).

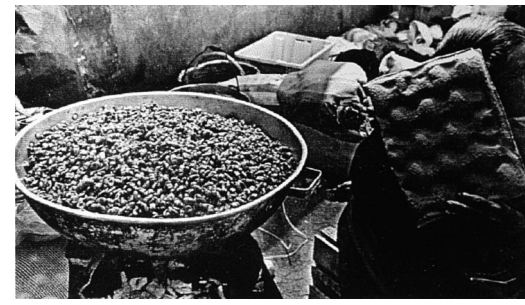

Fig. 8. *P. lutescens* on display at a street market in Quito, Ecuador.

All of the people interviewed knew about the practice of eating *P. lutescens.* All of the lower economic class interviewees (adults and children) ate this beetle at least once a year in late October to early November during the beetle's emergence. Commonly, families also prepare the beetles at home. Sometimes all the family members go to the meadows to capture the insects as a recreational activity. In other cases, families just buy the live insects. Adults and children usually know how to prepare and cook the "catsos." From the 24 people belonging to the middle and upper economic classes, only one had eaten *P. lutescens* (he found this traditional dish delightful). The other 23 people had no desire to taste this kind of food.

The use of *P. lutescens* as food has some economic relevance as well. Hunters sell live insects in the market to people that will cook and sell them to the consumers (Fig. 8). Suppliers usually sell the live insects in 5-liter containers for ≈25,000 sucres (approximately $3.50 US). Cooked insects are sold in small plastic bags containing 10–12 beetles each, at a cost of 3,000 sucres (approximately $0.40 US). Therefore, economic benefits from a single 5-liter container can be as high as 500,000 sucres (approximately $71.40 US). It is worth considering the possibility that *P. lutescens* may become an alternative food source in some areas of Ecuador and other Andean countries.

Habitat changes have had different affects on the populations of *P. lutescens* in the Ecuadorian Andes. The artificial meadows and grasslands cultivated for cattle may have a positive impact, providing a good habitat for *P. lutescens.* The growth of the urban areas around Quito has reduced grassland habitats and has restricted the beetles' habitat. It is, however, still possible to collect relatively large numbers of insects in some areas of Quito and the surrounding Andean valleys. For the lower economic classes, the custom of using *P. lutescens* for food is a part of the traditions inherited from their ancestors. It is source of nutrients, a delicious meal, and a family diversion. It is an old custom, and still remains valued among the people of Quito.

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