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Genera of the bee tribe Reedapini (Hymenoptera: Colletidae)

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Abstract. Those bees classified in the genera *Reedapis* Michener and *Cephalocolletes* Michener are discussed and organized into a new tribe, **Reedapini** Engel. In addition, three species formerly classified in *Cephalocolletes* are removed to two new genera: *Lonchopriscus* Engel, new genus, with the species *Lonchopriscus crassipunctatus* (Urban), new combination, and *Cactocolletes* Engel, new genus, for *Cactocolletes isabelae* (Urban), new combination, and *C. rugatus* (Urban), new combination. The tribe and its constituent genera are diagnosed, and a key is provided for the identification of the latter along with their included species.

INTRODUCTION

The South American fauna of paracolletine bees is quite diverse and includes various genera (often considered as subgenera of *Leioproctus* Smith: *e.g.*, Michener, 1989, 2007) that frequently exhibit unique floral specializations or associations. Among this diversity are two genera in particular, *Reedapis* Michener and *Cephalocolletes* Michener, that intermingle features of lonchopriines and other American Paracolletinae, sharing with the former genera the long second submarginal cell in the forewing venation. Quite interestingly, these two genera also encompass species bearing distinctive and functional metasomal scopae, resembling in this regard megachilines as individuals can often be found with these setae packed with pollen along with the scopae and fiscinae of the hind legs (*e.g.*, Fig. 18). While these genera form a discrete, cohesive group (here treated as a distinct tribe), and were also individually so as original defined, subsequent species placed within *Cephalocolletes* have rendered the circumscription of this group muddled and remarkably heterogeneous in morphological features. Herein,

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Cephalocolletes is narrowed in composition, with its subsequent species removed to other groups. Thus, the purpose here is to provide a diagnosis for the tribe, a key to its constituent genera, and diagnoses and figures of these taxa.

MATERIAL AND METHODS

Morphological terminology follows that of Michener (2007) and Engel (2001), with the term "spicate" (*sensu* Engel *et al.*, 2019) applied to certain forms of setal pile that have a velvety pipecleaner-like appearance owing to abundant, minute branches along the rachis. In addition, the term "fiscina" (*sensu* Engel, 2001) is used for what has historically been termed the "metafemoral corbicula" (Michener, 1999), but the latter is avoided in order to restrict the term "corbicula" for that unique structure found in the tribes of corbiculate Apinae (*e.g.*, Engel & Rasmussen, in press).

Photographs of specimens were prepared using a Canon 7D digital camera, and relative measures of body proportions were made with an Olympus SZX12 stereomicroscope. Material for all but two species were examined from the collections of the Division of Entomology, University of Kansas Natural History Museum, Lawrence and Division of Invertebrate Zoology, American Museum of Natural History, New York, with detailed images of additional specimens (of *Cactocolletes, vide infra*) provided by Clemens Schlindwein, Universidade Federal de Minas Gerais, Brazil.

SYSTEMATICS

Reedapini Engel, new tribe

ZooBank: urn:lsid:zoobank.org:act:9346BBD0-AFC4-40ED-B61F-2DC26F37FD32

TYPE GENUS: *Reedapis* Michener, 1989.

DIAGNOSIS: Reedapini intermingle features of Lonchopriini and other South American paracolletines. Reedapines, like those species of Lonchopria Vachal (sensu Michener, 2007), have three submarginal cells in the forewing, with a long second submarginal cell (Fig. 9). The posterior margin of the second submarginal cell is often as long as or at least three-fourths as long as that of the third submarginal cell, but may sometimes be longer than the third. The preoccipital ridge is rounded and the pronotum lacks a transverse carina dorsolaterally (preoccipital ridge carinate to lamellate and pronotum with transverse carina dorsolaterally in Eulonchopria Brèthes). All taxa have a probasitarsal comb, formed of a distinct longitudinal line of setae along the outer margin (also present in Lonchopriini, Eulonchopria, Nomiocolletes Brèthes, and weakly so in Lonchorhyncha Michener, but otherwise usually absent among other South American paracolletines). The pretarsal claws are cleft, with the inner ramus shorter than the outer ramus. There is a distinct fiscina (sensu Engel, 2001) on the ventral surface of the metafemur, bordered anteriorly by elongate, arching setae with numerous long branches, and posteriorly by long setae that are either largely simple to bearing numerous short branches. The metatrochanter has abundant, elongate, scopal setae (floccus) bordering the metafemoral fiscina proximally (similar to that of Lonchopriini, absent in other South American paracolletines). Metatibial scopa composed of numerous elongate, plumose setae but not so dense as to obscure the metatibial surface (dense and obscuring metatibial surface in Lonchopriini). The metabasitarsus is slender, tapering slightly apically, with an apical width more than one-half the basal width (about one-half basal width in Lonchopriini, thus metabasitarsus more strongly



Figure 1. Outline of distributions of Reedapini based on observed specimens (produced using Shorthouse, 2010). Blue = *Reedapis* Michener; yellow = *Cephalocolletes* Michener; green = *Lonchopriscus*, new genus; pink = *Cactocolletes*, new genus.

tapering apically in Lonchopriini), and the outer surface is flat (versus longitudinally concave in Lonchopriini). The male sternum VIII has the apical process terminating in a slightly exposed, rounded, beveled area superficially resembling a pygidial plate (absent in Lonchopriini). Females of Reedapini have a distinct, well-developed metasomal scopa on sterna II–V. The metasomal scopa is composed of abundant, elongate (nearly as long as the exposed portions of the sterna), appressed to subappressed, plu-

Table 1. Classification of tribe Reedapini (Colletidae). Distribution records based on specimens in University of Kansas Natural History Museum, American Museum of Natural History, Schlindwein collection, and as recorded by Toro (1973), Michener (1989), Urban (1995), and Lenzi & Orth (2011).

Tribe Reedapini, n. trib.	
Genus Cactocolletes, n. gen.	
C. isabelae (Urban, 1995), n. comb.	Brazil (Rio Grande do Sul, Santa Catarina)
C. rugatus (Urban, 1995), n. comb.	Argentina (Entre Ríos), Brazil (Rio Grande do Sul)
Genus Cephalocolletes Michener, 1989	
C. laticeps (Friese, 1906)	Argentina (Catamarca, Mendoza, La Rioja, Tucumán)
Genus Lonchopriscus, n. gen.	
L. crassipunctatus (Urban, 1995), n. comb.	Argentina (Catamarca)
Genus Reedapis Michener, 1989	
R. bathycyanea (Toro, 1973)	Chile (Atacama, Bío-Bío, Coquimbo,
	Región Metropolitana)
R. melanocyanea (Toro, 1973)	Chile (Antofagasta, Atacama)
R. semicyanea (Spinola, 1851)	Chile (Atacama, Coquimbo, Valparaíso, Región Metropolitana)

mose setae. Similar scopal setae are present along the apicolateral extremities of terga II–V and arch ventrally toward the sterna.

Сомментя: At times there is numerous pollen grains in the metasomal scopa (including those setae on the apicolateral extremities of terga II–V) as well as amid the scopal setae of the metafemur and metatibia. When pollen is present on specimens it appears to be cactus pollen (also noted by Michener, 1989), and it may be that reedapines are oligolectic on Cactaceae. The few observed floral records are all from cacti (*e.g.*, Lenzi, 2008; Lenzi & Orth, 2011).

INCLUDED GENERA: The tribe includes the genera *Reedapis*, *Cephalocolletes*, *Lonchopriscus*, n. gen., and *Cactocolletes*, n. gen., all occurring in southern South America [currently recorded from Argentina, southern Brazil, and Chile (Table 1), and likely occurring in Uruguay and perhaps southeastern Paraguay] (Fig. 1). It would appear that among these genera, *Lonchopriscus* and *Cactocolletes* are most closely related, with *Cephalocolletes* sister to this grouping, and *Reedapis* the earliest diverging of the constituent lineages.

Key to Genera of Reedapini

- Mesoscutum and mesoscutellum covered in dense, short, spicate pile or plu-2(1).mose setae that frequently largely obscures integumental surface in female (except in C. isabelae where pile is sparse over disc centrally) (Figs. 14, 16, 17, 20-22); mesoscutal setae tawny to white (Figs. 16, 17, 21, 22), metafemoral fiscinal and metatibial setae white to off white; first flagellomere distinctly shorter than combined lengths of second and third flagellomeres, subequal to fourth flagellomere (Fig. 11); scape extending only to level of median ocellus (Fig. 15); metasoma with apical bands of white or pale setae, sometimes interrupted medially on more basal terga; male with preapical tooth (un-Mesoscutum and mesoscutellum not covered in dense pile, instead with scattered long, dark setae, not obscuring integument (Figs. 6, 8); mesoscutal setae black to dark fuscous (Figs. 6, 8); metafemoral fiscinal and metatibial scopal setae black to dark fuscous; first flagellomere elongate, as long as or slightly longer than combined lengths of second and third flagellomeres (Fig. 10), distinctly longer than fourth flagellomere; scape extending to up-



Figures 2–4. Females of *Reedapis* Michener. **2.** Lateral habitus of female of *Reedapis semicyanea* (Spinola). **3.** Dorsal habitus of *R. bathycyanea* (Toro). **4.** Facial view of *R. bathycyanea*.

(Figs. 19, 23); mesoscutum with sparser areas of punctation centrally (male with preapical tooth) [Argentina, Brazil] *Cactocolletes*, n. gen.

Genus *Reedapis* Michener (Figs. 2–4, 12)

Leioproctus (Reedapis) Michener, 1989: 656. Type species: *Leioproctus bathycyaneus* Toro, 1973, by original designation.

DIAGNOSIS: This is a genus of moderately large, robust bees, with a total body length of approximately 9–15 mm. The integument is generally black with at least weakly metallic blue on the metasoma (unique for the tribe) (Figs. 2, 3), while the pubescence is principally fuscous to black on the head, legs, and ventral surfaces of the mesosoma and metasoma (Figs. 2–4), with metasomal terga I–III bearing prominent apical bands of white setae, sometimes weak or incomplete on tergum I and faintly indicated amid fuscous setae on tergum IV. The head is broader than long, with the compound eye length either slightly shorter or subequal to the distance between the lower inner orbits of the compound eyes (distinctly shorter than the distance between the upper inner orbits), and the inner orbits of the compound eyes are slightly to strongly convergent below (Fig. 4). Lateral ocelli situated at the upper tangent of the compound eyes, with the scape extending to the level of the lateral ocelli (Fig. 4). The first flagellomere of females is shorter than the combined lengths of the second and third flagellomeres (Fig. 12), while its medial length is approximately equal to the apical width of the scape. The integument of the face is not entirely obscured by pubescence, with the supraclypeal area lacking a subtriangular glabrous area (Fig. 4). The male mandible, like the female mandible, has a preapical tooth. The maxillary palpus is moderately long, with at least the apical two palpomeres extending beyond the galeal apex. The mesoscutum and mesoscutellum are covered with abundant, long, white, minutely branched setae that do not obscure the integumental surface (*i.e.*, not covered in dense, obscuring pile). The basal area of propodeum is about as long as the metanotum and is smooth to weakly transversely rugose, while the lateral surface of the propodeum is punctate, without striae or rugae. The probasitarsus has a distinct outer longitudinal comb. The meso- and metatibial spurs are straight [Reedapis bathycyanea (Toro)] or curved [R. semicyanea (Spinola) and R. melanocyanea (Toro)], with the mesotibial spur coarsely to finely pectinate and the inner and outer metatibial spurs pectinate and similar in form. The metafemoral fiscina anteriorly has elongate, fuscous setae bearing abundant long branches, while those posteriorly bordering the fiscinal space have distinctly short branches. The metatibial scopal setae are elongate, fuscous, and have numerous long branches. The metasomal scopa (on sterna II-V and apicolateral extremities of terga II–V) is composed of abundant, fuscous to black, elongate (nearly as long as exposed portions of sterna), subappressed setae with numerous long branches. The genus was thoroughly characterized by Michener (1989: as a subgenus of *Leioproctus*).

INCLUDED SPECIES: The genus includes three species from central and northern Chile — *Reedapis bathycyanea* (Toro), *R. melanocyanea* (Toro), and *R. semicyanea* (Spinola).

Key to Species of *Reedapis* (females only; modified from Toro, 1973)

1.	Outer metatibial spur coarsely pectinate, with branches longer than width of
	rachis, spur weakly arched; mesotibial spur curved apically 2
—.	Outer metatibial spur finely pectinate, with branches shorter than or equal to
	width of rachis, spur relatively straight; mesotibial spur nearly straight
2(1).	Third metasomal tergum with white setae except some intermingled black
	setae; fourth tergum with a poorly indicated, apical band of white setae
—.	Third metasomal tergum with black setae except some intermingled white se-
	tae: fourth tergum without white setal band



Figures 5–6. Female of *Cephalocolletes laticeps* (Friese). 5. Lateral habitus. 6. Dorsal habitus.

Genus Cephalocolletes Michener (Figs. 5–10)

Leioproctus (*Cephalocolletes*) Michener, 1989: 657. Type species: *Biglossa laticeps* Friese, 1906, by original designation.

DIAGNOSIS: This is a genus of moderately large, robust bees, with a total body length of approximately 10–16 mm. The integument is generally black, without any



Figures 7–9. Details of *Cephalocolletes laticeps* (Friese). 7. Facial view. 8. Mesosomal dorsum. 9. Wing venation.

hint of the metallic highlights that otherwise characterized *Reedapis* Michener (*vide su-pra*), and the pubescence is principally fuscous to black throughout, without prominent setal bands on the metasoma (Figs. 5, 6). The head is broader than long, with the compound eye length distinctly shorter than the distance between the lower inner orbits of the compound eyes (Fig. 7), and the inner orbits of the compound eyes are parallel in females and scarcely convergent below in males. Lateral ocelli situated below upper tangent of the compound eyes (Figs. 7, 10), with the scape extending slightly above the level of the lateral ocelli (Figs. 7, 10). The vertex is enlarged such that the ocelli are situated far from the posterior border of the vertex (Fig. 7). The first flagellomere of females is longer than the combined lengths of the second and third flagellomeres, while its medial length is much greater than the apical width of the scape (Figs. 7, 10). The integument of the face is not obscured by pubescence, with the



Figures 10–12. Details of female antennae from representative Reedapini. 10. *Cephalocolletes laticeps* (Friese). 11. *Lonchopriscus crassipunctatus* (Urban). 12. *Reedapis bathycyanea* (Toro).

supraclypeal area lacking a subtriangular glabrous area (Fig. 7). The male mandible is simple, unlike the female mandible which has a preapical tooth. The maxillary palpus is moderately long, with at least the apical two palpomeres extending beyond the galeal apex. The mesoscutum and mesoscutellum are covered with abundant, short to long, black, minutely branched setae that do not obscure the integumental surface (*i.e.*, not covered in dense, obscuring pile), setae sparser on disc than on margins (Figs. 6, 8). The integument of the mesoscutum and mesoscutellum is largely smooth, with sparsely scattered punctures. The basal area of propodeum is slightly longer than the metanotum and is smooth and shining, and the lateral surface of the propodeum has strong, longitudinal-oblique striae or rugae. The probasitarsus has a distinct outer longitudinal comb. The meso- and metatibial spurs are straight, with the mesotibial spur minutely ciliate, the outer metatibial spur simple, and the inner metatibial spur coarsely pectinate. The metafemoral fiscinal and scopal setae are like those of *Reedapis*. The genus was thoroughly characterized by Michener (1989: as a subgenus of *Leioproctus*).

INCLUDED SPECIES: The genus includes only the type species, *Cephalocolletes laticeps* (Friese), from northeastern Argentina (Tucumán, Catamarca, La Rioja, and Mendoza: likely also to be found in San Juan and Salta Provinces).



Figures 13–15. Female of *Lonchopriscus crassipunctatus* (Urban). 13. Lateral habitus. 14. Dorsal habitus. 15. Facial view.

Lonchopriscus Engel, new genus ZooBank: urn:lsid:zoobank.org:act:50BE939C-8300-4AD4-B2DC-526D8A5A7879 (Figs. 11, 13–17)

Lonchoprisaria Wittmann & Hoffmann, 1990: 27, nomen nudum.

Type species: Cephalocolletes crassipunctata Urban, 1995.

DIAGNOSIS: This is a genus of modest-sized bees, with a total body length of approximately 8–9 mm. The integument is generally black to dark brown, without me-



Figures 16–17. Details of *Lonchopriscus crassipunctatus* (Urban). **16.** Dorsal view of head and mesosoma. **17.** Dorsal detail of mesosoma, including basal area of propodeum.

tallic highlights, and the pubescence is principally white to off white, although tawny on vertex, mesoscutum, and mesoscutellum, and fuscous to black on pygidial and prepygidial fimbriae, slightly fuscous on outer metatibia, and fuscous on sterna III-V (Fig. 13), also with prominent apical bands of white to off-shite setae on metasomal terga II–V, sometimes thin or interrupted medially on worn individuals (Fig. 14). The head is slightly broader than long, with the compound eye length greater than the distance between the lower inner orbits of the compound eyes (distinctly shorter than the distance between the upper inner orbits), and the inner orbits of the compound eyes are slightly convergent below. The lateral ocelli are situated just above the upper tangent of the compound eyes, with the scape extending to the level of the median ocellus (Fig. 15). The first flagellomere of females is shorter than the combined lengths of the second and third flagellomeres, while its medial length is approximately equal to the apical width of the scape (Fig. 11). The face is largely obscured by dense, white pubescence, with the supraclypeal area uniformly punctured and hidden by setae and lacking a subtriangular glabrous area (Fig. 15). The female mandible has a preapical tooth. The maxillary palpus is moderately long, with at least the apical two palpomeres extending beyond the galeal apex. The mesoscutum and mesoscutellum are covered with abundant, short to moderate-length, tawny, spicate pile that largely obscures the integumental surface (Figs. 13, 14, 16, 17), similar white to off-white pile medially on metanotum (Fig. 17). The integument of the mesoscutum and mesoscutellum is contiguously punctured throughout, without distinct areas of sparse punctation centrally. The basal area of propodeum is subequal in length to the metanotum and is smooth and shining (Fig. 17), and the lateral surface of the propodeum has strong, longitudinal-oblique striae or rugae. The probasitarsus has a distinct outer longitudinal comb. The meso- and metatibial spurs are straight, with the mesotibial spur minutely

ciliate, the outer metatibial spur simple, and the inner metatibial spur pectinate. The metafemoral fiscina anteriorly has elongate white setae with abundant long branches, while those posteriorly bordering the fiscinal space are much shorter and largely simple or with a few short branches. The metatibial scopal setae are elongate, white, and have numerous long branches. The metasomal scopa (on sterna II–V and apicolateral extremities of terga II–V) is composed of abundant, lightly fuscous, elongate (nearly as long as exposed portions of sterna), subappressed setae with numerous long branches, those anteriorly on sternum II and on terga white. The male is presently unknown.

ETYMOLOGY: The new generic name is a combination of *Lonchopria* [itself composed of *lónkhos* ($\lambda \delta \gamma \chi \eta \zeta$, meaning, "lance") and *príõn* ($\pi \rho \tilde{\iota} \omega v$, meaning, "saw")], and the Greek diminutive suffix –*iskos* (–*i* $\sigma \kappa \sigma \zeta$), referencing the superficial similarity between these bees and those larger, robust species of the former. The gender of the name is masculine.

INCLUDED SPECIES: The genus includes only the type species, *Lonchopriscus crassipunctatus* (Urban), **new combination**, from northwestern Argentina (Catamarca).

Сомментя: This group has appeared in the literature and in collections under the Moure manuscript name *Lonchoprisaria*, *nomen nudum* (Wittmann & Hoffmann, 1990).

Cactocolletes Engel, new genus

ZooBank: urn:lsid:zoobank.org:act:ECF6E64B-3DC6-49D5-A115-610D40130950 (Figs. 18–23)

Type species: Cephalocolletes isabelae Urban, 1995.

DIAGNOSIS: This is a genus of modest-sized bees, with a total body length of approximately 9–11 mm. The integument is black, without metallic highlights, and the pubescence is principally white to off white, although tawny on vertex, mesoscutum, and mesoscutellum, and fuscous on pygidial and prepygidial fimbriae, slightly fuscous on outer metatibia, and lightly fuscous on sterna III-V, also with thin apical bands of white to off-shite setae on metasomal terga II-IV, sometimes medially interrupted (Fig. 18). The head is broader than long, with the compound eye length subequal to or slightly less than the distance between the lower inner orbits of the compound eyes, and the inner orbits of the compound eyes are faintly to slightly convergent below (Figs. 19, 23). The lateral ocelli are situated just above the upper tangent of the compound eyes, with the scape extending to the level of the median ocellus (Figs. 19, 23). The first flagellomere of females is shorter than the combined lengths of the second and third flagellomeres, while its medial length is approximately equal to the apical width of the scape. The integument of the face is not obscured by pubescence, and the supraclypeal area has a large, subtriangular, impunctate or sparsely punctate, glabrous area (Figs. 19, 23) (subtriangular area convex in C. rugatus, flat to slightly concave in C. isabelae). The male mandible, like the female mandible, has a preapical tooth. The maxillary palpus is moderately long, with at least the apical two palpomeres extending beyond the galeal apex. The mesoscutum and mesoscutellum have short to moderate-length, tawny, pile that may or may not obscure the integumental surface (Figs. 20–22). The basal area of propodeum is subequal in length to the metanotum and is transversely striate (Fig. 21), and the lateral surface of the propodeum has strong, longitudinaloblique striae or rugae. The probasitarsus has a distinct outer longitudinal comb. The meso- and metatibial spurs are straight, with the mesotibial spur minutely ciliate, the outer metatibial spur simple, and the inner metatibial spur pectinate. The metafemoral fiscina, metatibial scopa, and metasomal scopa are like that described for Loncho*priscus (vide supra).* The metasomal scopa is like that of *Lonchopriscus*.



Figures 18–19. Female of *Cactocolletes isabelae* (Urban) (photographs courtesy of Clemens Schlindwein, reproduced with permission). **18.** Lateral habitus. **19.** Facial view.

ETYMOLOGY: The new generic name is a combination of the Greek words *káktos* (*κάκτος*, today the name for cacti but originally for a spiny plant of uncertain identity) and *kollitís* (*κολλητής*, meaning, "gluer", and origin of the generic name *Colletes* Latreille). The name references the apparent preference of these bees to visit cactus flowers (Lenzi & Orth, 2011; C. Schlindwein, pers. comm.). The gender of the name is masculine.

Figures 20–23. Females of species of *Cactocolletes*, new genus (photographs courtesy of Clemens Schlindwein, reproduced with permission). **20.** Dorsal habitus of *Cactocolletes isabelae* (Urban), new combination. **21.** Detail of mesosomal dorsum of *C. isabelae*, note transverse striae on basal area of propodeum. **22.** Dorsal habitus of *Cactocolletes rugatus* (Urban), new combination. **23.** Facial view of *C. rugatus*.

INCLUDED SPECIES: The genus presently includes the type species, *Cactocolletes isabelae* (Urban), new combination, of southeastern Brazil (Rio Grande do Sul, Santa Catarina), and *C. rugatus* (Urban), new combination, from southeastern Brazil (Rio Grande do Sul) and northeastern Argentina (Entre Ríos). According to C. Schlindwein (pers. comm.) the species do not overlap, with the former occurring closer to the coasts, and the latter more centrally and southerly. It is almost assured that the genus will be found in Uruguay as the known distribution of *C. rugatus* spans each side of the country (and the species may also be found in Corrientes Province, Argentina).

Key to Species of *Cactocolletes* (females only; male unknown for *C. rugatus*)

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The *Journal of Melittology* is an international, open access journal that seeks to rapidly disseminate the results of research conducted on bees (Apoidea: Anthophila) in their broadest sense. Our mission is to promote the understanding and conservation of wild and managed bees and to facilitate communication and collaboration among researchers and the public worldwide. The *Journal* covers all aspects of bee research including but not limited to: anatomy, behavioral ecology, biodiversity, biogeography, chemical ecology, comparative morphology, conservation, cultural aspects, cytogenetics, ecology, ethnobiology, history, identification (keys), invasion ecology, management, melittopalynology, molecular ecology, pollination biology, sociobiology, systematics, and taxonomy.

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