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ARTÍCULO:

A redescription of *Isoctenus coxalis* (F.O.P. Cambridge, 1902) comb. nov. and description of *I. corymbus*, a new species of cave dwelling spider (Araneae, Ctenidae, Cteninae) from the State of Goiás, Brazil.

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A redescription of *Isoctenus coxalis* (F.O.P. Cambridge, 1902) comb. nov. and description of *I. corymbus*, a new species of cave dwelling spider (Araneae, Ctenidae, Cteninae) from the State of Goiás, Brazil.

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Abstract:
Ctenus coxalis F.O.P. Cambridge, 1902 is transferred to *Isoctenus* Bertkau and redescribed. *I. corymbus*, a new cave dwelling species, is described based on specimens collected in the Lapa do Angélica, São Domingos, Goiás, Brazil. In addition, notes on the natural history of *I. corymbus* are presented, based in field and laboratory observations.
Key words: Spiders, Neotropical, taxonomy.
Taxonomy: *Isoctenus coxalis* (F.O.P. Cambridge, 1902) comb. nov.
Isoctenus corymbus, sp. nov.

Resumen: La especie C*tenus coxalis* F.O.P. Cambridge, 1902 es transferida a *Isoctenus* Bertkau y redescripta. Se describe una nueva especie cavernícola, *I. corymbus*, de la Lapa do Angélica, São Domingos, Goiás, Brasil. Son pre sentadas algunas notas sobre la historia natural de *I. corymbus*, observadas en campo y en laboratorio.
Palabras clave: arañas, neotrópico, taxonomía.
Taxonomía: *Isoctenus coxalis* (F.O.P. Cambridge, 1902) comb. nov.
Isoctenus corymbus, sp. nov.

Introduction

The genus *Isoctenus* (Bertkau, 1880) comprises median to large ground dwelling spiders, with nocturnal habits. According to the latest spider catalog (Platnick, 2005), this genus includes seven species. Of these, five were described from Brazil, and the remaining two, from French Guiana and Venezuela. These wandering appear to be common dwellers in Neotropical habitats. They have been recorded from a great range of phytogeographical regions in Brazil, e.g., the Atlantic Forest and the "Cerrado". The later, is an area covered by savanna-like vegetation (Fernandes, 1998; Durigan, 2004); however, *Isoctenus* spiders are also found in caves (Eickstedt, 1975).

During September 2000, an expedition to the Parque Estadual de Terra Ronca, São Domingos County, Goiás, resulted in the collection of several spider specimens including a new species of *Isoctenus* from the Lapa do Angélica. This new species has a peculiar male ventral apophysis on coxa IV (Fig. 5), which is observed in a group of Cteninae species, presently included in the genus *Ctenus,* e. g., *C. coxalis* F.O.P. Cambridge, 1902. Males of this group of species show the diagnostic characters of the genus *Isoctenus*: an embolus with a sinuous basal apophysis, median apophysis with two prominent projections and bifid RTA with a large dorsal branch. Females have an epigynum with a swollen median plate and prominent ovoid lobes, spermathecae medially constricted and with a prominent ventral wall (Figs. 1-9). In a phylogenetic analysis presented by Simó & Brescovit (2001: 79), *Ctenus coxalis* formed a monophyletic group together with *C. longipes* and *C. taeniatus.* These authors suggested that those species could be members of *Isoctenus*. According to the phylogenetic approach presented by Silva (2003: 9, 26), *C. coxalis* arises within the *Isoctenus* clade. Although this species is currently listed as *Ctenus* (Platnick, 2005), Silva (2003: 26) cited it as *Isoctenus*. However, she did not formally transfer it to this genus.

In this paper, *Ctenus coxalis* F.O.P. Cambridge is formally transferred to *Isoctenus* and both male and female are redescribed. In addition, a new species, *Isoctenus corymbus,* is described from Lapa do Angélica, Parque Estadual de Terra Ronca, São Domingos, Goiás, Brazil and some observations of its natural history are also presented.

Material and methods

The material examined belongs to the following institutions (curators in parentheses): IBSP, Instituto Butantan, São Paulo (A.D. Brescovit); MZSP, Museu de Zoologia, Universidade de São Paulo, São Paulo (R. Pinto da Rocha). All the measurements are in millimeters. Descriptions and terminology follow Höfer *et al*. (1994). The nomenclature of the structures of the epygynum follows Sierwald (1989). The epigynum was detached from the abdomen and submerged in clove oil for examination of internal structures. Abbreviations: RTA: retrolateral tibial apophysis; AME: anterior median eyes; ALE: anterior lateral eyes; PME: posterior median eyes; PLE: posterior lateral eyes.

Taxonomy

Isoctenus coxalis (F.O.P. Cambridge, 1902) comb. nov. (Figs 1-5)

Ctenus velox Keyserling, 1891: 147, pl. 4, fig. 100, preoccupied by Blackwall,1865 (male holotype from Alto da Serra, Nova Friburgo, Rio de Janeiro, Brazil, 1.VII.1890, Göldi leg., deposited in BMNH 2919, examined).
Ctenus coxalis F.O.P.-Cambridge 1902: 413 (replacement name); Simó & Brescovit, 2001: 69, 79; Silva, 2003: 9; Platnick, 2005.
Ctenus velocitarcis Roewer, 1951: 446 (superfluous replacement name).
Isoctenus coxalis: Silva, 2003: 26 (informal new combination).

NOTE. The male specimen identified as *Ctenus. velox* by Mello-Leitão (1936: figs 28-29) was examined. This male was found in the collection of the Museu Nacional do Rio de Janeiro (MNRJ 42294) and it is an undescribed species from Brazil.

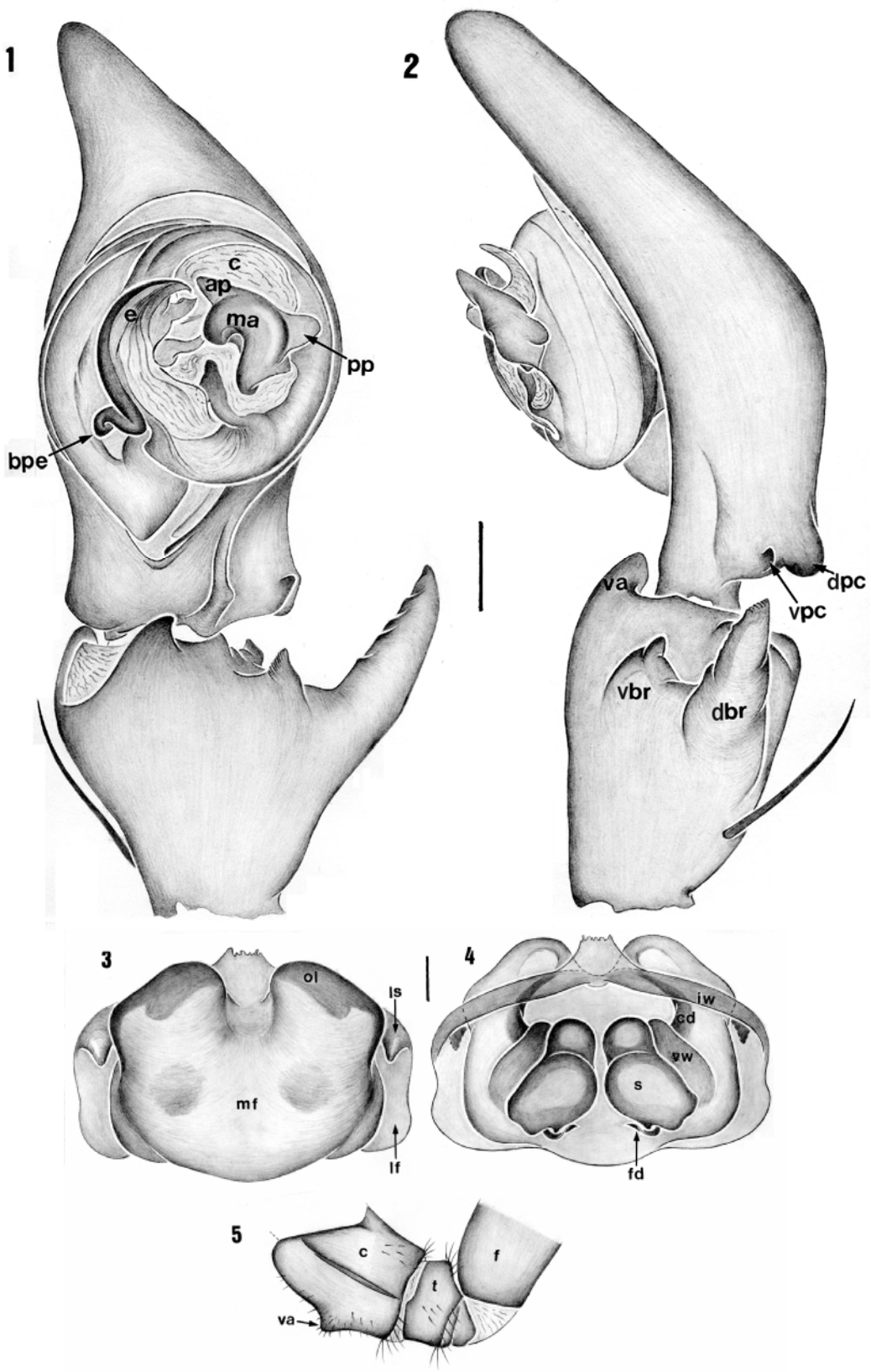
DIAGNOSIS. The males of *Isoctenus coxalis* (F.O.P. Cambridge, 1902) resembles *I. corymbus* sp. n. by the presence of a ventral apophysis in coxa IV (Fig. 5), but differ by the smaller palpal tibia, accentuated ventral apophysis of the basal retrolateral projection on base of cymbium and longer posterior projection on the median apophysis of the palpal bulb (Fig. 1-2). Externally, the females can be distinguished by the elevated and separated ovoid lobes and short lateral spurs on the epigynum (Fig. 3-4).

DESCRIPTION.
MALE (IBSP 21043). Chelicerae dark brown. Labium, endites, carapace, sternum and legs reddish. Abdomen light brown. Total length 11.80. Carapace 6.30 long, 5.00 wide. Clypeus height 0.26. Eyes: diameters AME 0.24, ALE 0.26, PME 0.34, PLE 0.32; interdistances AME-AME 0.12, AME-ALE 0.24, PME-PME 0.12, PME-PLE 0.36, ALE-PLE 0.24, AME-PME 0.20. Chelicerae with 3 promarginal teeth and 5 retromarginal teeth. Leg measurements: I: femur 6.90/ patella 2.30/ tibiae 7.80/ metatarsus 6.50/ tarsus 3.20/ total 26.70; II: 6.40/ 2.60/ 6.70/ 6.40/ 2.80/ 24.90; III: 5.80/ 2.40/ 5.60/ 5.50/ 2.30/ 21.60; IV: 7.40/ 2.50/ 6.60/ 9.10/ 3.00/ 28,60. Leg formula: 4123. Leg spination: tibia I-II v2-2-2-2-2, p1-0-0, r1-0-0, III v2-2-2, p1-1, r1-1, IV v2-2-2-2-2, p1-1, r1-1; metatarsus I-II v2-2-2, p1-1-2, r1-1-2; III-IV v2-2-2, p1-1-2, r1-1-2. Coxae IV with ventral, rounded and projected apophyses (Fig. 5). Metatarsi and tarsi I-IV with thin and short ventral scopulae. Male palp with short tibia. RTA bifid with long dorsal branch with several folds on the internal border and short and striated ventral branch (Figs. 1-2). Ventral apophysis short and rounded. Cymbium with two basal retrolateral projections, the more dorsal is large and rounded and the more ventral is small and conic (Figs. 1-2). Embolus curved and laminar, with bifid apex and sinuous basal projection (Fig. 1). Median apophysis curved, with two prominent projections, the posterior larger (Fig. 1).

FEMALE (IBSP 20320). Coloration pattern as in male. Total length 16.50; carapace 8.10 long, 5.90 wide. Clypeus height 0.25. Eyes: diameters AME 0.32, ALE 0.30, PME 0.37, PLE 0.38; interdistances AME-AME 0.20, AME-ALE 0.36, PME-PME 0.20, PME-PLE 0.50, ALE-PLE 0.23, AME-PME 0.22. Chelicerae with 3 promarginal teeth and 4 retromarginal teeth. Leg measurements: I: femur 7.10/ patella 3.60/ tibiae 7.60/ metatarsus 6.20/ tarsus 2.80/ total 27.30; II: 7.30/ 3.70/ 7.00/ 5.80/ 2.80/ 26.60; III: 6.50/ 3.00/ 5.50/ 5.65/ 2.00/ 22,65; IV: 8.00/ 3.20/ 8.20/ 8.60/ 3.50/ 31.50. Leg formula as in male. Leg spination: tibia I v2-2-2-2-2, p0, r0, II v2-2-2-2-2, p0-1-0, r0, III-IV v2-2-2, p1-1, r1-1; metatarsus I-II v2-2-2, p0, r0; III v2-2-2, p1-1-2, r1-1-2; IV v1-2-2-2-2, p1-1-2, r1-1-2. No apophysis on coxa IV. Metatarsi and tarsi I-IV with thick and short ventral scopulae. Epigynal plate quadrangular, invaginated anteriorly between the ovoid lobes. Median field slightly elevated. Lateral spur short and apically positioned on the lateral field (Fig. 3). Internally with short and curved copulatory ducts. Spermathecae with a median strangulation, forming a large base and little head, and with a prominent ventral wall. Fertilization ducts short, originating from the base of the spermathecae (Fig. 4).

VARIATION: Ten males: total length 11.70-16.00; carapace 6.00-8.50; femur 6.50-9.30; promarginal teeth 2-4; retromarginal teeth 3-5. Ten females: total length 15.30-25.60; carapace 7.30-11.50; femur I 6.40-11.50; promarginal teeth 3; retromarginal teeth 4-5.

MATERIAL EXAMINED. BRAZIL. *Minas Gerais*: São Tomé das Letras, 1 male, 15.V.2000, F.S.B. Lacerda leg. (IBSP 27746); Ibitipoca, Parque Estadual do Ibitipoca, 4 males, 1 female, VI.1998, A. de Oliveira & B.M. Souza leg. (IBSP 21473; 21479; 21489; 21494);



Figures 1-5. *Isoctenus coxalis* (F.O.P. Cambridge, 1902) comb. nov.: (1) male, right palp, ventral view; ap: anterior projection of median apophysis; bpe: basal projection of embolus; c: conductor; e: embolus; ma: median apophysis; pp: posterior projection of median apophysis. (2) male, right palp, retrolateral view; dbr: dorsal branch of RTA; dpc: dorsal projection of cymbium; va: ventral apophysis; vbr: ventral branch of RTA; vpc: ventral projection of cymbium. (3) female, epigynum, ventral view; lf: lateral field; ls: lateral spur; mf: median field; ol: ovoid lobes. (4) female, epigynum, dorsal view; cd: copulatory ducts; fd: fertilization ducts; iw: internal wall of lateral field; s: spermathecae; vw: ventral wall of spermathecae. (5) male, IV leg, prolateral view; c: coxae; f: femur; t: trochanter; va: ventral apophysis of coxae IV. Scale lines: 0.25 mm.

Espírito Santo: Linhares, Reserva Florestal da Vale do Rio Doce, 1 male, 19-25.VIII.1997, A.D. Brescovit leg. (IBSP 12656); *Rio de Janeiro*: Barra Mansa, Campus do SOBEU, 3 males, 3 females, 8.I.1997, E.F. Ramos leg. (IBSP 12039; 13306; 13308; 21043; 21044); *São Paulo*: Americanópolis, 1 male, 21.VI.2002, C.R.L. Cavalcante leg. (IBSP 36783); Bragança Paulista, 2 males, 29.IV.2003, V.F. José leg. (IBSP 37871); Igaratá, 1 female, 26.V.1998, B. Belcsak leg. (IBSP 20320); Tietê, 1 male, 30.VII.2002, Prefeitura de Tietê leg. (IBSP 36344); Itú, 1 male, 1 immature, 27.VI.2002, no collector (IBSP 36771); Piracicaba, 1 female, 27.VI.2001, Prefeitura de Piracicaba leg. (IBSP 29198); Jundiaí,1 female, 9.VI.1997, no collector (IBSP 7624); Araras, 1 female, 1996, C. Christianini leg. (IBSP 8554); São Paulo, 1 female, 8.XII.1969, O. Podreschi leg. (IBSP 8265); 1 female, 5.V.2003, P.C.A. Paes leg. (IBSP 37853); 1 female, 06.V.1968, V.A.C. Filho leg. (IBSP 2119); 1 male, 01.IV.1980, R. Somoffi leg. (IBSP 19815).

DISTRIBUTION. Southeastern Brazil, states of Espírito Santo, Minas Gerais, Rio de Janeiro and São Paulo.

Isoctenus corymbus sp. nov.
Figs. 6-9

TYPES. Male hototype and female paratype from Lapa do Angélica, Parque Estadual de Terra Ronca, São Domingos, Goiás, Brazil, September 2004, F. Pellegatti-Franco leg., deposited in IBSP 47613 and 36325, respectively; 1 male paratype, IX.2000, F. Pellegatti-Franco leg. (MZSP); 1 female paratype, III.2005, F. Pellegatti-Franco leg. (MZSP).

ETYMOLOGY. The specific name is a Latin noun that means stalactite, and refers to the stalactites found in Lapa do Angélica.

DIAGNOSIS. The males of *Isoctenus corymbus* can be distinguished from that of *I. coxalis* by the larger palpal tibia, by the truncated apex of the dorsal branch of the RTA and smaller posterior projection of the median apophysis (Figs 6-7). Externally, the female can be distinguished by the acuminate anterior area of the epigynal plate and longer lateral spurs. Internally, can be recognized by the little and conical head of the spermathecae (Figs 8-9).

DESCRIPTION.
MALE (holotype). Chelicerae dark brown. Labium, endites, carapace, sternum and legs reddish. Abdomen light brown. Total length 16.20. Carapace 8.30 long, 6.30 wide. Clypeus height 0.48. Eyes: diameters AME 0.37; ALE 0.30; PME 0.40; PLE 0.38; interdistances: AME-AME 0.13, AME-ALE 0.22, PME-PME 0.16, PME-PLE 0.36, ALE-PLE 0.18, AME-PME 0.16. Chelicerae with 3 promarginal teeth and 4 retromarginal teeth. Leg measurements: I: femur 11.20/ patella 4.30/ tibiae 12.00/ metatarsus 11.10/ tarsus 5.00/ total 43.60; II: 8.90/ 3.60/ 9.50/ 9.00/ 3.30/ 34.3; III: 8.40/ 3.50/ 8.30/ 8.70/ 3.40/ 32.30; IV: 10.20/ 3.90/ 10.40/ 14.75/ 4.50/ 43.75. Leg formula: 4123. Leg spination: tibia I v2-2-2-2-2, p0-1-1-0, r0-1-1-0, II v2-2-2-2-2, p0-1-1-0, r1-1-1, III v2-2-2, p1-1, r1-1, IV v2-2-2-2-2, p1-1, r1-1-1; metatarsus I-II v2-2-2, p1-1-1, r1-1-1, III v2-2-2, p1-1-1, r1-1-1, IV v2-2-2-2-2, p1-1, r1-1. Coxae IV with ventral, rounded and projected apophyses (Fig. 5). Metatarsi and tarsi I-IV with thin ventral scopulae with short hairs. Male palp with long tibia. RTA with long dorsal branch with several folds on the internal apical border and bifid apex, and short and conical ventral branch. Ventral apophysis short and with conical apex. Cymbium with two basal retrolateral projections, the more dorsal is large and rounded and the more ventral is small and conic (Fig. 7). Embolus curved and laminar, with bifid apex and sinuous and sclerotized basal projection. Median apophysis curved, with prominent anterior and posterior projections (Figs. 6-7).

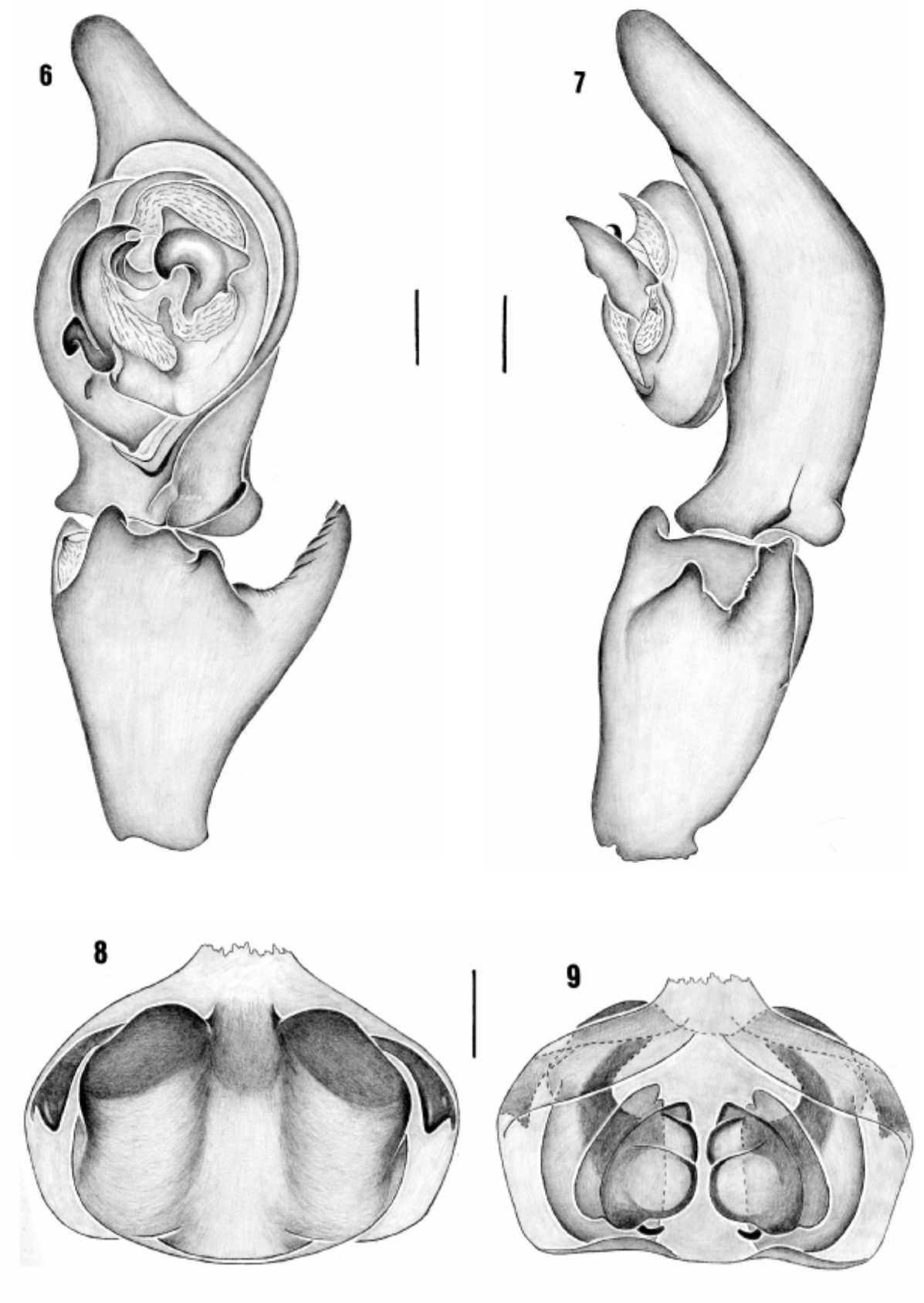
FEMALE (IBSP 36325). Coloration pattern as in male. Total length 20.80. Carapace 10.20 long, 7.90 wide. Clypeus height 0.46. Eyes: diameters AME 0.38; ALE 0.42; PME 0.44; PLE 0.42; interdistances AME-AME 0.21, AME-ALE 0.46, PME-PME 0.26, PME-PLE 0.58, ALE-PLE 0.26, AME-PME 0.34. Chelicerae as in male. Leg measurements: I: femur 9.80/ patella 4.90/ tibiae 11.20/ metatarsus 9.30/ tarsus 3.80/ total 39.00; II: 9.60/ 4.70/ 10.10/ 8.50/ 3.40/ 36.30; III: 9.00/ 3.60/ 8.10/ 8.40/ 2.90/ 32.00; IV: 10.50/ 4.20/ 11.10/ 13.60/ 4.00/ 43.40. Leg formula as in male. Leg spination: tibia I-II v2-2-2-2-2, p0, r0, tíbia III-IV v2-2-2, p1-1, r1-1; metatarsus I-II v2-2-2, p0, r0, metatarsus III v2-2-2, p1-1-1, r1-1-1, metatarsus IV v2-2-2-2-2, p1-1-1, r1-1-1. Coxa IV with no apophysis. Metatarsi and tarsi I-IV with thick and short ventral scopulae. Epigynal plate quadrangular, not invaginated anteriorly. Lateral spurs curved (fig. 8). Ovoid lobes conspicuous. Internally, with short and curved copulatory ducts. Spermathecae with a prominent ventral wall, apically constricted, forming a large and oval base and very small head. Fertilization ducts short, curved and originating at the base of spermathecae (Figs 9).

VARIATION: Two males: total length 15.90-16.20; carapace 8.30-8.70; femur 11.20-10.40; Two females: total length 20.80-21.00; carapace 9.80-10.60; femur I 9.80-9.90.

Other material examined. BRAZIL. *Goiás*: São Domingos, Parque Estadual de Terra Ronca, Lapa do Angélica, 1 female, 2 immatures, 6-7.IX.2000, F. Pellegatti-Franco leg. (IBSP 26048); 1 male, 4 females, III.2005, F. Pellegatti-Franco leg. (IBSP 51609-51611); São Domingos, 1 male, 11.IX.1997, P. Gnaspini *et al*. leg. (IBSP 23756); 1 female, 26.VII.2000, A. Chagas leg. (IBSP 28001).

DISTRIBUTION. Known only from the type locality.

NATURAL HISTORY. All specimens were collected in the Lapa do Angélica (13° 21' S, 46° 23' W) located in the limits of the protected area of the Parque Estadual de Terra Ronca, São Domingos, Goiás, Brazil. The cave



Figures 6-9. *Isoctenus corymbus* sp. n.: (6) male, right palp, ventral view. (7) male, right palp, retrolateral view. (8) female, epigynum, ventral view. (9) female, epigynum, dorsal view. Scale lines: 0.25 mm.

has a large entrance and 13.800m of mapped passageways, and is a sinkhole for the Angélica Stream. The city of São Domingos is in a carbonate karst area characterized by the presence of continuous limestone outcrops belonging to the Bambuí Speleological Province (Trajano 2001; Bichuette & Trajano 2003). This area is located within the Cerrado (savanna-like vegetation), a phytogeographical domain characterized by a tropical semi-humid climate (Nimer 1989). Specimens of *I. corymbus* were collected approximately 900m from the cave entrance, in an aphotic zone. This species is probably a troglophile (able to complete their life cycle both in the hypogean and epygean habitats (Bichuette & Trajano 2003)), and is easily kept under laboratory conditions, enduring temperatures of over 25°C. In captivity, this species is a generalist feeder. After copulation, the females usually eat the male, and they do not abandon the egg sac for feeding. The embryonic development was observed under laboratory conditions and lasted 36 days. The post-embryonic development is slow, taking at least four years. The males in the captivity became adults after the 17th instar and the females after the 18th instar. This time difference suggest that the variation in the instar stages could be related to sex or could simply indicate that the number of preadult instars is not constant, such as that observed for *Teminius* Keyserling (Miturgidae) by Platnick & Shadab (1989: 3). In the first approach, adult males of wandering spiders can be found next to sub-adult females, suggesting that these males are waiting for their last moult in order to secure copula when the females mature (Johnson, 1995; Bonaldo *et al*. 2000). According to Foelix (1982: 176) males need fewer moults to reach maturity than females, because of their smaller body size. The adult males of *I. corymbus* range from 15.90 to 16.20 milimeters in total length, and the adult females presents from 20.80 to 21.00 milimeters.

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