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BIOLOGIA
CENTRALI-AMERICANA.

ARACHNIDA. ACARIDEA.

BY

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3

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AMBLYOMMA.

Amblyomma, C. L. Koch, System. Uebers. über die Ordn. der Zecken, in Arch. f. Naturg. x. Jahrg. Bd. 1, p. 223 (1844).

1. ***Amblyomma mixtum***. (Tab. XII. figg. 1-1 *i*, ♀; 2-2 *b*, ♂.)

Amblyomma mixtum, C. L. Koch, loc. cit. p. 227; Uebers. d. Arachnidensyst. Heft iv. pp. 74, 75, t. 13. figg. 47 (♂), 48 (♀).

♂. Corpus ovatum, valde depressum, subtus concavum, colore ex rufo brunneo. Superficies dorsualis punctis numerosis impressis atque lineolis arcuatis irregularibus, interruptis, undulatis, flavo-albescentibus ornata, quæ ex dorsi centro, radiatorum instar, ad peripheriam corporis petunt. Earum duæ maximæ angulum humeralem cujusque lateris capessunt inter quas area triangularis fere unicolor et lineolis albidis fere carens interest. Foveæ frontales nullæ. In abdominis parte posteriore lineolæ obscure fusæ ex intestinis translucens natae, albidis se admiscent. Inter sulculos marginis posterioris lineolæ albidæ et fusæ, breves, radiatim per pares alternantes dispositæ, adsunt. Scutum frontale, rostrum et palpi rufo-brunnei. Orificium genitale rimam angustam transversalem formans. Lamina analis in utroque latere marginis posterioris setis duabus longis armata. Pedes rufo-brunnei, setulis paucis sericeis armati.

Long. 4.5 millim.; lat. 3.5 millim.

♀. Corpus ovatum, in jejunis valde depressum, in satiatis depresso-globosum. Scutum occipitale magnum, triangulare angulis rotundatis, centrum dorsi angulo postico fere attingens, læve, colore rufo-brunneo, marginibus lateralibus fuscis, maculis albido-flavis irregularibus, disjunctis, e margine postico in ramos duo ramificatos discedentibus. Foveolæ punctiformes scuto impressæ numerosæ, nigræ. Abdomen colore fusco-olivaceo, margine clarius brunneo, haud nitidum, setulis albidis raris ornatum, punctis, sulcis et foveis impressis iniquum. In jejunis intestina colore fusco translucent, in satiatis abdomen colorem uniformem obscure purpureum seu rubidum exhibet. Lamina stigmatica triangularis, angulis late rotundatis, lateribus arcuatis. Rima stigmatica claviformis. Area genitalis triangularis; orificium genitale transversale angustum, margine anteriore subtilissime denticulato. Area analis rectangulata angulis rotundis, valvulis analibus semilunatis; quæque valvula in apice anteriore setis duabus, in posteriore setis tribus armata. Scutum frontale foveis duabus rotundis ornatum. Palpi, rostrum et pedes in ambobus sexibus æqualiter constructi. Palpi rostrum haud superantes, compressi, articulo quarto brevi, in apice tertii inserto, colore corporis, ad apicem secundi et ad basin tertii articuli macula fusca interne ornati. Apex rostri albido-flavus. Basis rostri et anguli posteriores scuti frontalis fuscis. Area maxillaris colore succineo, dentibus conoideis, sat erectis, inter se sat distantibus armata. Area mandibularis in utroque latere hamulis quinque armata: eorum primus longissimus, secundum velut appendiculam brevem insertam ferens; tertius, quartus et quintus in ramo segregato dispositi. Pedes rufo-brunnei, setulis paucis armati. Pedes antici longiores, externe denticulati, ceterorum parium articulus quintus in apice dentibus duabus armatus. Variant femine hujus species in singulis individuis colore plus minusve clariore scutorum occipitalis et frontalis, nec non rostri et pedum. Accedit ad hoc quod maculæ albidæ scuti occipitalis ramificatæ extensione multum variant.

Long. 4.5 millim., lat. 3.5 millim. in jejunis, ad long. 12 millim. et lat. 8 millim. in satiatis.

Hab. MEXICO (*Koch*); GUATEMALA, Retalhuleu, Antigua (*Stoll*); NICARAGUA, Chontales (*Janson*); COSTA RICA, Cache (*Rogers*).

♂. Body oval, much depressed, concave on its lower surface, testaceous, the dorsal surface with numerous punctiform black and testaceous dimples and several irregularly shaped, arcuate, narrow whitish stripes, which radiate from the centre of the dorsum and are sometimes interrupted so as to form a mere series of spots; a triangular area behind the anterior margin of the collar is comparatively free from these spots. On each side-margin and parallel to it there runs a narrow longitudinal stripe, which

begins near the white eyes and ends in about the middle of the lateral margin. In the hinder part of the body the intestines shine through the semipellucid skin in the form of blackish spots and stripes. On the interstices between the furrows of the posterior margin there occur alternating pairs of black and white linear stripes. The arrangement of the white colouring is subject to individual variation. Colour and shape of the frontal plate, of the rostrum, palpi, and legs, similar to that of the female, except the two frontal dimples, which only occur in the female and are wanting in the male*. The genital plate bears a transverse narrow fissure. The anal plate bears two setæ on each side of its posterior margin.

♀. Body oval, in empty specimens much depressed, in the satiated ones globose. Occipital plate triangular, almost reaching the centre of the dorsum, shining, testaceous, with dark brown side margins. From the posterior angle, which is yellowish-white, there proceeds a ramificated branch of the same colour towards the anterior margin of each side: these branches vary much in the different specimens; in some they are broad and continuous, in others they are narrow and tend to resolve themselves into several spots. The abdomen is dark brown, opaque, lighter at its margin, irregularly dimpled and furrowed, and bears short, thinly set whitish hairs. In transparent light under the microscope the ramifications of the intestines are visible in the form of blackish arcuate stripes. In the specimens which are filled with blood the abdomen assumes during life a uniform dark purple hue. The stigmatic plate in both sexes is triangular, its fissure claviform; the stigma proper presents itself as an arcuate small hole in a dark chitinized lamina. The genital plate is triangular, with a narrow transverse fissure, the anterior margin of which is finely denticulated. The anal valvula of each side shows two setæ on its anterior and three on its posterior end. The front plate bears two round dimples. The eyes are white. The palpi are compressed, similar in colour to the body; they bear at the top of the second and the base of the third joint a small brown spot, and are beset with several short hairs; the fourth joint, which is very small, is inserted centrally at the top of the third one. The rostrum is of a light transparent brown, yellowish at its extremity. The mandibles bear five hooks arranged on two branches, the first bearing the first and second hooks, the second bearing the third, fourth, and fifth hooks; the second hook is very short and forms a sort of small appendage to the first one. The maxillary teeth are conoid, obliquely erect, somewhat distant from each other, amber-yellow. The legs are light brown, whitish at the apex of the joints; the first pair have their last joint irregularly denticulate at its apex, and the other pairs bear two teeth at the apex of the fifth joint.

This species is the most common of all the Ixodidæ of Central America, and generally known by the name of "*garrapata*," which is a corruption of "*agarrapata*" (clasping something with the legs). I have never found the male in a parasitic state,

* They have been drawn by mistake in fig. 2 of Tab. XII.

only free on grass and bushes in the "tierra caliente" and "tierra fria" of Guatemala (Retalhuleu, Guatemala city). The female, which abounds in the woods and savanas on grass and bushes, is occasionally rubbed off by horses, cattle, or dogs, and even by man. It adheres tenaciously to the skin, fixing itself by perforating the cutis with its sucking-apparatus; and remains, when undisturbed, for several days, till filled with blood, and then probably falls off spontaneously by its own weight. If forcibly removed, the sucking-apparatus breaks off and remains in the wound, causing a disagreeable and sometimes painful inflammation for a considerable time, but I never saw any serious consequences result from it. Even in its juvenile state the garrapata is of parasitic habits. The young, which are distinguished by the inhabitants of Guatemala by the name of "mostacilla" (derived from "mostaza," mustard), hang to the grass in clusters of thousands, especially during the dry season; and by their creeping on the bare skin and frequent biting they form one of the greatest plagues to the European traveller, who is sometimes kept awake for hours during the night by them. The males I have heard spoken of as "conchuda." The female has been collected by Mr. Janson in Nicaragua, by Mr. Rogers in Costa Rica, and by myself in many places of the "tierra caliente" and "tierra fria" of Western Guatemala (Retalhuleu, Escuintla, Antigua, Guatemala city).

Remarks. Though I have not seen the types of *A. mixtum*, which Koch describes as from Mexico, I cannot doubt that the above described *Amblyomma* really belongs to that species. As Koch describes and figures both sexes, his must therefore have been a common species; and the above described is the most common of all Ixodidæ in Central America, and probably also in Southern Mexico.

2. *Amblyomma foreli*, sp. n. (Tab. XII. figg. 3-3 b; and Tab. XIV. figg. 3, 3 a-3 d, ♀.)

♂ latet.

♀. Corpus ovato-depressum, abdominis cuticula (in exemplo satiato, in alcoholo præservato) ex griseo fusca seu olivacea, punctis, striolis transversalibus atque maculis numerosis fuscis marmorata. Scutum occipitale oblonge triangulatum, angulis rotunde truncatis, planum, nitidum, punctis nigris magnis raris impressis in superficie dorsuali ornatum, nigrum, in angulo postico maculam colore succineo ferens, e qua stria lata mediana obscure castanea ad marginem scuti anteriorem petens nascitur. Margo humeralis punctis impressis caret. Scutum frontale nigrum, nitidum, punctis impressis raris ornatum; foveolæ duæ frontales oblongæ, postice truncatæ, antice angulatim protractæ. Arca mandibularis basi nigra, apicem versus flavescens, hamulis quinque, binis in primo, ternis in secundo ramo dispositis armata; arca maxillaris colore succineo. Palpi fusci, nitidi, superficie interna deplanati, externa convexi; articulus quartus minimus tertio excentrice insertus. Pedes ex piceo fusci, setulis paucis instructi. Lamina stigmatica triangularis, angulis late rotundatis, rima stigmatica claviformi. Lamina analis utriusque lateris setas duas in margine postico ferens.

Long. (in satiato) corporis 20 millim.; rostri 1 millim., scuti occipitalis 2.5 millim.; lat. corporis 11 millim., scuti occipitalis 2.25 millim.

Hab. GUATEMALA, Retalhuleu (*Stoll*).

Male unknown. Body of the female ovoid, the skin of the abdomen greyish-brown, marbled with small dark spots and striæ. Occipital plate triangular with rounded angles, on its dorsal surface with black, comparatively large dimples. The general colour of the occipital plate is shining black, with a large amber-yellow spot on its posterior angle, which continues towards the anterior margin as a broad chestnut-brown stripe. On the humeral margin of the scutum the punctiform dimples are wanting. Frontal plate shining, black, with a few punctiform dimples and two oblong frontal holes, truncate behind, angulate in front. Mandibles black at their base, becoming yellowish towards the apex, bearing five hooks on each side, which are arranged two and three on two branches. Palpi shining, dark brown, bearing a few short bristles, abruptly depressed or almost concave on their inner surface, convex externally, the fourth joint inserted excentrically on the third one. Legs dark brown, with some bristles. Stigmatic plate triangular, with rounded angles and a claviform stigmatic fissure. Stigma proper arcuate, with swollen margins.

I accidentally found one specimen of this species among a lot of *A. mixtum* collected at Retalhuleu. I dedicate it to my friend Prof. A. Forel, the well-known myrmecologist.

3. *Amblyomma crassipunctatum*, sp. n. (Tab. XIV. figg. 1, 1 a-1 h, ♂.)

♂. Corpus ovatum, postice late rotundatum, depressum, cuticula foveolis punctiformibus sat profundis areis lævigatis irregulariter intermixtis instructa. Color obscure rubro-fuscus, maculis albidis secundum marginem corporis distributis: macula magna rhomboidea regionem humeralem utriusque lateris occupat, maculæ quatuor parvæ in interstitiis 3°, 5°, 7°, et 9° inter sulculos marginis postici siti sunt. In margine laterali maculæ duæ vel tres adsunt. Scutum frontale supra planum, nitidum, fuscum, lateribus convexe declivibus, sine foveis frontilibus, sulculis obliquis irregularibus nec non punctis subtilibus impressis atque striis paucis albidis ornata. Rostrum et palpi clarius rufo-fusci. Palporum articulus quartus in tertii apice centraliter insertus. Area mandibularis in utroque latere hamulis tribus in duos ramos distributis. Hamulorum apices colore succineo nitentes. Hamulus secundus primi rami bidentatus. Dentès maxillares simplices, unicolores transparentes vitrei, dense conferti, squamiformes, modice erecti. Lamina stigmatica parva, triangulato-semilunaris, fissura stigmatica parva, claviformi, rima stigmati arcuata. Valvula analis utriusque lateris setis quinque armata: tribus in margine interno, duabus in margine postico sitis. Fissura genitalis transversa, in area polygona sita, labris incrassatis. Pedes rufo-fusci, ad apicem articulorum albedo-annulati, setulis armati.

Long. corp. 7.5 millim., scuti frontalis cum rostro 2 millim.; lat. 5 millim.

♀ latet.

Hab. NICARAGUA, Chontales (*Janson*).

Body of the male oval, depressed, dark reddish-brown, with many deeply impressed, punctiform dimples, between which are a few callous, smooth, irregularly distributed spots. A comparatively large rhomboid whitish spot adorns the shoulder-region of each side, and on the 3rd, 5th, 7th, and 9th interstices between the furrows of the posterior margin there is a small whitish spot. A few irregular spots of the same colour are seen on the side margin. The frontal plate is flat, shining, with some oblique furrows and impressed dimples; a few whitish stripes interrupt the light chestnut-brown

colour of the plate. The rostrum and palpi are light chestnut-brown; the fourth joint of the palpi is centrally inserted. The mandibular hooks, three in number, are of a shining amber-yellow at the apex; the second hook of the first branch is bidentate. The maxillary teeth are transparent, uniformly white, simple, scaly, moderately erect. The stigmatic plate is small, its shape between triangular and obliquely semilunar; the stigmatic fissure short, claviform, the stigma proper small and arcuate. Each of the anal valvulæ bears five bristles. The genital fissure, which is comparatively large, lies in a polygonal cavity and is enclosed by a sort of swollen lip. Legs reddish-brown, whitish at the apex of the joints.

Female unknown.

The figures and description are taken from a dried specimen obtained in Nicaragua by Mr. Janson.

4. *Amblyomma sabaneræ*, sp. n. (Tab. XIV. figg. 2, 2 a-2 i, ♀.)

♂ latet.

♀. Corpus ovatum, depressum. Scutum occipitale nitidum, sat dense et haud profunde punctatum, colore ex fusco nigrescente, secundum marginem humeralem utriusque lateris macula lineari irregulari albida, quæ in exemplo desiccato difficulter observatur. Scutum frontale nigro-fuscum, foveis frontalibus profundis, ovatis, antice angulatim protractis. Abdomen haud nitens, crasse punctatum; superficies dorsualis sulcis longitudinalibus latis iniqua. Rostrum et palpi fusci, clariores apicem versus. Palporum articulus quartus in tertii apice excavato centraliter insertus. Area mandibularis hamulis quinque in ramos duos dispositis: hamulus secundus primi rami bidentatus, hamulus primus secundi rami brevissimus. Dentès maxillares acuti, sat dense conferti, in medio apicem versus torulo succineo incrassati. Lamina stigmatica triangularis, angulis rotundatis, fissura stigmatica irregulariter claviformis, lata; rima stigmati irregulariter arcuata. Valvula analis utriusque lateris setis quinque armata. Apertura genitalis margine posteriore recto, laterali flexuose convexo; inter rugulas integumenti parietis anterioris aperturae genitalis toruli lineares recti observantur. Pedes clarius fusco-rufi, coxæ dentibus duobus respicientibus armati. Long. corp. 7 millim.; scuti occipitalis 2 millim.; lat. corp. 5 millim.

Hab. GUATEMALA, Retalhuleu (*Stoll*).

Male unknown. Body of the female oval, depressed. Occipital plate shining, punctate, brownish-black, with an irregular whitish stripe on the shoulder-margin, which almost disappears after desiccation. Frontal plate brownish, the two frontal holes deep and oblong. Abdomen not shining, rather coarsely punctate, with some broad longitudinal furrows on its upper surface. Rostrum and palpi brown, lighter towards the apex; the fourth joint of the palpi centrally inserted on the third one, which has its apex excavated. Five mandibular hooks arranged on two branches; the second hook of the first branch bidentate, the first one of the second branch very short and rudimentary. Maxillary teeth acute, with an amber-yellow longitudinal swelling on the middle, their margin double-bordered. The stigmatic plate is triangular with rounded angles; the stigmatic fissure irregularly claviform, comparatively broad, the stigma proper moderately arcuate. Each anal valvula bears five bristles. The posterior margin of the genital orifice is straight, transverse, its side margin convex, arcuate; a

series of short linear swellings between the ripples of the integument of the anterior margin. Legs light brown. The coxæ bear two broad, rounded teeth.

I found two females of this species attached to the throat and tail of a small terrapin, known to the natives by the name of "la Sabanera." The figures and description are taken from specimens preserved in alcohol.

Fam. ORIBATIDÆ.

[Dugès, Rech. sur l'ordre des Acar., 3^e Mém., in Ann. Sci. Nat. sér. 2, i. p. 21, *Oribatei* (1834); Kramer, Grundzüge zur System. der Milben, in Arch. f. Naturg. xliii. p. 215 (1877).]

Subfam. PTEROGASTERINÆ.

[Michael, British Oribatidæ, pp. 64 & 202 (1884).]

ORIBATA.

Oribate, Latreille, Hist. nat. gén. et partic. des Crust. et des Ins. vii. p. 400 (1804); Gen. Crust. et Ins. i. p. 148 (1806).

1. *Oribata centro-americana*, sp. n. (Tab. XV. figg. 1, 1 a-1 f.)

Corpus globosum, supra valde convexum, nigrum, læve, nitidum, sine sculptura microscopica ulla. Dorso-vertex ab abdomine non separatus, antice sulco transverso ab rostri tecto separatum. Rostrum tectum, valde declivum, triangulare, antice late angulatum, simplex. Lamellæ breves, angustæ, apice brevi, acuto, seta medioeris longitudinis armatæ. Pseudostigmata ab desupra inspicienti non perspiciuntur. Organa pseudo-stigmatica longa, setiformia, apice paullulum incrassato. Tectopædia non conspicua. Pedes rufofusci, medioeris longitudinis, setulis armati, coxis, femoribus atque tibiis posticis complanatis; tarsus unguibus tribus instructus. Pteromorphæ modicæ, antice protractæ, late rotundatæ, plerumque corpori appressæ, ita ut a desupra inspicienti difficulter videantur, colore rufo-fusco, semi-pellucidæ. Laminæ genitales ab analibus valde distantes, iis minores, aream rotundato-pentagonam occupantes. Laminæ anales semilunares. Palpi nihil extraordinarii exhibent. Mandibulæ crassæ, breves, brachia chelarum dentibus quatuor obtusis armata. Maxillæ incisuram longitudinalem margini externo vicinam profundam præbent, quæ partem anteriorem marginis externi dentis instar discernit.

Long. corp. 0.9 millim.; lat. corp. 0.8 millim.

Hab. BRITISH HONDURAS, R. Hondo, R. Sarstoon, Belize (*Blancaneaux*); GUATEMALA, Antigua, Guatemala city (*Stoll*); PANAMA, Volcan de Chiriqui 2500 to 4000 feet (*Champion*).

Body globose, of a short and almost circular shape, broad and rounded behind; colour black, the legs and edges of the pteromorphæ brown; texture polished, shining; without any hairs or minute sculpture on the dorsal surface. Cephalothorax comparatively broad: rostrum simple, broadly pointed; lamellæ small and narrow, short, ending in a short acute point; from the anterior margin of the lamellæ there project two comparatively short bristles on each side. Tectopædia wanting. Pseudostigmata short, difficult to be seen from above, projecting from the angle between the basis of

ORNITHODOROS, Koch.

1. *Ornithodoros coriaceus*.

Ornithodoros coriaceus, C. L. Koch, Arch. f. Naturg. x. Bd. 1, p. 219, no. 1; Übers. d. Arachniden-syst. Heft iv. pp. 12, 31, t. 1. figg. 2, 3.

Hab. MEXICO (*teste Koch*).

Berlese, in his 'Acari Austro-Americani,' p. 23, mentions *Ornithodoros coriaceus*, Koch, from Rio Apa (Paraguay), but without entering into details.

IXODES, C. L. Koch.

1. *Ixodes boarum*.

Ixodes boarum, Stoll, anteà, p. 18, Tab. XIII. figg. 1-1 e, and Tab. XIV. fig. 4.

Hab. GUATEMALA, Retalhuleu.

2. *Ixodes pygmæus*.

Ixodes pygmæus, C. L. Koch, Arch. f. Naturg. x. Bd. 1, p. 233, no. 18; Übers. d. Arachniden-syst. Heft iv. pp. 22, 107, and t. 22. figg. 81 a, b (♀).

Hab. MEXICO.—BRAZIL (*teste C. L. Koch*).

AMBLYOMMA, C. L. Koch.

1. *Amblyomma mixtum*.

Amblyomma mixtum, C. L. Koch, Arch. f. Naturg. x. Bd. 1, p. 227, no. 17; Übers. d. Arachniden-syst. Heft iv. pp. 74, 75, t. 13. figg. 47 (♂), 48 (♀); Stoll, anteà, p. 19, Tab. XII. figg. 1-1 i (♀), 2-2 b (♂).

Hab. MEXICO (*teste C. L. Koch*); GUATEMALA, Retalhuleu, Antigua; NICARAGUA, Chontales; COSTA RICA, Caché.

2. *Amblyomma dissimile*.

Amblyomma dissimile, C. L. Koch, Arch. f. Naturg. x. Bd. 1, p. 225, no. 10 (♂ ♀); Übers. d. Arachniden-syst. Heft iv. pp. 17, 64, 66, t. 12. figg. 37 (♂), 38 (♀).

Hab. MEXICO (*teste Koch*).

3. *Amblyomma tenellum*.

Amblyomma tenellum, C. L. Koch, Arch. f. Naturg. x. Bd. 1, p. 227, no. 16 (♂); Übers. d. Arachniden-syst. Heft iv. pp. 17, 78, 79, t. 14. fig. 51 (♂).

Hab. MEXICO (*teste Koch*).

4. *Amblyomma ovale*.

Amblyomma ovale, C. L. Koch, Arch. f. Naturg. x. Bd. 1, p. 227, no. 20; Übers. d. Arachniden-syst. Heft iv. pp. 18, 79, 80, t. 14. fig. 52 (♂).

Hab. MEXICO (*teste Koch*).

5. **Amblyomma foreli.**

Amblyomma foreli, Stoll, anteà, p. 21, Tab. XII. figg. 3-3 *b*, and Tab. XIV. figg. 3-3 *d* (♀).

Hab. GUATEMALA, Retalhuleu.

6. **Amblyomma crassipunctatum.**

Amblyomma crassipunctatum, Stoll, anteà, p. 22, Tab. XIV. figg. 1-1 *h* (♂).

Hab. NICARAGUA, Chontales.

7. **Amblyomma sabanerae.**

Amblyomma sabanerae, Stoll, anteà, p. 23, Tab. XIV. figg. 2-2 *i* (♀).

Hab. GUATEMALA, near Retalhuleu.

Fam. ORIBATIDÆ.

Subfam. *PTEROGASTERINÆ*.

ORIBATA, Latr.

1. **Oribata centro-americana.**

Oribata centro-americana, Stoll, anteà, p. 24, Tab. XV. figg. 1-1 *f*.

Hab. BRITISH HONDURAS, R. Hondo, R. Sarstoon, Belize; GUATEMALA, Antigua, Guatemala city; PANAMA, Volcan de Chiriqui.

2. **Oribata rugifrons.**

Oribata rugifrons, Stoll, anteà, p. 25, Tab. XV. figg. 2-2 *d* (? nymph, Tab. XV. figg. 3-3 *d*).

Hab. BRITISH HONDURAS, Belize; GUATEMALA, Retalhuleu.

Subfam. *APTEROGASTERINÆ*.

HOPLOPHORA, C. L. Koch.

1. **Hoplophora retalteca.**

Hoplophora retalteca, Stoll, anteà, p. 27, Tab. XV. figg. 4-4 *f*.

Hab. GUATEMALA, Retalhuleu.

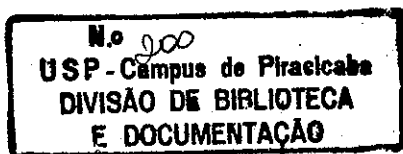
Fam. NICOLETIELLIDÆ.

NICOLETIELLA, R. Canestrini.

1. **Nicolettiella neotropica.**

Nicolettiella neotropica, Stoll, anteà, p. 27, Tab. XVI. figg. 1-1 *c*.

Hab. GUATEMALA, Retalhuleu.



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[Names in small capitals refer to Families &c. ; those in roman type to the chief reference to each species included in the work ; those in italics to species incidentally mentioned, synonyms, &c.]

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