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FIRST SPECIES OF *COLLOPHORA* (COLLEMBOLA: SYMPHYPLEONA: COLLOPHORIDAE) FROM BRAZIL, WITH COMMENTS ON ITS DISTRIBUTION

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Abstract

A new species of springtail (Symphypleona, Collophoridae), *Collophora brasilis* **sp. nov.**, is described, the first species known from Brazil. The species is distributed from the coastal region to the semi-arid region in northeastern Brazil. It is characterized by the reduction in the trochanteral setae and teeth on the empodial complex. Diagnostic features are illustrated and compared to other members of the genus.

Key Words: new species, neotropical Collembola, Brazilian fauna, globular springtail

Resumen

Se describe una nueva especie de colémbolo (Symphypleona, Collophoridae), *Collophora brasilis* **sp. nov.**, la primera conocida de Brasil. La especie se distribuye desde la región costera hasta la semi-árida en el Nordeste del país. La especie se caracteriza por presentar reducción de las cerdas trocanterales y los dientes del complejo empodial. Los caracteres diagnósticos de *C. brasilis* **sp. nov**. son representados con dibujos y fotografias y son comparados com otras especies del género.

Palabras Clave: nueva especie, Collembola neotropicales, fauna Brazileña, colémbolos globulares

Resumo

Descrevemos uma espécie nova de colêmbolo (Symphypleona, Collophoridae), *Collophora brasilis* **sp. nov.**, a primeira descrita no Brasil. A espécie se distribui desde a região costeira até o semi-árido no nordeste do país. A espécie se caracteriza por apresentar redução nas cerdas trocanterais e dentes do complexo empodial. As principais estruturas que diagnosticam *C. brasilis* **sp. nov**. são desenhadas, fotografadas e comparadas com as demais espécies do gênero.

Palavras Chave: nova espécie, Collembola neotropicais, fauna Brasileira, colêmbolos globulares

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The genus *Collophora* (Symphypleona: Collophoridae) was first described by Richards in 1956 (unpublished) but published only in 1964 by Delamare Deboutteville & Massoud (1964a), the type species of the genus *C. quadrioculata* (Denis 1933) from Costa Rica, was originally placed in the genus *Arrhopalites*. Six species are known, *C. africana* Delamare Deboutteville & Massoud 1964b and *C. sudanica* Hüther 1967 from Africa, *C. mysticiosa* Yosii 1966 and *C. subquadrioculata* (Denis 1948) from India and Vietnam and *C. remanei* Delamare Deboutteville & Massoud, 1964a from Peru. The distribution of the species strongly suggests a Gondwanan origin for the genus, reinforced by the new species described here from Brazil. The only species known from Nearctic Region is *C. quadrioculata*, which must have invaded Central and North America after the formation of the Isthmus of Panama.

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The genus *Collophora* presents 4 eyes each side of head, tenent hairs absent, proximal setal field of metatrochanter absent, fifth abdominal segment fused to the great abdomen, trichobothria D capitate on a conspicuous papilla (Richards 1968; Betsch 1980) with setae P1 and P2 modified into 2 capitate sensilla (Bretfeld 1994), figured for the first time in *C. africana* by Delamare Deboutteville & Massoud (1964b).

Collophora brasilis **sp. nov.** from Northeastern Brazil, ranges from the rainy Atlantic Forest close to littoral, to the semi-arid Caatinga Forest more than 200 km away from the coast. This is the first species of *Collophora* recorded from Brazil, the second from South America.

Materials and Methods

Head and dens chaetotaxy labeling follow Christiansen (1966) and Christiansen & Bellinger (1998), anal valve and apical organ of Ant. III follow Lawrence (1979) and Nayrolles (1991) respectively, trichobothria and surrounding setae as Richards (1968) and Bretfeld (1994). The abbreviations used along the description are the following: Ant, antennal segment; Abd, abdominal segment; CD, cephalic diagonal

Ordo Symphyleona Börner 1901 sensu Massoud 1971

Superfamilia Katiannoidea Bretfeld 1994

Familia Collophoridae Bretfeld 1999

Genus *Collophora* Richards in Delamare Deboutteville and Massoud 1964

Collophora brasilis **sp. nov.** (Figs. 1-22, Table 1)

Material Examined

HOLOTYPE: Female, BRAZIL: Paraiba, Mamanguape, Biological Reserve Guaribas, Barro

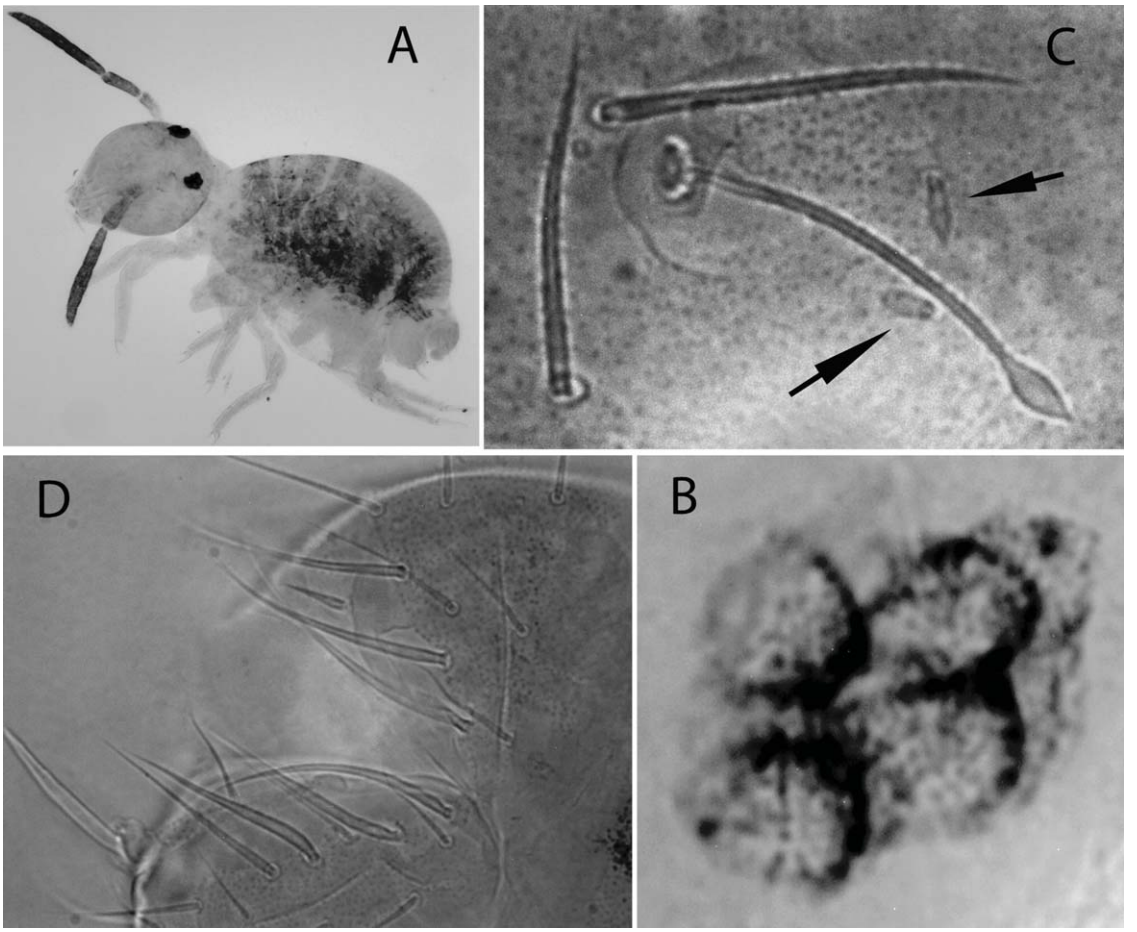


Fig. 1: *Collophora brasilis* **sp. nov.** A, Habitus and pigment distribution pattern; B, eye patch showing 4 lenses and pigments; C, Trichobothria D capitated and special sensilla of Abd V; D, anal valve setae.

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TABLE 1. AVERAGE MEASUREMENTS OF BODY PARTS OF *COLLOPHORA BRASILIS* **SP. NOV.**

Character	Measurements (µm)
Total size	199
Body	140
Cephalic Diagonal	84
Ant I	10
Ant II	17
Ant III	23
Ant IV	64
Dens	36
Mucro	19
Tibiotarsus I	35
Unguis I	9
Tibiotarsus II	33
Unguis II	9
Tibiotarsus III	42
Unguis III	9

Branco river, 09-IV-2011, coll. R. A. Brito, deposited at Museu Nacional da Universidade Federal do Rio de Janeiro (MNUFRJ) number 2389.

PARATYPES: 3 females and 6 males, same data label as Holotype, deposited at MNUFRJ number 2389.

Other material: 1 female and 1 male, Brazil: Bahia, Juazeiro, Ilha de Nossa Senhora and Ilha do Fogo, 09-I-2011. coll. R.A. Brito. 1 male, Brazil, Paraiba, Serra Branca, 15-V-2011 coll. Zeppelini, Dias, Callado and Mota, kept at Laboratório de Sistemática de Collembola e Conservação, Universidade Estadual da Paraíba.

Description. Body length ~0,20 mm, body parts measurements see Table 1, Habitus Sminthuroid (Fig. 1A). Eyes 4+4 in dark blue patches (Fig. 1B). Color varying from light purple to pink over dorsal great abdomen and antennae, head sparsely mottled, ventral body, legs and furca pale white (Fig. 1A). Some specimens from "Ilha do fogo" white with pigments on eye

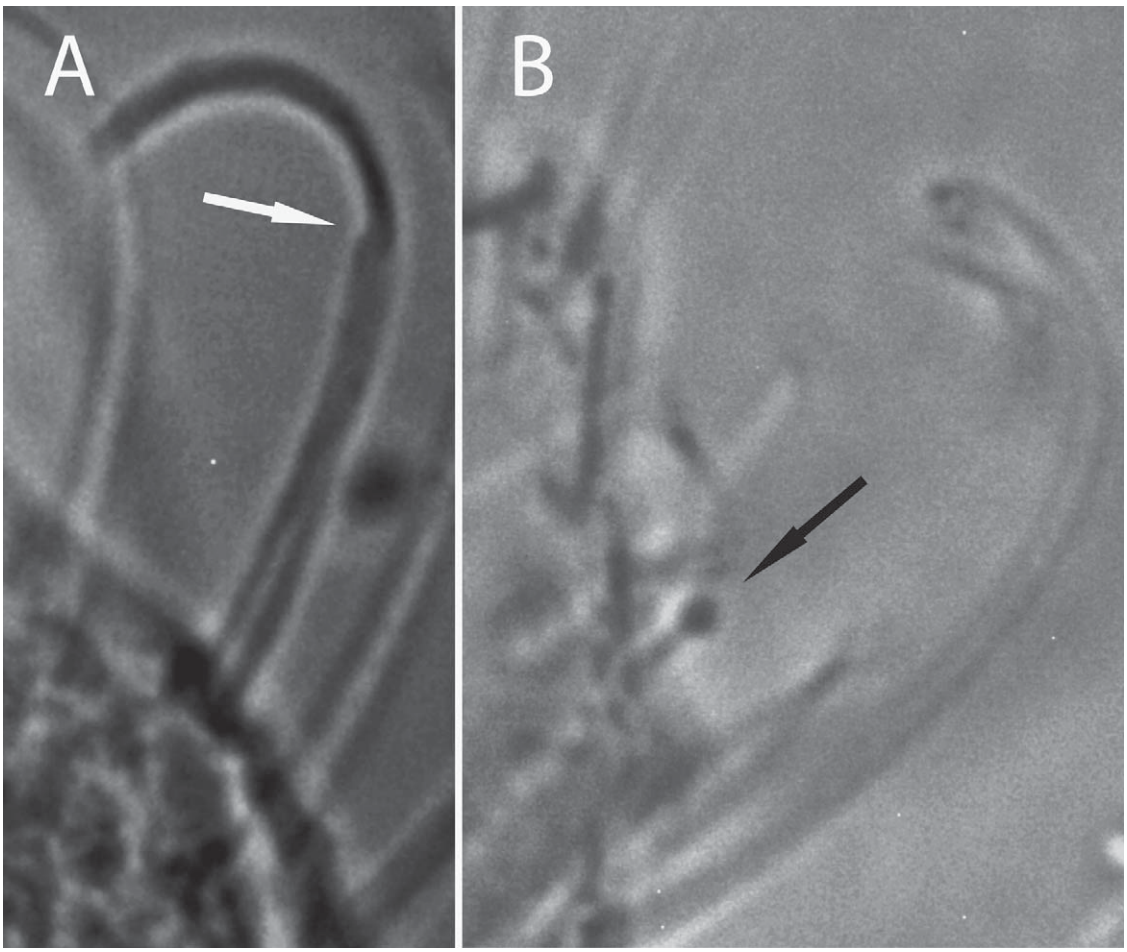
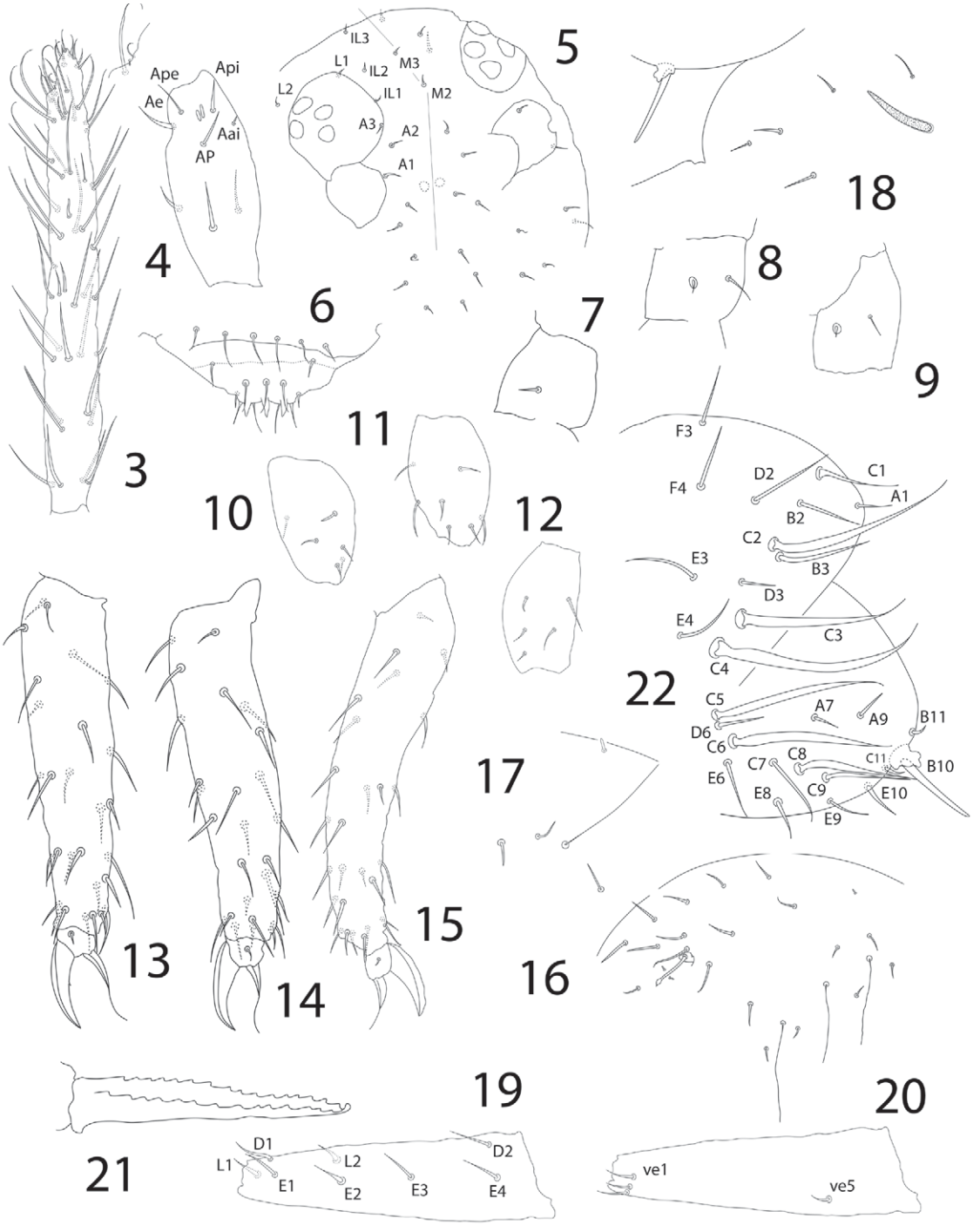


Fig. 2: *Collophora brasilis* **sp. nov.** Apex of fourth antennal segment. A, hooklike seta (white arrow points to the distal narrowing); B, sensillum at the base of the hooklike seta (black arrow).

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Figs. 3-22: *Collophora brasilis* **sp. nov.** 3, Fourth antennal segment chaetotaxy (detail showing the apical sensilla); 4, Apical sensory organ of Ant III; 5 Posterior cephalic chaetotaxy; 6, labral chaetotaxy; 7, Trochanter leg I; 8, Trochanter leg II; 9, Trochanter leg III; 10, Femur leg I; 11, Femur leg II; 12, Femur leg III; 13, Tibiotarsus and foot complex leg I; 14, Tibiotarsus and foot complex leg II; 15, Tibiotarsus and foot complex leg III; 16, Trichobothria on great abdomen; 17, sensillum on dorsal great abdomen; 18, seta neosminthuroid and ventral chaetotaxy of genital segment; 19, Dens dorsal chaetotaxy; 20, Dens ventral chaetotaxy; 21, Mucro; 22, Anal valve chaetotaxy.

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patches. Ant/CD as 1:1.35, Ant IV apex bearing a hook-like seta narrowed at the distal third (Figs. 2A and 3), with a sensillum in the shape of a bulb in a short stalk (Figs. 2B and 3). Ant IV not subdivided or partially subdivided into 5 subsegments, 1 sensillum present on second third, apical third bears bristles and short setae at the tip, apical bulb absent, hooked microseta present (Fig. 3). Apical organ of Ant III with 2 sense rods in separate pits, Aai thin, short and acuminated, Ape slender bristlelike (Fig. 4). Cephalic setae short, posterior cephalic M1, M4 and M5 absent (Fig. 5), clypeal-labral setae 6-2/5/4 (Fig. 6). All subcoxae with one small seta. Trochanteral setae short and stout (Figs. 7-9), trochanteral organ in circular sockets (Figs. 8 and 9). Internal/external setae of femora I-III as 2/4:2/5:0/5, one seta on first femur spinelike (Figs. 10-12). All ungues with tunica, all unguiculi with apical filament exceeding unguis tip, corner tooth absent (Figs. 13-15) first unguis with a small inner tooth. Trichobothria A-B-C on great abdomen arranged almost in a straight line (Fig. 16), a small acuminated finger shaped sensillum present dorsad to trichobothria A (Fig. 17). Trichobothria D short, capitate, acuminated and inserted in a clear papilla, 2 small acuminated sensilla present posterior to trichobothria D (Figs. 1C and 16). Basal part of collophore cylindrical, distal part paired with 1+1 seta at the apex. Corpus tenaculum with 1 seta, rami tridentate with 1 basal process. Furca base complex with 1 neosminthuroid and 5 normal setae each side on ventral surface (Fig. 18). Dens dorsal chaetotaxy L1-2 and E2 somewhat spinelike, D1-2 present, E1, E3 and E4 normal (Fig. 19), ventral setae ve1... ve5 as 3..:1 (Fig. 20). Mucro narrow, gutterlike, both edges serrated (Fig. 21). Anal valve seta C1-6 and C8-9 swollen, subanal appendages thick, rodlike and smooth, inserted in a prominent irregular papilla (Figs. 1D), chaetotaxy as Fig. 22.

Etymology

The species was named *brasilis* as the first *Collophora* species described from Brazil. Terra Brasilis is among the ancient Latin names given to Brazil.

Distribution and Habitat

Good's Biogeographic Zone 27 (Good 1974). The species is distributed in Northeastern Brazil, in Atlantic Forest remnants, semi-deciduous Forest and extending westward to Caatinga semiarid forest. The specimens studied were collected in Paraiba State at coordinates S 6°42'40.3' W -35°10'40.3", S 6°48' 12.7"W -35°06' 27" and S 7° 28' 58" W -36° 39' 54", and in Bahia State at coordinates S 9° 24' 23.4" W -40° 30' 9.2" and S 9° 24' 49.4" W -40° 28' 42.3".

The species inhabits on leaf litter in forest grounds from wet littoral zone to semi-arid (rainy winter, less than 500 mm/year), dwelling riparian environments associated to plant debris and moisture. Climate according to Köppen's system is As (Koppen 1936; Shear 1966).

Remarks

Collophora brasilis **sp. nov.** can be recognized from all known species of the genus by the reduced number (1/1/1) of seta on trochanter (3/2/2 in *C. africana*, *C. remanei* and *C. sudanica*), having small abdomen seta C swollen instead of winged, small abdomen A1 and B3 smooth, and lacking the corner tooth in all unguiculi. In addition, the number of clypeolabral setae (6:2:5:4) separates the new species from *C. mysticiosa* (6:2:3:4) and *C. sudanica* (6:5:5:4). The new species presents a sensillum at the dorsal surface of great abdomen each side of the body, aligned with trichobothria A, the same sensillum is present in *C. sudanica*.

The 2 special sensilla posterior to trichobothria D (Bretfeld 1994) present in *C. brasilis* **sp. nov.**, is similar to those seen in *C. africana* (Delamare Deboutteville & Massoud 1964b), described as short trichobothria with the same structure, but completely transparent, placed near the base of each trichobothria D.

Hüther (1967) presents an identification key to all the 6 previously known species. The revised chaetotaxy (Bretfeld 1994) re-defined the genus, although detailed chaetotaxy of great abdomen and anal valve remains undescribed for most named species of *Collophora*. Most species need to be re-described, as original descriptions are too incomplete to allow clear diagnosis for the genus and to recognize the real limits of species. Therefore updates to the identification key are useless until the genus is revised.

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References Cited

Betsch, J. M. 1980. Éléments pour une monographie des Collemboles Symphypléones (Hexapodes, Aptérygotes). Mém. Mus. Nat. Hist. Nat., NS A, Zool. 116: 1-227.

Börner, C. 1901. Zur Kenntnis der Apterygoten-Fauna von Bremen und der Nachbardistrikte. Beitrag zu einer Apterygoten-Fauna Mitteleuropas. Abh. Naturwiss. Ver. Bremen 17(1): 1-140.

Bretfeld, G. 1994. The chaetotaxy of the small abdomen of the Symphypleona (Insecta, Collembola) and its phylogenetic interpretation. Acta Zool. Fennica 195: 13-17.

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Bretfeld, G. 1999. Synopses on Paleartic Collembola. Volume 2, Symphypleona. Abh. Ber. Nat.kd.mus. Görlitz 71(1): 1-318.

Christiansen, K. 1966. The genus Arrhopalites (Collembola: Sminthuridae) in the United States and Canada. Intl. J. Spel. 2: 43-73.

Christiansen, K., and Bellinger, P. 1998. The Collembola of North America North of the Rio Grande. Grinnell College, Grinnell, Iowa. 1322 pp.

Delamare Deboutteville, C., and Massoud, Z. 1964a. *Collophora remanei* n. sp., Collembole Symphypléone du Pérou et remarques sur le genre *Collophora* Richards et sa position systématique. Zool. Anz. 172(1): 30-36.

Delamare Deboutteville, C., and Massoud, Z. 1964b. Collemboles Symphypléones de l'Angola (Première note). Publ. cul. Co. Diam. Ang., Lisboa. 69:67-104.

Denis, J. R. 1933. Collemboles de Costa Rica avec une contribution au species de l'ordre, pp. 284-285 *In* Contributo alla conoscenza del "Microgenton" di Costa Rica. Boll. Lab. Zool. Gen. Agr. R. Scuola Agric. Portici. 27: 222-322.

Denis, J. R. 1948. Collemboles d'Indochine. Musée Heude, Notes d'Entomologie Chinoise. 12(17): 289-291.

Good, R. 1974. The geography of flowering plants. 4th ed. Longman Group, London, 574 pp.

Hüther, W. 1967. Beiträge zur Kenntnis der Collembolenfauna des Sudans (II. Allgemeiner Teil und Symphypleona). Senckenberg. Biol. 48(4): 238-242.

Köppen, W. 1936. Das geographische System der Klimate. *In*: Köppen, W. & Geiger, R. (Eds.), Handbuch der klimatologie. Verlag von Gebrüder Borntraeger, Berlin, Vol. 1 Part C, 1-44 pp.

Lawrence, P. N. 1979. The terminology of terminalia and cartography of chaetotaxy in the Collembola, its evolutionary significance and systematic utility. First Int. Seminar Apterygota, Siena, pp. 69-80.

Massoud, Z. 1971. Contribution à la connaissance morphologique et systématique des Collemboles Neelidae. Rev. Ecol. Biol. Sol. 8(1): 195-198.

Nayrolles, P. 1991. La chétotaxie antennaire des collemboles symphypléones. Travaux Laboratoire Ecobioogique, Arthropodes Édaphique Toulouse. 6: 1-94.

Richards, W. R. 1968. Generic classification, evolution, and biogeography of the Sminthuridae of the world (Collembola). Mem. Entomol. Soc. Canada. 53: 1-54.

Shear, J. A. 1966. A set-theoretic view of the Koppen dry climates. Ann. Assoc. American. Geographers 56(3): 508-515. doi: 10.1111/j.1467–8306.1966.tb00575.x

Yosii, R. 1966. On some Collembola of Afghanistan, India and Ceylon, collected by the Kuphe-Expedition, 1960. The committee of the Kyoto University scientific expedition to the Karakoram and Hindukush, Kyoto Univ., Japan, pp. 391-393.

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