



Taxonomic Paper

Checklist and distribution of Collembola from Greater Puerto Rico

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Academic editor: Yassen Mutaftchiev

Received: 13 Mar 2020 | Accepted: 03 Jun 2020 | Published: 09 Jul 2020

Citation: Ospina-Sánchez CM, Soto-Adames FN, González G (2020) Checklist and distribution of Collembola from Greater Puerto Rico. Biodiversity Data Journal 8: e52054. <https://doi.org/10.3897/BDJ.8.e52054>

Abstract

Background

Springtails (Arthropoda, Hexapoda, Collembola) are small arthropods commonly found in soil, litter and other habitats all around the Globe. More than 9,000 species have been described worldwide, but knowledge about their diversity and distribution remains far from complete. Reports of springtail diversity in the Antilles are uneven, some islands are relatively well known, whereas others have not been explored at all. The fauna of Puerto Rico is reasonably well known, but many recent reports are scattered in published literature and unpublished theses.

New information

Here, we present a summary of all springtail species identified from the Bank of Puerto Rico, including unpublished records. As a result, we list 146 species including 43 unnamed, included in 65 genera and 17 families. Most species, 33, belong to Entomobryidae, but this possibly reflects the taxonomic expertise of specialists working in Puerto Rico rather than a real bias in the distribution of higher taxa in the islands. In addition to the new records, the database provides information on the world and local distribution of species listed. The

dataset, presented here, is work in progress and will be updated as ongoing taxonomic inventories are completed.

Keywords

Caribbean, distribution, database, historical data, literature, Puerto Rico, springtails, Tropical Island.

Introduction

The present checklist synthesises the occurrence and distribution of the springtail fauna of Greater Puerto Rico (i.e. Puerto Rico, Vieques, Culebra, Mona) and also makes and updates the available online dataset to the general scientific community through <https://doi.org/10.2737/RDS-2018-0063> (Ospina-Sánchez et al. 2019).

Puerto Rico is an archipelago located in the north-eastern part of the Caribbean and has an area of approximately 8900 km² in land. The main island accounts for approximately 8746 km² of that area, whereas the islands of Vieques and Culebra account for 131 km² and 26 km², respectively. In the main island, the altitude varies between sea level and 1300 m a.s.l. Temperatures tend to decrease towards higher elevations along the centre of the main island (Ewel and Whitmore 1973) and the mean annual temperature ranges from 19 to 26°C. The ecological life zones of Puerto Rico include subtropical dry forests and subtropical rainforests, amongst other life zones described by Ewel and Whitmore (1973). In addition, the island can be divided into three major physiographic regions, based on topographic features, geologic structure and rock type: the coastal lowlands, the coastal hills and the central mountains (Helmer et al. 2002, Parés-Ramos et al. 2008).

The first report of Collembola in Puerto Rico was made by Folsom (1927) who described two species. Wolcott (1948) reported seven genera and Wray (1953) included nine additional genera to the list. Mari Mutt (1976), Mari Mutt (1977), Mari Mutt (1979), Mari Mutt (1981), Mari Mutt (1982), Mari Mutt (1984), Mari Mutt (1985a), Mari Mutt (1985b), Mari Mutt (1986b), Mari Mutt (1987), Mari Mutt (1988), Mari Mutt (1986a) reported more than 60 species and described 27 new species from the Island. Soto-Adames (1988a), Soto-Adames (1988b), Soto-Adames (2002a) reported 39 from the US Virgin Islands and Puerto Rico and described nine species. Samalot-Roque (2006) found 44 species in red mangrove forest (*Rhizophora mangle*) around the Island. Ospina-Sánchez (2011) found 35 species in a secondary forest in Mayagüez. Soto-Adames (unpublished data) identified 33 and Ospina-Sánchez (2019) identified 53 species from the Luquillo Experimental Forest.

The present work updates the list of Collembola of Puerto Rico published by Mari Mutt (1982), where 39 genera and 59 species were listed, including their geographic distribution according to biogeographic zones in the world. In the present revision for Collembola from Puerto Rico, we include a list of species, historical reports and world and local distribution.

Materials and methods

The list of species recorded from Puerto Rico (Fig. 1) is based on bibliographic references (Folsom 1927, Wolcott 1948, Wray 1953, Mari Mutt 1976, Mari Mutt 1977, Mari Mutt 1979, Mari Mutt 1981, Mari Mutt 1982, Mari Mutt 1984, Mari Mutt 1985a, Mari Mutt 1985b, Mari Mutt 1986b, Mari Mutt 1987, Mari Mutt 1988, Soto-Adames 1988a, Soto-Adames 1988b, Soto-Adames 2002a), including species reported in two unpublished master theses reported here as new records for the fauna (Samalot-Roque 2006, Ospina-Sánchez 2011) and taxonomic identifications of altitudinal gradient experiments in the Luquillo Experimental Forest (Richardson et al. 2005, Ospina-Sánchez 2019). The collection location information for each species was obtained from the cited references, when available. The data for global distribution of species is based on Bellinger et al. (2019).

Biogeographical distribution regions according to Good (1974), modified by Christiansen and Bellinger (1995) and Culik and Zeppelini (2003), were summarised for each species as follows: Boreal, Neotropical, South African, Paletropical, Australian and Antarctic. Species distributed in four or more major regions are considered cosmopolitan (Abrantes et al. 2010, Mari Mutt 1982). The species distribution was extracted from Bellinger et al. (2019). The species reported exclusively from the Puerto Rico Bank were listed as Endemic. Nomenclatural organisation follows that of Bellinger et al. 2019.



Figure 1. [doi](#)

Localisation of Puerto Rico in the great Caribbean Region.

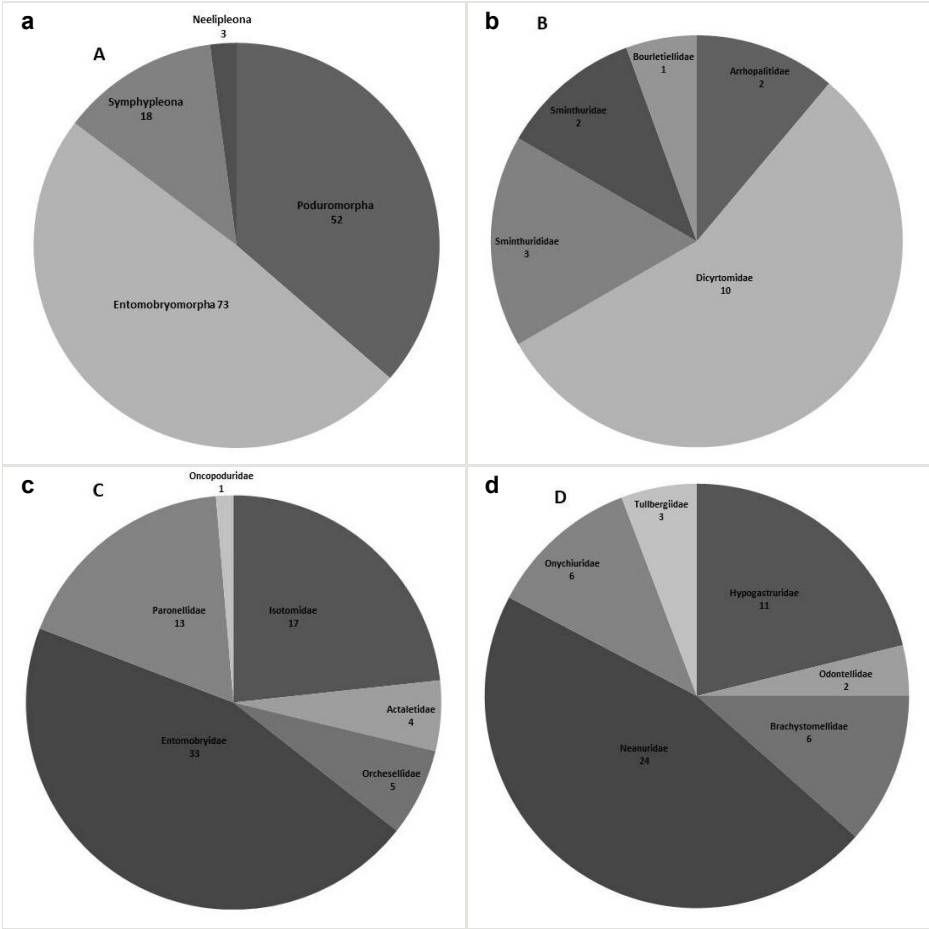


Figure 2.
Taxonomic coverage of Collembola recorded in Puerto Rico.

- a: Orders of Collembola [doi](#)
- b: Families within the order Symphyleona [doi](#)
- c: Families within the order Entomobryomorpha [doi](#)
- d: Families within the order Poduromorpha [doi](#)

The fields given in the online database <https://doi.org/10.2737/RDS-2018-0063> are: Family, genus, species, world distribution and Neotropical distribution, historical reports in Puerto Rico, life zone in P.R, location (municipality) and habitat (Ospina-Sánchez et al. 2019). The list of the Collembola from Puerto Rico are presented here, include: Family, genus, species, world and local distribution and historical records.

Checklist of Collembola from Puerto Rico

Family Hypogastruridae

***Ceratophysella denticulata* (Bagnall, 1941)**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Mari Mutt 1982 as *Hypogastrura denticulata*.

***Microgastrura* sp. "nov."**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Paraxenylla affiniformis* (Stach, 1930)**

Distribution: Cosmopolitan; Puerto Rico: Ceiba, Guayama, Naguabo, Santa Isabel.

Notes: Reported by Samalot-Roque 2006, new record.

***Xenylla grisea* Axelson, 1900**

Distribution: Boreal, Neotropical, Austral; Puerto Rico.

Notes: Reported by Heatwole and Levins 1973.

***Xenylla malayana* Salmon, 1951**

Distribution: Neotropical, Palearctic; Puerto Rico: Mayagüez.

Notes: Reported by Samalot-Roque 2006, new record.

***Xenylla portoricensis* da Gama, 1976**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Da Gama 1976.

***Xenylla welchi* Folsom, 1916**

Distribution: Cosmopolitan; Puerto Rico: San Juan.

Notes: Reported by Wolcott 1948, Samalot-Roque 2006.

***Xenylla yucatana* Mills, 1938**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Da Gama 1976.

***Xenylla* sp. "nov. 1"**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Xenylla* sp. "nov. 2"**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

Family Odontellidae***Odontella* sp. 1 Mari Mutt, 1977**

Distribution: Cosmopolitan; Puerto Rico: Cayey, Luquillo.

Notes: Reported by Mari Mutt 1977.

***Superodontella* cf. *cornifer* Mills, 1934**

Distribution: Cosmopolitan; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

Family Brachystomellidae***Brachystomella agrosa* Wray, 1953**

Distribution: Neotropical; Puerto Rico: Luquillo, Mayagüez.

Notes: Reported by Wray 1953, Samalot-Roque 2006, Ospina-Sánchez 2011, Soto-Adames (unpublished data).

***Brachystomella baconaensis* Gruia, 1983**

Distribution: Neotropical; Puerto Rico: Cabo Rojo, Guánica.

Notes: Reported by Samalot-Roque 2006, new record.

***Brachystomella* sp.**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

***Brachystomella* sp. "nov. 1"**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Brachystomella* sp. "nov. 2 "**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

Family Neanuridae***Friesea* sp. Mari Mutt, 1976**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Mari Mutt 1976.

***Friesea josei* Palacios-Vargas, 1986**

Distribution: Neotropical; Puerto Rico.

Notes: Reported by Palacios-Vargas 1986.

***Friesea magnicornis* Denis, 1931**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Palacios-Vargas 1986.

***Americanura interrogator* Cassagnau & Palacios-Vargas, 1983**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, new record.

***Arlesia albipes* Folsom, 1927**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Wray 1953 as *Portachorutes mambatus*, Samalot-Roque 2006, Ospina-Sánchez 2011.

***Arlesia* sp.**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

***Arlesia* sp. "nov. "**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Neotropiella silvestri* (Denis, 1929)**

Distribution: Neotropical; Puerto Rico: Cayey, Luquillo, Maricao, Mayagüez.

Notes: Reported by Mari Mutt 1977, Ospina-Sánchez 2011.

***Neotropiella* sp.**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

***Furculanurida bistribusata* Ospina-Sánchez, Palacios-Vargas & González, 2020**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, Ospina-Sánchez et al. 2020.

***Pronura* sp. "nov."**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Hylaeonura infima* Arlé, 1966**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Hylaeonura* sp. "nov."**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Micranurida* sp.**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, as a new record "*Micranurida wladimiri* n. subsp. *caribeña*".

***Pseudachorutes parvulus* Börner, 1901**

Distribution: Neotropical, Palearctic; Puerto Rico: Mayagüez.

Notes: Reported by Samalot-Roque 2006, Ospina-Sánchez 2011, new record.

***Pseudachorutes* sp.**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

***Pseudachorutes* sp. "nov. 1"**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Pseudachorutes* sp. "nov. 2"**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Pseudanurida sawayana* Schuster, 1965**

Distribution: Neotropical, Palearctic; Puerto Rico: Aguadilla.

Notes: Reported by Christiansen and Bellinger 1988, Samalot-Roque 2006.

***Paranura* sp. Mari Mutt, 1977**

Distribution: Holartic, Palearctic, Neotropical; Puerto Rico: Cayey, Guajacata, Luquillo, Quebradillas, San Sebastián.

Notes: Reported by Mari Mutt 1977, Soto-Adames (unpublished data).

***Paranura* nr. *anops* Christiansen & Bellinger, 1980**

Distribution: Palearctic; Puerto Rico.

Notes: Reported by Mari Mutt 1982.

***Paranura* nr. *quadrilobata* Hammer, 1953**

Distribution: Holartic; Puerto Rico.

Notes: Reported by Mari Mutt 1977.

***Paleonura* *borincana* Palacios-Vargas & Soto-Adames, 2017**

Distribution: Endemic; Puerto Rico: Luquillo, Maricao.

Notes: Reported by Palacios-Vargas and Soto-Adames 2017.

***Sensillanura* nr. *illina* (Christiansen & Bellinger, 1980)**

Distribution: Nearctic; Puerto Rico.

Notes: Reported by Mari Mutt 1982 as *Neanura* nr. *illina*.

***Sensillanura* sp.**

Notes: Reported by Soto-Adames (unpublished data), new record.

Family Onychiuridae***Onychiurus* *cunhai* (Arlé, 1970)**

Distribution: Neotropical; Puerto Rico: Arecibo.

Notes: Reported by Samalot-Roque 2006, new record.

***Onychiurus* *subcadaverinus* (Denis, 1931)**

Distribution: Neotropical; Puerto Rico: Maricao, Mayagüez.

Notes: Reported by Mari Mutt 1977 as *Onychiurus* *finetarius*.

***Onychiurus* sp.**

Distribution: Palearctic; Puerto Rico: Luquillo, Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, Soto-Adames (unpublished data), new record.

***Thalassaphorura* nr. *encarpata* (Denis, 1931)**

Distribution: Cosmopolitan; Puerto Rico: Luquillo.

Notes: Reported by Mari Mutt 1982 as *Protaphorura* nr. *encarpata*.

***Thalassaphorura* sp. "nov."**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Protaphorura* nr. *hera* (Christiansen & Bellinger, 1980)**

Distribution: Cosmopolitan; Puerto Rico

Notes: Reported by Palacios Vargas and Díaz 1995 as *Protaphorura* nr. *hera*.

Family Tullbergiidae***Tullbergia* sp.**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Mari Mutt 1982.

***Mesaphorura* *yosiii* (Rusek, 1967)**

Distribution: Cosmopolitan; Puerto Rico: Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, new record.

***Mesaphorura* cf. *ruseki* Christiansen & Bellinger, 1980**

Distribution: Cosmopolitan; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

Family Isotomidae

***Archisotoma goubaultae* Thibaud, 1993**

Distribution: Neotropical; Puerto Rico.

Notes: Reported by Christiansen and Bellinger 1988 as *A. interstitialis*, Samalot-Roque 2006.

***Archisotoma interstitialis* Delamare Deboutteville, 1953**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Christiansen and Bellinger 1988.

***Axelsonia tubifera* Strenzke, 1958**

Distribution: Neotropical; Puerto Rico: Guánica, Guayama, Lajas, Patillas, Salinas, Santa Isabel.

Notes: Reported by Samalot-Roque 2006, new record.

***Hemisotoma thermophila* (Axelson, 1900)**

Distribution: Cosmopolitan; Puerto Rico: Aguadilla, Arecibo, Cabo Rojo, Cayey, Ceiba, Guayama, Las Marias, Luquillo, Maricao, Mayagüez, Morovis, Río Grande, Toa Baja.

Notes: Reported by Mari Mutt 1977 as *Cryptophygus thermophilus*, Samalot-Roque 2006, Ospina-Sánchez 2011.

***Proisotoma* sp. 1**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Mari Mutt 1976.

***Folsomina onychiurina* Denis, 1931**

Distribution: Cosmopolitan; Puerto Rico: Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, new record.

***Folsomia candida* Willem, 1902**

Distribution: Cosmopolitan; Puerto Rico.

Notes: Reported by Peck 1974, Mari Mutt 1982.

***Folsomia sylvia* Wray, 1953**

Distribution: Neotropical; Puerto Rico.

Notes: Reported by Wray 1953.

***Folsomides americanus* Denis, 1931**

Distribution: Tropical; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

***Folsomides centralis* (Denis, 1931)**

Distribution: Neotropical, Austral, Palearctic; Puerto Rico: Arecibo, Cabo Rojo, Humacao, Mayagüez, Toa Baja.

Notes: Reported by Samalot-Roque 2006, Ospina-Sánchez 2011, new record.

***Folsomides parvulus* Stach, 1922**

Distribution: Cosmopolitan; Puerto Rico: Arecibo, Mayagüez, Moca, San Juan, Toa Baja.

Notes: Reported by Mari Mutt 1977 as *Folsomides americanus*, Mari Mutt 1982, Samalot-Roque 2006, Ospina-Sánchez 2011.

***Isotomodes* sp.**

Distribution: Cosmopolitan; Puerto Rico: Mayagüez.

Notes: Reported by Mari Mutt 1982, Ospina-Sánchez 2011.

***Isotomiella minor* (Schäffer, 1896)**

Distribution: Cosmopolitan; Puerto Rico: Arecibo, Cabo Rojo, Humacao, Luquillo, Mayagüez, San Juan Toa Baja.

Notes: Reported by Wray 1953, Samalot-Roque 2006, Ospina-Sánchez 2011, Soto-Adames 2005 (unpublished data).

***Isotomiella* sp.**

Notes: Reported by Ospina-Sánchez 2019, new record.

***Isotomurus* sp. 1**

Distribution: Cosmopolitan; Puerto Rico: Luquillo, Mayagüez.

Notes: Reported by Mari Mutt 1976, Ospina-Sánchez 2011, Soto-Adames, 2005 (unpublished data).

***Isotomurus* sp. 2**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Psammisotoma dispar* (Christiansen & Bellinger, 1988)**

Distribution: Neotropical; Puerto Rico: Cabo Rojo, Ceiba, Toa Baja.

Notes: Reported by Samalot-Roque 2006, new record.

Family Actaletidae***Spinactaletes aebianus* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Isla Mona.

Notes: Reported by Soto-Adames 1988b.

***Spinactaletes bellingeri* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Guánica, Vieques.

Notes: Reported by Soto-Adames 1988b.

***Spinactaletes calcalectoris* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Aguadilla, Guajataca, Isla Mona, Vega Baja.

Notes: Reported by Soto-Adames 1988b.

***Spinactaletes myoptesimus* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Guánica, Vieques, Yabucoa.

Notes: Reported by Soto-Adames 1988b.

Family Orchesellidae

***Dicranocentrus celatus* Mari Mutt, 1985**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Mari Mutt 1985a.

***Dicranocentrus marias* Wray, 1953**

Distribution: Endemic; Puerto Rico: Mayagüez.

Notes: Reported by Mari Mutt 1979, Ospina-Sánchez 2011.

***Heteromurtrella puertoricensis* (Mari Mutt, 1979)**

Distribution: Endemic; Puerto Rico: Maricao, Mayagüez.

Notes: Reported by Mari Mutt 1979.

***Heteromurtrella tihuiensis* (Mari Mutt, 1985)**

Distribution: Endemic; Puerto Rico: Mayagüez.

Notes: Reported by Mari Mutt 1985b, Ospina-Sánchez 2011.

***Heteromurus* sp.**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

Family Entomobryidae

***Calx* sp.**

Distribution: Neotropical, Holarctic; Puerto Rico: Fajardo.

Notes: Reported by Samalot-Roque 2006, new record.

***Calx cubensis* (Folsom, 1927)**

Distribution: Neotropical; Puerto Rico.

Notes: Reported by Wolcott 1948 as *Entomobya cubensis*, Soto-Adames 2002b.

***Entomobrya linda* Soto-Adames, 2002**

Distribution: Neotropical; Puerto Rico: Humacao, Toa Baja.

Notes: Reported by Samalot-Roque 2006, new record.

***Entomobrya longiseta* Soto-Adames, 2002**

Distribution: Neotropical; Puerto Rico: Mayagüez, Luquillo, Orocovis.

Notes: Reported by Soto-Adames 2002b, Ospina-Sánchez 2011.

***Entomobrya* sp. "nov."**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Willowsia jacobsoni* (Börner, 1913)**

Distribution: Neotropical, Palearctic, Austral; Puerto Rico: Fajardo, Salinas.

Notes: Reported by Mari Mutt 1982, Mari Mutt and Gruia 1983, Samalot-Roque 2006.

***Seira blanca* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Carolina, Cabo Rojo, Fajardo, Humacao, Río Grande.

Notes: Reported by Mari Mutt 1986b, Soto-Adames 2002b, Samalot-Roque 2006.

***Seira brasiliiana* (Arlé, 1939)**

Distribution: Neotropical, Holarctic; Puerto Rico: Cabo Rojo, Carolina, Ceiba, Guayama, Peñuelas, Salinas, San Juan, Santa Isabel.

Notes: Reported by Mari Mutt 1986b, Samalot-Roque 2006.

***Seira desapercibida* Soto-Adames, 2002**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Soto-Adames 2002b.

***Seira dowlingi* (Wray, 1953)**

Distribution: Neotropical, Holarctic; Puerto Rico: Guánica, Luquillo.

Notes: Reported by Wray 1953, Mari Mutt 1986b, Samalot-Roque 2006.

***Seira steinmetzi* (Wray, 1953)**

Distribution: Neotropical, Holarctic; Puerto Rico: Bayamón, Guánica, Mayagüez.

Notes: Reported by Mari Mutt 1986b as *Seira distincta*.

***Lepidocyrtus caprilesi* Wray, 1953**

Distribution: Neotropical; Puerto Rico: Arecibo, Cayey, Guayama, Isabela, Las Marias, Luquillo, Manatí, Maricao, Mayagüez, Moca, Orocovis, Quebradillas, Río Grande, Utuado.

Notes: Reported by Wray 1953, Mari Mutt 1986a, Soto-Adames 2002a, Ospina-Sánchez 2011, Ospina-Sánchez 2019.

***Lepidocyrtus biphasis* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Aibonito, Aguadilla, Arecibo, Cabo Rojo, Cayey, Coamo, Guánica, Manatí, Moca, Utuado, Villalba.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a, Samalot-Roque 2006.

***Lepidocyrtus diminutus* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Cabo Rojo, Guánica, Mayagüez, Quebradillas.

Notes: Reported by Mari Mutt 1986a.

***Lepidocyrtus dispar* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Aguadilla, Cayey, Isabela, Luquillo, Manatí, Maricao, Mayagüez, Moca, Quebradillas, Río Grande, Utuado.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a, Ospina-Sánchez 2011.

***Lepidocyrtus distinctus* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Mayagüez.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a, Ospina-Sánchez 2011.

***Lepidocyrtus finicolus* Mari Mutt, 1988**

Distribution: Endemic; Puerto Rico: Aguadilla, Vieques.

Notes: Reported by Mari Mutt 1988, Soto-Adames 2002a.

***Lepidocyrtus griseolus* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Guánica, Mayagüez, Utuado.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a, Ospina-Sánchez 2011.

***Lepidocyrtus ianthinus* Mari Mutt, 1986**

Distribution: Neotropical; Puerto Rico: Cayey.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a.

***Lepidocyrtus lepargus* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Cabo Rojo, Guánica, Toa Baja.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a, Samalot-Roque 2006.

***Lepidocyrtus maldonadoi* Mari Mutt, 1986**

Distribution: Neotropical; Puerto Rico: Carite, Luquillo, Orocovi, Salinas, Villalba.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a.

***Lepidocyrtus nigrosetosus* Folsom, 1927**

Distribution: Neotropical; Puerto Rico: Adjuntas, Aguadilla, Arecibo, Barranquitas, Cabo Rojo, Caguas, Cayey, Ceiba, Coamo, Fajardo, Guayama, Humacao, Isabela, Manatí, Mayagüez, Morovis, Orocovi, Río Grande, Salinas, San Juan, San Sebastián, Toa Baja, Vega Baja.

Notes: Reported by Folsom 1927, Mari Mutt 1986a, Soto-Adames 2002a, Samalot-Roque 2006, Ospina-Sánchez 2011.

***Lepidocyrtus paracaprilesi* Mari Mutt, 1988**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Mari Mutt 1988, Soto-Adames 2002a, Ospina-Sánchez 2019.

***Lepidocyrtus ramosi* Mari Mutt, 1988**

Distribution: Endemic; Puerto Rico: Aguadilla, Añasco, Arecibo, Caguas.

Notes: Reported by Mari Mutt 1988, Soto-Adames 2002a.

***Lepidocyrtus vireticulus* Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Aguadilla, Mayagüez, San Sebastián.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a.

***Pseudosinella biunguiculata* Ellis, 1967**

Distribution: Neotropical; Puerto Rico: Aguadilla, Caguas, Manatí, Mayagüez, Utuado, Villalba.

Notes: Reported by Mari Mutt 1982, Mari Mutt 1986a, Soto-Adames 2002a, Samalot-Roque 2006, Ospina-Sánchez 2011.

***Pseudosinella lahainaensis* Christiansen & Luther, 1986**

Distribution: Neotropical; Puerto Rico: Arecibo.

Notes: Reported by Samalot-Roque 2006, new record.

***Pseudosinella violeta* (violets) Mari Mutt, 1986**

Distribution: Endemic; Puerto Rico: Arecibo, Cayey, Ceiba, Guayama, Isabela, Las Marias, Luquillo, Mayagüez, Orocovis, Río Grande, Toa Baja.

Notes: Reported by Mari Mutt 1986a, Soto-Adames 2002a, Samalot-Roque 2006, Ospina-Sánchez 2019, Soto-Adames, 2005 (unpublished data).

***Sulcuncus borincana* Mari Mutt & Gruia, 1983**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Mari Mutt and Gruia 1983.

***Sulcuncus coralia* Mari Mutt & Gruia, 1983**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Mari Mutt and Gruia 1983.

***Sulcuncus rapoporti* Massoud & Gruia, 1973**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Mari Mutt 1982 as *Metasinella rapoporti*, Mari Mutt and Gruia 1983.

***Sulcuncus topotypica* Bonet, 1944**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Mari Mutt 1977 as *Metasinella topotyca*.

***Sulcuncus subfusa* (Wray, 1953)**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Wray 1953.

Family Paronellidae***Campylothorax sabanus* (Wray, 1953) Mitra, 1975**

Distribution: Endemic; Puerto Rico: Luquillo, Mayagüez, Toa Baja.

Notes: Reported by Wray 1953 as *Gampylothorax sabanus*, Mari Mutt 1987, Samalot-Roque 2006, Ospina-Sánchez 2011.

***Trogolaphysa* sp.**

Distribution: Neotropical, Afrotropical; Puerto Rico: Luquillo.

Notes: Reported by Mari Mutt 1982.

***Trogolaphysa geminata* (Mari Mutt, 1987)**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Mari Mutt 1987, Ospina-Sánchez 2011.

***Trogolaphysa jataca* (Wray, 1953)**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Wray 1953 as *Dicranocentruga jataca*, Ospina-Sánchez 2011, Ospina-Sánchez 2019.

***Trogolaphysa luquillensis* (Mari Mutt, 1987)**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Mari Mutt 1987.

***Trogolaphysa riopedrensis* (Mari Mutt, 1987)**

Distribution: Neotropical; Puerto Rico: San Juan.

Notes: Reported by Mari Mutt 1987.

***Trogolaphysa subterranea* (Mari Mutt, 1987)**

Distribution: Endemic; Puerto Rico.

Notes: Reported by Mari Mutt 1987.

***Lepidonella marimutti* Soto-Adames & Bellini, 2015**

Distribution: Neotropical; Puerto Rico.

Notes: Reported by Mari Mutt 1987 as *Microparonella incerta*, Soto-Adames and Bellini 2015.

***Salina tristani* Denis, 1931**

Distribution: Neotropical; Puerto Rico: Aguadilla, Arecibo, Cabo Rojo, Luquillo, Mayagüez, Río Grande, Toa Baja.

Notes: Reported by Mari Mutt 1982, Mari Mutt 1987, Samalot-Roque 2006, Ospina-Sánchez 2011, Soto-Adames 2005 (unpublished data).

***Salina wolcottii* Folsom, 1927**

Distribution: Endemic; Puerto Rico: Bayamón, Isabela, Peñuelas San Juan.

Notes: Reported by Folsom 1927, Mari Mutt 1987.

***Cyphoderus inaequalis* Folsom, 1927**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Wolcott 1948, Ospina-Sánchez 2011.

***Cyphoderus similis* Folsom, 1927**

Distribution: Palearctic, Boreal, Neotropical; Puerto Rico: Arecibo, Cabo Rojo, Ceiba, Mayagüez, Toa Baja, Vega Baja.

Notes: Reported by Folsom 1927, Samalot-Roque 2006.

***Serroderus* sp. "nov."**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, Soto-Adames (unpublished data), new record.

Family Oncopoduridae***Oncopodura arecibena* Mari Mutt, 1984**

Distribution: Endemic; Puerto Rico: Arecibo, Luquillo.

Notes: Reported by Mari Mutt 1984, Ospina-Sánchez 2019.

Family Arrhopalitidae***Arrhopalites* sp.**

Notes: Reported by Ospina-Sánchez 2019, new record.

***Collophora quadrioculata* Denis, 1933**

Distribution: Neotropical, Palearctic; Puerto Rico: Adjuntas, Humacao, Mayagüez, San Sebastián.

Notes: Reported by Mari Mutt 1977, Samalot-Roque 2006, Ospina-Sánchez 2011.

Family Dicyrtomidae***Ptenothrix borincana* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Aibonito, Arecibo, Cayey, Las Marias, Mayagüez, Luquillo, Utuado, Villalba.

Notes: Reported by Soto-Adames 1988a, Ospina-Sánchez 2011, Soto-Adames (unpublished data).

***Dicyrtoma mangle* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Aguadilla.

Notes: Reported by Soto-Adames 1988a.

***Calvatomina discolor* (Schött, 1902) Betsch, 1980**

Distribution: Boreal, Neotropical, Palearctic; Puerto Rico: Aguadilla, Mayagüez.

Notes: Reported by Samalot-Roque 2006, new record.

***Calvatomina nymphascopula* Soto-Adames, 1988**

Distribution: Endemic; Puerto Rico: Aguadilla, Arecibo, Guayama, Cabo Rojo, Coamo, Mayagüez, San Juan, Toa Baja.

Notes: Reported by Soto-Adames 1988a, Samalot-Roque 2006.

***Calvatomina rufescens* (Reuter, 1890) Betsch, 1980**

Distribution: Boreal, Neotropical, Palearctic; Puerto Rico: Luquillo, Mayagüez.

Notes: Reported by Soto-Adames 1988a, Ospina-Sánchez 2011, Soto-Adames (unpublished data).

***Calvatomina* sp. "nov. nr. rossi"**

Distribution: Neotropical; Puerto Rico: Mayagüez, Toa Baja.

Notes: Reported by Samalot-Roque 2006, new record.

***Calvatomina* sp. "nov. 1"**

Distribution: Neotropical; Puerto Rico: Ceiba, Humacao, Mayagüez, Naguabo, Río Grande, San Juan, Toa Baja, Vega Baja.

Notes: Reported by Samalot-Roque 2006, new record.

***Calvatomina* sp. "nov. 2"**

Distribution: Neotropical; Puerto Rico: Mayagüez, Toa Baja.

Notes: Reported by Samalot-Roque 2006, new record.

***Calvatomina* sp. "nov. 3"**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, new record.

***Calvatomina* sp. "nov. 4"**

Distribution: Neotropical; Puerto Rico: Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, new record.

Family Sminthuridae

***Sphaeridia* sp. "nov. 1"**

Distribution: Neotropical; Puerto Rico: Arecibo, Guayama, Lajas, Patillas.

Notes: Reported by Samalot-Roque 2006, new record.

***Sphaeridia* sp. 1**

Distribution: Neotropical; Puerto Rico: Arecibo, Vega Baja.

Notes: Reported by Samalot-Roque 2006, new record.

***Sphaeridia* sp. 2**

Distribution: Neotropical; Puerto Rico: Arecibo, Guayama, Lajas, Patillas.

Notes: Reported by Samalot-Roque 2006, new record.

***Sphaeridia* sp. 3**

Distribution: Neotropical; Puerto Rico: Luquillo.

Notes: Reported by Soto-Adames (unpublished data), new record.

Family Sminthuridae

***Sphyrotheca aleta* Wray, 1953**

Distribution: Endemic; Puerto Rico: Luquillo.

Notes: Reported by Wray 1953, Ospina-Sánchez 2019.

Family Bourletielidae

***Stenognathriopes* sp. "nov."**

Distribution: Neotropical, Palearctic; Puerto Rico: Cabo Rojo, Ceiba.

Notes: Reported by Samalot-Roque 2006, new record.

***Bourletiella* sp.**

Distribution: Cosmopolitan; Puerto Rico: Isabela, Luquillo.

Notes: Reported by Mari Mutt 1977, Soto-Adames (unpublished data).

Family Neelidae***Neelides minutus* (Folsom, 1901) Bonet, 1947**

Distribution: Boreal, Neotropical, Palearctic; Puerto Rico: Luquillo.

Notes: Reported by Mari Mutt 1982, Soto-Adames (unpublished data).

***Neelus desantisi* Najt, 1971**

Distribution: Cosmopolitan; Puerto Rico: Luquillo; Puerto Rico: Luquillo.

Notes: Reported by Ospina-Sánchez 2019, new record.

***Neelus murinus* Folsom, 1896**

Distribution: Austral, Boreal, Neotropical, Palearctic; Puerto Rico: Luquillo, Mayagüez.

Notes: Reported by Ospina-Sánchez 2011, Soto-Adames (unpublished data), new record.

Analysis

Of the 33 families of springtails recognised worldwide (Bellinger et al. (2019), 17 have been reported from Greater Puerto Rico. Amongst the major cosmopolitan families, only Tomoceridae is not represented in the islands. Most small families, not reported from Greater Puerto Rico (i.e. Poduridae, Gulgastruridae, Pachytullbergiidae, Paleotullbergiidae, Mackenziellidae and Spinothecidae), represent divergent lineages endemic to geographical regions distant from the Caribbean and are unlikely to be found here. Sturmiidae is a Neotropical family of the small order Symphypleona that typically occur on epiphytic mosses. Mosses have not been widely sampled for springtails in Greater Puerto Rico and it is possible that *Sturmius* Bretfeld, 1994 may still be found in the Islands. Isotogastruridae, Coenaletidae are known from other Antilles (e.g. *Coenaletes* has been reported from Hispaniola and St. Croix) and they might likely occur in Greater Puerto Rico, although none has been recorded yet.

Politically, the Island is divided into 78 municipalities, 45 of them covered in this database (Fig. 3). According to the present inventory, the largest number of species comes from Luquillo (70 spp.), followed by Mayagüez (47 spp.) and Arecibo (17 spp., Table 1). The Collembola fauna in Puerto Rico is distributed in three principal habitats: forests, littorals

and caves. In this inventory, 127 species are reported in forests (including mangrove habitats). *Archisotoma goubaultae*, *A. interstitialis*, *S. aebianus*, *S. bellingeri*. *S. calcalectoris* and *S. myoptesimus* are reported from littorals habitats. *Sulcuncus topotypica*, *O. arecibena*, *T. subterranea* and *C. quadrioculata* were reported in caves. Amongst the listed species from Puerto Rico, 58 have Neotropical distribution, 54 are Endemic and 24 are present in more than three world regions.

In the present dataset, we report that the most abundant order is Entomobryomorpha with 73 species. Amongst Entomobryomorpha, the family with the largest number of species is Entomobryidae (33); followed by Isotomidae (17). Poduromorpha with 51, the families Neanuridae (25) and Hypogastruridae (10) have the largest number of species (Table 2). In Neelipelona and Symphypleona, most families are represented by a single species, except for Dicyrtomidae. *Lepidocyrtus* Bourlet, 1839 (Entomobryidae), is the genus best represented in the islands, with 14 species, followed by *Calvatolina* Yosii, 1966 (Dicyrtomidae) represented by 8 spp. (Fig. 2, Table 2).

Table 1. Municipalities sampled in Puerto Rico and number of Collembola species reported for each one.					
Municipality	No. of species	Municipality	No. of species	Municipality	No. of species
Adjuntas	2	Guajacata	2	Orocovis	5
Aguadilla	13	Guánica	10	Patillas	2
Aibonito	2	Guayama	9	Peñuelas	2
Añasco	1	Humacao	6	Quebradillas	4
Arecibo	17	Isabela	5	Río Grande	7
Barranquitas	1	Isla Mona	3	Salinas	6
Bayamón	2	Lajas	2	San Juan	7
Cabo Rojo	9	Las Marias	4	San Sebastián	4
Caguas	3	Luquillo	70	Santa Isabel	2
Carite	1	Manatí	5	Toa Baja	15
Carolina	2	Maricao	8	Utua	6
Cayey	11	Mayagüez	47	Vega Baja	4
Ceiba	14	Moca	4	Vieques	3
Coamo	3	Morovis	1	Villalba	4
Fajardo	3	Naguabo	2	Yabucoa	1

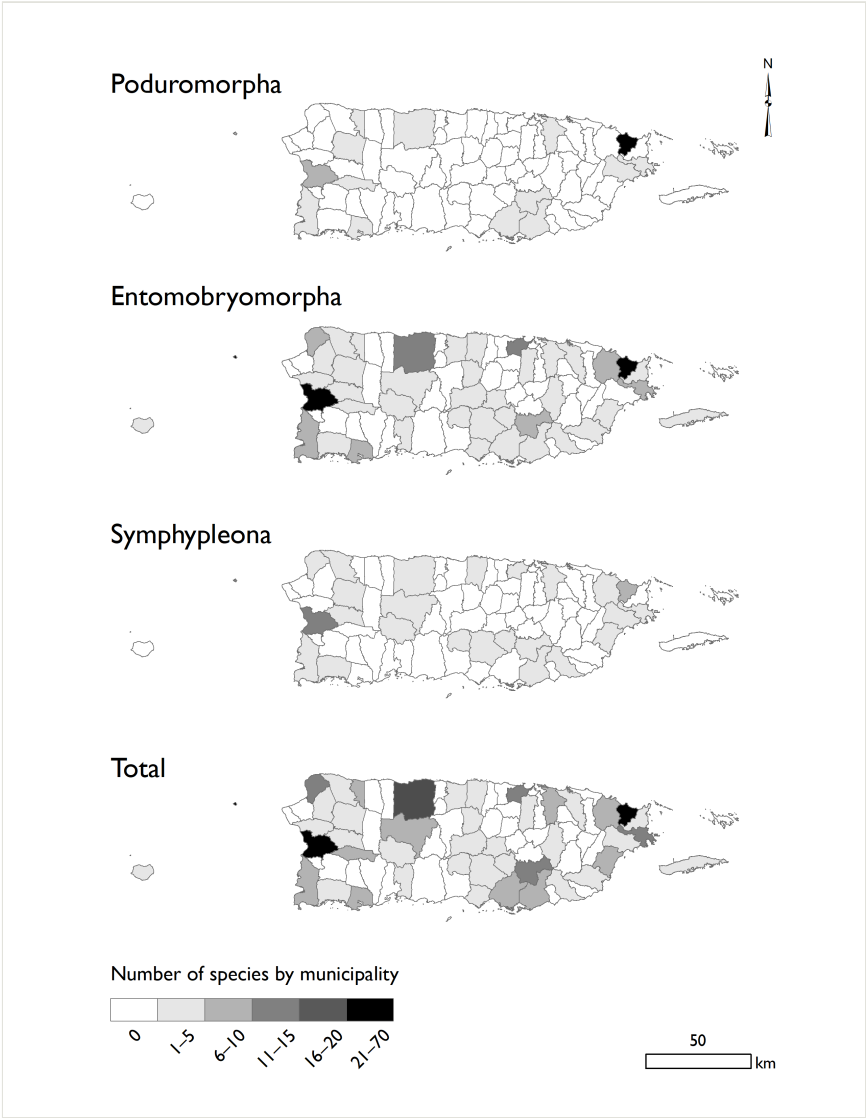


Figure 3. [doi](#)
Distribution of the recorded species of Collembola in Puerto Rico, darker areas indicate higher number of species in the locality.

Table 2. Distribution of Collembola species in Puerto Rico.				
Family	Genus	No. Genera	No. Species	No. Localities
Hypogastruridae	4	11	7	
	<i>Ceratophysella</i>		1	N.I.
	<i>Microgastrura</i>		2	1
	<i>Paraxenylla</i>		1	4
	<i>Xenylla</i>		7	4
Odontellidae		2	2	2
	<i>Odontella</i>		1	1
	<i>Superodontella</i>		1	1
Brachystomellidae		1	6	4
	<i>Brachystomella</i>		5	4
	<i>Folsomiella</i>		1	1
Neanuridae		12	24	8
	<i>Friesea</i>		3	1
	<i>Americanura</i>		1	1
	<i>Arlesia</i>		3	1
	<i>Neotropiella</i>		2	4
	<i>Pronura</i>		1	1
	<i>Hylaeonura</i>		2	1
	<i>Micranurida</i>		1	1
	<i>Pseudachorutes</i>		4	3
	<i>Pseudanurida</i>		1	N.I
	<i>Paranura</i>		3	5
	<i>Paleonura</i>		1	2
	<i>Sensillanura</i>		1	N.I
Onychiuridae		4	6	4
	<i>Orthonychiurus</i>		2	3
	<i>Onychiurus</i>		1	2
	<i>Protaphorura</i>		1	N.I.
	<i>Thalassaporura</i>		2	1
Tullbergiidae		2	3	2
	<i>Tullbergia</i>		1	1
	<i>Mesaphorura</i>		2	1
Isotomidae		11	17	24
	<i>Archisotoma</i>		2	N.I

Family	Genus	No. Genera	No. Species	No. Localities
	<i>Axelsonia</i>		1	6
	<i>Hemisotoma</i>		1	13
	<i>Proisotoma</i>		1	N.I.
	<i>Folsomia</i>		1	1
	<i>Folsomia</i>		2	N.I.
	<i>Folsomides</i>		3	6
	<i>Isotomodes</i>		1	1
	<i>Isotomiella</i>		2	8
	<i>Isotomurus</i>		2	2
	<i>Psammisotoma</i>		1	3
Actaletidae	<i>Spinactaletes</i>	1	4	7
Orchesellidae		3	5	3
	<i>Dicranocentrus</i>		2	2
	<i>Heteromurtella</i>		2	3
	<i>Heteromurus</i>		1	1
Entomobryidae		7	33	30
	<i>Calx</i>		2	1
	<i>Entomobrya</i>		3	6
	<i>Willowsia</i>		1	2
	<i>Seira</i>		5	13
	<i>Lepidocyrtus</i>		14	29
	<i>Pseudosinella</i>		3	19
	<i>Sulcuncus</i>		5	N.I.
Paronellidae		6	13	14
	<i>Campylothorax</i>		1	3
	<i>Trogolaphysa</i>		6	2
	<i>Lepidonella</i>		1	N.I.
	<i>Salina</i>		2	12
	<i>Cyphoderus</i>		2	7
	<i>Serroderus</i>		1	1
Oncopoduridae	<i>Oncopodura</i>	1	1	2
Collophoridae		2	2	5
	<i>Arrhopalites</i>		1	1
	<i>Collophora</i>		1	4
Dicyrtomidae		3	10	17
	<i>Ptenothrix</i>		1	9

Family	Genus	No. Genera	No. Species	No. Localities
	<i>Dicyrtoma</i>		1	1
	<i>Calvatomina</i>		8	14
Sminthurididae	<i>Sphaeridia</i>	1	3	6
Sminthuridae	<i>Sphyrotheca</i>	2	1	1
Bourletiellidae		2	2	3
	<i>Stenognathriopes</i>		1	1
	<i>Bourletiella</i>		1	2
Neelidae		2	3	2
	<i>Neelides</i>		1	1
	<i>Neelus</i>		2	2
N.I. No location Information				

Acknowledgements

This research was supported by Grant DEB 1239764 and 1546686 from the U.S. National Science Foundation to the Institute for Tropical Ecosystem Studies, University of Puerto Rico and to the International Institute of Tropical Forestry (IITF) USDA Forest Service, as part of the Luquillo Long-Term Ecological Research Program. The U.S. Forest Service (Department of Agriculture) Research and Development Unit and the University of Puerto Rico provided additional support. Thanks also to Michael J. and Barbara A. Richardson for their comments on an earlier version of this manuscript.

References

- Abrantes EA, Bellini BC, Bernardo AN, Fernandes LH, Mendonca MC, Oliveira EP, Queiroz GC, Sautter KD, Silveira TC, Zeppelini D (2010) Synthesis of Brazilian Collembola: an update to the species list. *Zootaxa* 2388: 1-22. <https://doi.org/10.11646/zootaxa.2388.1.1>
- Bellinger P, Christiansen K, Janssens F (2019) Checklist of the Collembola of the World 1996–2019. <http://www.collembola.org>. Accessed on: 2019-12-19.
- Christiansen K, Bellinger P (1988) Marine littoral collembola of North and Central America. *Bulletin of Marine Science* 42: 215-245.
- Christiansen K, Bellinger P (1995) The biogeography of Collembola. *Polskie Pismo Entomologiczne* 64 (1-4): 279-294.
- Culik M, Zeppelini FD (2003) Diversity and distribution of Collembola (Arthropoda: Hexapoda) of Brazil. *Biodiversity & Conservation* 12 (6): 1119-1143. <https://doi.org/10.1023/a:1023069912619>
- Da Gama M (1976) Systematique evolutive des Xenylla. VIII. Espèces provenant de plusieurs îles du Pacifique et des Indes-Occidentales, et de quelques régions d'Afrique, d'Asie et d'Amérique du Nord (Insecta: Collembola). *Revue suisse de Zoologie* 83: 317-327. <https://doi.org/10.5962/bhl.part.91442>

- Ewel JJ, Whitmore JL (1973) The Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands. Research Paper ITF-018. USDA Forest Service, Institute of Tropical Forestry
- Folsom JW (1927) Insects of the Subclass Apterygota from Central America and the West Indies. 72. Proceedings of the United States National Museum, 15 pp.
- Good R (1974) The geography of the flowering plants. Logman, London, 557 pp.
- Heatwole H, Levins R (1973) Biogeography of the Puerto Rican Bank. Species-turnover on small cay, Cayo Ahogado. Ecology 54: 1042-1055. <https://doi.org/10.2307/1935570>
- Helmer E, Ramos O, López T, Quiñónez M, Diaz W (2002) Mapping the forest type and land cover of Puerto Rico, a component of the Caribbean biodiversity hotspot. Caribbean Journal of Science 38 (3/4): 165-183.
- Mari Mutt JA (1976) The genera of Collembola (Insecta) in Puerto Rico: keys, diagnoses, and general comments. Journal of Agriculture of the University of Puerto Rico 60 (1): 113-128.
- Mari Mutt JA (1977) Nine new records of Collembola (Insecta) from Puerto Rico and the first record of the order from Tortola, British West Indies. The Journal of Agriculture of the University of Puerto Rico 61 (3): 405-408.
- Mari Mutt JA (1979) A revision of the genus *Dicranocentrus* Schött (Insecta: Collembola: Entomobryidae). The Journal of Agriculture of the University of Puerto Rico 63 (2): 214-222.
- Mari Mutt JA (1981) New genus, a new species, and complements to descriptions of seven neotropical *Dicranocentrus* (Collembola: Entomobryidae: Orchesellinae). The Journal of Agriculture of the University of Puerto Rico 65 (4): 361-373.
- Mari Mutt JA (1982) Observaciones preliminares sobre la distribución geográfica de los colémbolos de Puerto Rico (Insecta). Caribbean Journal of Science 18: 29-34.
- Mari Mutt JA, Gruia MM (1983) A revision of the genus *Metasinella* Denis (Collembola: Entomobryidae). Journal of Agriculture of the University of Puerto Rico Puerto Rico, Agricultural Experiment Station 67: 121-147.
- Mari Mutt JA (1984) Una nueva especie de *Oncopodura* de Puerto Rico (Collembola: Oncopoduridae). Caribbean Journal of Science 20: 163-167.
- Mari Mutt JA (1985a) Eight new species of *Dicranocentrus* and redescriptions for *D. thaicus* and *D. pilosus* (Collembola: Entomobryidae: Orchesellinae). The Journal of Agriculture of the University of Puerto Rico 69 (3): 297-322.
- Mari Mutt JA (1985b) A new species of *Heteromurus* from Puerto Rico (Collembola: Entomobryidae). Entomological News 96 (4): 145-147.
- Mari Mutt JA (1986a) Puerto Rican species of *Lepidocyrtus* and *Pseudosinella* (Collembola: Entomobryidae). Caribbean Journal of Science 1 (2): 1-48.
- Mari Mutt JA (1986b) Puerto Rican species of *Seira* (Collembola: Entomobryidae). Caribbean Journal of Science 22: 145-158.
- Mari Mutt JA (1987) Puerto Rican species of Paronellidae (Insecta: Collembola). Caribbean Journal of Science 23: 400-416.
- Mari Mutt JA (1988) Two new species of *Lepidocyrtus* from Puerto Rico and descriptive notes for *L. ramosi* Mari Mutt (Collembola: Entomobryidae). Caribbean Journal of Science 24 (3-4): 197-200.
- Ospina-Sánchez CM, Soto-Adames FN, González G (2019) Springtails (Arthropoda, Collembola) from Greater Puerto Rico: species list and distribution. Forest Service Research Data Archive, Fort Collins, CO. URL: <https://doi.org/10.2737/RDS-2018-0063>

- Ospina-Sánchez CM (2011) Caracterización de las poblaciones de colémbolos asociados a la hojarasca de un bosque secundario en Mayagüez, Puerto Rico. University of Puerto Rico, Mayaguez Campus, Mayaguez.
- Ospina-Sánchez CM (2019) Role of microhabitats and environment variation on Collembola (Hexapoda: Entognatha) populations in the Luquillo experimental forest: A montane environment. University of Puerto Rico, Rio Piedras Campus, San Juan, Puerto Rico.
- Ospina-Sánchez CM, Palacios-Vargas JG, González G (2020) New species of *Furculanurida* (Collembola, Neanuridae, Pseudachorutinae) from the Luquillo Mountains, Puerto Rico. ZooKeys 917 <https://doi.org/10.3897/zookeys.917.33020.figure2>
- Palacios Vargas JG, Díaz M (1995) Survey of the Onychiuridae (Collembola) from the Neotropical region. Anales del Instituto de Biología. Serie Zoología 66 (2): 165-180.
- Palacios-Vargas JG (1986) Nuevos registros y nuevas especies neotropicales de Friesea (Collembola: Neanuridae). Folia Entomológica Mexicana 70: 5-23.
- Palacios-Vargas JG, Soto-Adames FN (2017) On the genus *Paleonura* (Collembola: Neanuridae: Neanurinae) from the Americas and description of a new species from Puerto Rico. Zootaxa 4318: 388-394. <https://doi.org/10.11646/zootaxa.4318.2.11>
- Parés-Ramos IK, Gould WA, Aide TM (2008) Agricultural abandonment, suburban growth, and forest expansion in Puerto Rico between 1991 and 2000. Ecology and Society 13 (2): 1. <https://doi.org/10.5751/ES-02479-130201>
- Peck SB (1974) The invertebrate fauna of tropical American caves, part II: Puerto Rico, an ecological and zoogeographic analysis. Biotropica 6: 14-31. <https://doi.org/10.2307/2989693>
- Richardson BA, Richardson MJ, Soto-Adames FN (2005) Separating the effects of forest type and elevation on the diversity of litter invertebrate communities in a humid tropical forest in Puerto Rico. Journal of Animal Ecology 74 (5): 926-936. <https://doi.org/10.1111/j.1365-2656.2005.00990.x>
- Samalot-Roque B (2006) Diversidad de Collembola (Hexapoda) asociados a *Rhizophora mangle* en manglares de Puerto Rico. University of Puerto Rico, Mayaguez Campus, Mayaguez.
- Soto-Adames FN (1988a) Nuevos dicirtómidos de Puerto Rico (Insecta: Collembola: Dicyrtomidae). Caribbean Journal of Science 24 (1-2): 60-70.
- Soto-Adames FN (1988b) Revisión de la familia Actaletidae Börner, 1902 (Insecta: Collembola). Caribbean Journal of Science 24: 161-196.
- Soto-Adames FN (2002a) Molecular phylogeny of the Puerto Rican *Lepidocyrtus* and *Pseudosinella* (Hexapoda: Collembola), a validation of Yoshii's "color pattern species". Molecular Phylogenetics and Evolution 25 (1): 27-42. [https://doi.org/10.1016/S1055-7903\(02\)00250-6](https://doi.org/10.1016/S1055-7903(02)00250-6)
- Soto-Adames FN (2002b) Four new species and new records of springtails (Hexapoda: Collembola) from the US Virgin Islands and Puerto Rico, with notes on the chaetotaxy of *Metasinella* and *Seira*. Caribbean Journal of Science 38: 77-105.
- Soto-Adames FN, Bellini BC (2015) Dorsal chaetotaxy of neotropical species supports a basal position for the genus *Lepidonella* among scaled Paronellidae (Collembola, Entomobryoidea). Florida Entomologist 98: 330-341. <https://doi.org/10.1653/024.098.0152>

- Wolcott G (1948) The insects of Puerto Rico. The Journal of Agriculture of the University of Puerto Rico 32: 1-975.
- Wray D (1953) New Collembola from Puerto Rico. The Journal of Agriculture of the University of Puerto Rico 37 (2): 140-150.