

Annotated checklist of the springtails (Hexapoda: Collembola) of the Collo massif, northeastern Algeria

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Ptenothrix italica Dallai, 1973. Body size: 1.4 mm, immature.

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ABSTRACT

A checklist of the Collembola of the Collo massif in northeastern Algeria, the wettest region of northern Africa, is presented, based on the results of sampling campaigns carried out from 2011 to 2017. Before this work, only four species were reported from Collo in the literature. The Collembola of the massif include now a total of 74 species, in 53 genera and 17 families. Of the 74 recorded species, 26 are new for Algeria, and at least four are new to science and will be described in forthcoming papers. The most remarkable discoveries include an undescribed Pseudachorutinae Börner, 1906 provisionally assigned to the tropical genus *Kenyura* Salmon, 1954; *Sensillanura austriaca* (da Gama, 1963) a Neanurinae Börner, 1901, so far only known from the northern Alps; a second undescribed species of the so far monospecific Neanurinae genus *Edoughmura* Deharveng, Hamra-Kroua & Bedos, 2007; the first record of the genus *Subisotoma* Börner, 1901 in Algeria (Isotomidae Börner, 1913); an undescribed species of the genus *Pseudosinella* Schäffer, 1897, close to the recently described *P. najtae* Jordana, Barranco, Amezcua & Baquero, 2017 from Spain and remarkable by the ciliation of all its labral chaetae (Entomobryidae Tömösvary, 1882). This inventory makes the Collo massif the richest spot of Collembolan diversity today in Algeria. It also illustrates how large are the geographical gaps in our knowledge of the Algerian fauna.

KEY WORDS

Faunistic,
species list,
Northern Africa,
Kenyura sp.,
Sensillanura austriaca,
new records.

RÉSUMÉ

Liste annotée des collemboles (Hexapoda: Collembola) du massif de Collo, nord-est de l'Algérie.

Une liste des collemboles du massif de Collo dans le nord-est de l'Algérie, région la plus humide de l'Afrique du Nord, est présentée, sur la base des résultats de campagnes d'échantillonnage effectuées de 2011 à 2017. Avant ce travail, quatre espèces seulement avaient été signalées de Collo. Leur nombre est aujourd'hui de 74 espèces, pour 53 genres et 17 familles. Parmi ces 74 espèces, 26 sont nouvelles pour l'Algérie, et au moins quatre sont nouvelles pour la science et seront décrites dans de futurs articles. Parmi les découvertes les plus remarquables figurent un Pseudachorutinae Börner, 1906 inédit provisoirement placé dans le genre tropical *Kenyura* Salmon, 1954; *Sensillanura austriaca* (da Gama, 1963), un Neanurinae Börner, 1901 qui n'était connu que des Alpes du nord; une seconde espèce inédite du genre de Neanurinae *Edoughmura* Deharveng, Hamra-Kroua et Bedos, 2007 jusqu'ici monospécifique; la première citation du genre *Subisotoma* Börner, 1901 (Isotomidae Börner, 1913) pour l'Algérie; une espèce inédite du genre *Pseudosinella* Schäffer, 1897, proche de l'espèce récemment décrite *P. najtae* Jordana, Barranco, Amezcua & Baquero, 2017 d'Espagne, remarquable par la ciliation de toutes ses soies labrales (Entomobryidae Tömösvary, 1882). Ce travail fait aujourd'hui du massif de Collo le site le plus riche d'Algérie pour la diversité de sa faune collembologique. Il illustre aussi l'étendue des lacunes géographiques dans la connaissance de cette faune algérienne.

MOTS CLÉS

Faunistique,
liste d'espèces,
Afrique du Nord,
Kenyura sp.,
Sensillanura austriaca,
signalisations nouvelles.

INTRODUCTION

Collembola are well known as the most abundant soil hexapods in almost all habitats and all regions of the world. The first citations of Collembola from Algeria were those of Lucas (1846), who described seven new species. Contributions to Algerian fauna since 1846 are listed in Thibaud (2013), who gives 190 species for the whole country. The major contributions are those of Handschin (1926, 32 species cited); Cassagnau (1963, 30 species from northern Constantine region); Thibaud & Massoud (1980, 102 species for the whole country); Bretfeld (1997, 2001, 37 species of Symphyleona, including 10 new to science). Since 2013, six new species, all Poduromorpha, have been described (Arbea *et al.* 2013; Deharveng *et al.* 2015a, b; Zoughailech *et al.* 2016). Geographically, only a few sites have been surveyed: mostly the surroundings of Algiers and Constantine, and the Djurdjura massif, while other regions have never or only sporadically been sampled. Since the work of Thibaud & Massoud (1980), which concerned the whole Maghreb and is now outdated, several faunistic local inventories have been published, as short lists of species (Hamra-Kroua & Allatou 2003; Ait Mouloud *et al.* 2007; Hamra-Kroua & Deharveng 2010; Arbea *et al.* 2013; Brahim-Bounab *et al.* 2017). Collembola of the region of Constantine have been the focus of the pioneering work of Hamra-Kroua (2005). The present paper deals with the fauna of a well-delimited region north of Constantine, the Collo massif, which has a special ecological interest as the wettest region of northern Africa. The Collembolan fauna of this massif was only known until now by the description of three species of *Pseudachorutes* by Zoughailech *et al.* (2016) and the citation of *Deutonura zana* (Deharveng *et al.* 2015b) in the original description of this species.

MATERIAL AND METHODS

STUDY SITE (Fig. 1)

The Collo massif, part of the Tell Atlas of northern Africa, is located west of Annaba city and North of Constantine, and is bordered by the Mediterranean Sea to the North. It reaches 1183 m at its highest point. The climate is Mediterranean. The Collo massif is the wettest region of Algeria and the Maghreb, with up to 1800 mm per year at its highest elevation (Mebarki 2003). It is largely covered with forests dominated by cork oak (*Quercus suber* L.), with local stands of maritime pine (*Pinus pinaster* Aiton).

SAMPLING (Fig. 2)

Sampling was conducted between 2011 and 2017 in six localities of the Collo massif in the wilaya of Skikda (Fig. 1): Oued Z'hor (36°55'1.27"N, 6°19'33.28"E; altitude 78 m), Khenak Mayoune (36°59'17.97"N, 6°15'44.31"E, altitude 389 m), Siouane (36°55'42.88"N, 6°23'44.24"E, altitude 788 m), Kanoua (37°2'56.24"N, 6°25'1.99"E, altitude 595 m), Zitouna (36°59'10.53"N, 6°27'16.71"E, altitude 594 m) and Azakor et Oueldja (37°1'21.11"N, 6°20'14.03"E, altitude 354 m). We sampled the most representative soil habitats of the Collo forests, including litter layer (54 samples), soil layer (22 samples), rotten wood (30 samples), moss (26 samples), and various wet habitats (18 samples). A total of 150 samples were collected, mostly from September to April, which are the most humid months in the Collo region.

SORTING, IDENTIFICATION AND MATERIAL DEPOSIT

Substrate samples were put on Berlese funnels when back from the field. The extraction was done in a dry room of the Laboratoire de Biosystème et Écologie des Arthropodes in Constantine. It varied from four to eight days depending



FIG. 1. — Localisation of the Collo massif in northeastern Algeria (A, B), and sampling sites (C).

on the substrate, at room temperature and without heating. Specimens were stored in 70% ethanol and sorted under a Leica MZ16 stereomicroscope. Representative adult-size specimens of each recognized morphospecies were cleared in lactic acid, and mounted on slides in Marc-André II for identification on a Leica DMLB2 microscope with Differential Interference Contrast (DIC). Photographs of species given in the text were taken from specimens in ethanol using a Jenoptik ProgRes C10+ camera mounted on the stereomicroscope. The collected specimens listed in Table 1 are deposited in the Muséum national d'Histoire naturelle (Paris, France) as a provisional work collection, and in the Laboratoire de Biosystématique et Écologie des Arthropodes, Université des Frères Mentouri Constantine 1 (Algeria).

CHECKLIST

The 150 samples we analyzed contained 7609 specimens in 74 species, 53 genera and 17 families. Among them, 63 have been identified as described species and 11 have been sorted as morphospecies but could not be identified at the specific level; four species are new to science and will be described in forthcoming papers. Twenty-six of the 74 species are new records for Algeria. For each species of our samples in Collo, the number of localities, number of occurrences, and abundance are given in Table 1.

The checklist includes type locality (for species described from Algeria), citation(s) from Algeria outside Collo, global distribution and remarks. Citations include only published data.

TABLE 1. — Collembola species recorded from the Collo Massif (Algeria). The taxonomic nomenclature follows the reference list of Fauna Europaea (Deharveng 2013). The taxonomic hierarchy follows Deharveng (2004).

Species	New for Algeria	New for science	No. sites	No. samples	No. specimens	number of samples					number of specimens						
						El Ouedja	Kanoua	Khenak Mayoune	Oued Z'hor	Siouane	Zitouna	El Ouedja	Kanoua	Khenak Mayoune	Oued Z'hor	Siouane	Zitouna
Poduromorpha																	
Hypogastruridae																	
1 <i>Ceratophysella armata</i> (Nicolet, 1842)	-	-	3	14	25	0	1	4	9	0	0	0	1	7	17	0	0
2 <i>Ceratophysella gibbosa</i> (Bagnall, 1940)	-	-	1	4	16	0	0	0	4	0	0	0	0	0	16	0	0
3 <i>Ceratophysella tergilobata</i> (Cassagnau, 1954)	-	-	2	3	4	0	0	0	1	2	0	0	0	0	1	3	0
4 <i>Mesachorutes quadriocellatus</i> Absolon, 1900	-	-	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0
5 <i>Microgastrura minutissima</i> (Mills, 1934)	x	-	1	2	2	0	0	0	2	0	0	0	0	0	2	0	0
6 <i>Willemia</i> sp.	-	-	1	1	2	0	0	0	1	0	0	0	0	0	2	0	0
7 <i>Xenylla brevisimilis mediterranea</i> Stach, 1949	-	-	4	15	144	0	1	3	10	1	0	0	1	3	139	1	0
Brachystomellidae																	
8 <i>Brachystomella parvula</i> (Schäffer, 1896)	-	-	1	2	4	0	0	0	2	0	0	0	0	0	4	0	0
Neanuridae																	
Frieseinae																	
9 <i>Friesea afurcata</i> (Denis, 1926)	x	-	1	3	4	0	0	0	3	0	0	0	0	0	4	0	0
10 <i>Friesea decemoculata</i> Börner, 1903	x	-	2	3	7	0	0	0	2	1	0	0	0	0	6	1	0
11 <i>Friesea espunaensis</i> Arbea & Jordana, 1993	-	-	4	17	51	0	1	6	9	1	0	0	1	12	37	1	0
12 <i>Friesea laouina</i> Deharveng & Hamra-Kroua, 2004	-	-	6	57	307	1	3	12	26	12	3	2	3	44	224	26	8
13 <i>Friesea major</i> Hamra-Kroua, Jordana & Deharveng, 2009	-	-	1	3	3	0	0	0	3	0	0	0	0	0	3	0	0
Neanurinae																	
14 <i>Bilobella aurantiaca</i> (Caroli, 1912)	-	-	6	41	338	5	5	5	21	4	1	73	32	12	196	24	1
15 <i>Deutonura zana</i> Deharveng, Zoughailech, Hamra-Kroua & Porco, 2015	-	-	4	10	53	4	0	2	2	0	2	37	0	6	4	0	6
16 <i>Edoughnura</i> sp.	x	x	2	6	8	0	0	2	4	0	0	0	0	2	6	0	0
17 <i>Protanura pseudomuscorum</i> (Börner, 1903)	-	-	6	49	590	4	4	6	24	8	3	117	4	31	352	18	68
18 <i>Sensillanura austriaca</i> (Gama, 1963)	x	-	3	15	50	0	0	3	10	1	0	0	0	4	45	1	0
Pseudachorutinae																	
19 <i>Kenyura</i> sp.	x	x	4	8	9	1	2	0	4	1	0	1	2	0	3	3	0
20 <i>Micranurida candida</i> Cassagnau, 1952	x	-	4	7	83	1	3	0	1	2	0	11	69	0	1	2	0
21 <i>Pseudachorudina meridionalis</i> (Bonet, 1929)	-	-	2	5	9	0	0	1	4	0	0	0	0	2	7	0	0
22 <i>Pseudachorutella asigillata</i> (Börner, 1901)	-	-	5	13	31	2	1	1	8	1	0	5	1	2	22	1	0
23 <i>Pseudachorutes deficiens</i> Zoughailech, Hamra-Kroua & Deharveng, 2016	-	-	4	14	266	0	6	2	3	3	0	0	256	2	5	3	0
24 <i>Pseudachorutes labiatus</i> Zoughailech, Hamra-Kroua & Deharveng, 2016	-	-	2	2	10	0	1	1	0	0	0	0	1	9	0	0	0
25 <i>Pseudachorutes octosensillatus</i> Zoughailech, Hamra-Kroua & Deharveng, 2016	-	-	1	3	6	0	0	0	3	0	0	0	0	0	6	0	0
Odontellidae																	
26 <i>Superodontella lamellifera</i> (Axelson, 1903)	-	-	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0
27 <i>Superodontella tayaensis</i> Arbea, Brahim-Bounab & Hamra-Kroua, 2013	-	-	3	8	76	0	2	2	4	0	0	0	9	2	65	0	0
28 <i>Xenyllodes armatus</i> Axelson, 1903	-	-	4	14	106	0	7	1	2	4	0	0	75	0	8	23	0
Onychiuridae																	
29 <i>Deuteraphorura cebennaria</i> (Gisin, 1956)	x	-	3	11	77	1	1	0	9	0	0	1	1	0	75	0	0
30 <i>Protaphorura armata</i> (Tullberg, 1869)	-	-	4	21	53	0	3	1	8	9	0	0	7	1	21	24	0
31 <i>Protaphorura fimata</i> (Gisin, 1952)	x	-	1	1	28	0	0	0	1	0	0	0	0	0	28	0	0
32 <i>Protaphorura pannonica</i> (Haybach, 1960)	x	-	1	4	14	0	0	4	0	0	0	0	0	14	0	0	0
Tullbergiidae																	
33 <i>Mesaphorura critica</i> Ellis, 1976	x	-	1	2	2	0	0	0	2	0	0	0	0	0	2	0	0
34 <i>Mesaphorura macrochaeta</i> Rusek, 1976	-	-	3	7	25	0	2	1	4	0	0	0	14	1	10	0	0
Entomobryomorpha																	
Isotomidae																	
35 <i>Folsomia penicula</i> Bagnall, 1939	x	-	5	62	386	1	12	15	24	10	0	4	103	127	133	19	0
36 <i>Folsomia quadrioculata</i> (Tullberg, 1871)	-	-	2	2	19	0	0	1	1	0	0	0	0	18	1	0	0

Table 1. — Continuation.

Species	New for Algeria	New for science	No. sites	No. samples	No. specimens	number of samples						number of specimens					
						El Ouedja	Kanoua	Khenak Mayoune	Oued Z'hor	Siouane	Zitouna	El Ouedja	Kanoua	Khenak Mayoune	Oued Z'hor	Siouane	Zitouna
37 <i>Folsomides angularis</i> (Axelson, 1905)	x	-	1	2	101	0	0	0	0	2	0	0	0	0	101	0	
38 <i>Folsomides parvulus</i> Stach, 1922	-	-	4	9	55	0	1	3	3	2	0	0	16	25	3	11	0
39 <i>Hemisotoma thermophila</i> (Axelson, 1900)	-	-	3	12	120	0	1	0	10	1	0	0	3	0	111	6	0
40 <i>Isotoma viridis</i> Bourlet, 1839	-	-	1	4	8	0	0	0	4	0	0	0	0	0	8	0	0
41 <i>Isotomiella minor</i> (Schäffer, 1896)	-	-	5	43	266	1	2	4	23	13	0	4	4	10	151	97	0
42 <i>Isotomurus</i> sp.	x	x	1	6	25	0	0	0	6	0	0	0	0	0	25	0	0
43 <i>Parisotoma notabilis</i> (Schäffer, 1896)	-	-	4	14	48	1	3	0	3	7	0	1	4	0	15	28	0
44 <i>Proctostephanus sanctiaugustini</i> Cassagnau, 1963	-	-	3	25	200	0	0	2	22	0	1	0	0	2	197	0	1
45 <i>Proisotoma minuta</i> (Tullberg, 1871)	-	-	4	262	953	0	5	4	4	13	0	0	551	107	37	2258	0
46 <i>Subisotoma meridionalis</i> (Dallai, 1973)	x	-	1	3	39	0	0	0	3	0	0	0	0	0	39	0	0
47 <i>Tetracanthella pilosa</i> Schött, 1891	x	-	1	2	2	0	0	0	0	2	0	0	0	0	2	0	0
Oncopoduridae																	
48 <i>Oncopodura crassicornis</i> Shoebbotham, 1911	-	-	3	17	82	0	6	10	1	0	0	0	52	24	6	0	0
Tomoceridae																	
49 <i>Tomocerus minor</i> (Lubbock, 1862)	-	-	3	8	12	1	2	0	5	0	0	3	4	0	5	0	0
Cyphoderidae																	
50 <i>Cyphoderus albinus</i> (cf.) Nicolet, 1842	-	-	2	3	6	0	0	0	1	2	0	0	0	0	1	5	0
51 <i>Cyphoderus</i> sp.	x	-	2	2	3	0	0	1	1	0	0	0	0	2	1	0	0
Entomobryidae																	
52 <i>Entomobrya multifasciata</i> (cf.) (Tullberg, 1871)	-	-	1	4	4	0	0	0	4	0	0	0	0	0	4	0	0
53 <i>Heteromurus major</i> (Moniez, 1889)	-	-	6	49	231	2	8	13	17	8	1	11	74	62	60	23	1
54 <i>Heteromurus tetraphthalmus</i> Börner, 1903	-	-	3	23	246	1	0	0	8	14	0	2	0	0	18	226	0
55 <i>Lepidocyrtus lignorum</i> (Fabricius, 1775)	-	-	1	9	17	0	0	0	9	0	0	0	0	0	17	0	0
56 <i>Lepidocyrtus</i> sp.	x	-	3	6	11	0	0	1	4	0	1	0	0	1	9	0	1
57 <i>Orchesella quinquefasciata</i> (Bourlet, 1841)	-	-	2	6	20	0	0	1	5	0	0	0	0	5	15	0	0
58 <i>Pseudosinella</i> sp. 1	x	x	2	4	6	0	0	0	3	1	0	0	0	0	5	1	0
59 <i>Pseudosinella</i> sp. 2	x	-	1	2	3	0	0	2	0	0	0	0	0	3	0	0	0
60 <i>Seira domestica</i> (Nicolet, 1842)	-	-	3	6	16	0	0	1	2	3	0	0	0	1	9	6	0
61 <i>Seira</i> sp.	-	-	2	2	2	0	0	0	1	0	1	0	0	0	1	0	1
Symphyleona																	
Arrhopalitidae																	
62 <i>Arrhopalites infrasecondarius</i> (cf.) Loksa & Rubio, 1966	x	-	4	11	18	0	2	3	4	2	0	0	5	6	4	3	0
Dicyrtomidae																	
63 <i>Dicyrtomidae</i> sp.	-	-	1	1	2	0	0	0	1	0	0	0	0	0	2	0	0
64 <i>Dicyrtomina ornata</i> (Nicolet, 1842)	-	-	1	1	2	0	0	0	1	0	0	0	0	0	2	0	0
65 <i>Ptenothrix italica</i> Dallai, 1973	x	-	2	2	5	0	0	0	1	1	0	0	0	0	2	3	0
Katiannidae																	
66 <i>Sminthurinus niger</i> (Lubbock, 1868)	-	-	5	12	39	0	2	3	3	3	1	0	2	10	11	15	1
67 <i>Sminthurinus signatus</i> (Krausbauer, 1898)	x	-	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0
Sminthuridae																	
68 <i>Allacma</i> sp.	-	-	1	2	3	0	0	0	2	0	0	0	0	0	3	0	0
69 <i>Caprainea echinata</i> (Stach, 1930)	-	-	3	18	35	0	0	7	9	2	0	0	0	11	21	3	0
70 <i>Lipothrix lubbocki</i> (Tullberg, 1872)	-	-	2	11	27	0	0	5	6	0	0	0	0	16	11	0	0
Sminthurididae																	
71 <i>Sminthurides signatus</i> (Krausbauer, 1898)	x	-	1	2	3	0	0	0	2	0	0	0	0	0	3	0	0
72 <i>Sphaeridia pumilis</i> (Krausbauer, 1898)	-	-	4	25	118	0	6	5	12	2	0	0	40	33	43	2	0
Neelipleona																	
Neelidae																	
73 <i>Megalothorax perspicillum</i> Schneider & D'Haese, 2013	x	-	4	32	56	0	6	3	16	2	0	0	15	23	16	2	0
74 <i>Neelus murinus</i> Folsom, 1896	x	-	4	8	14	1	1	2	4	0	0	5	1	3	5	0	0
Total	26	4			7609	5	23	22	59	38	3	277	1351	643	2306	2944	88

Order PODUROMORPHA Börner, 1913
Family HYPOGASTRURIDAE Börner, 1913
Genus *Ceratophysella* Börner, 1932

Ceratophysella armata (Nicolet, 1842)

Podura armata Nicolet, 1842: 57.

Ceratophysella armata – Stach 1949: 126.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Thibaud & Massoud (1980: 514), Handschin (1926: 117; 1928: 4, as *Hypogastrura armata* (Nicolet, 1841); Ait-Mouloud *et al.* (2007: 151, as *Ceratophysella* gr. *armata*).

DISTRIBUTION. — Holarctic region (Thibaud *et al.* 2004).

REMARK

Frequent in our samples.

Ceratophysella gibbosa (Bagnall, 1940)

Achorutes gibbosus Bagnall, 1940: 165.

Ceratophysella gibbosa – Stach 1949: 138.

CITATION FROM ALGERIA OUTSIDE COLLO. — Baquero *et al.* (2009: 68).

DISTRIBUTION. — Holarctic region (Thibaud *et al.* 2004).

REMARK

Rare in our samples, only collected in Oued Z'hor. Specimens are identical to those of Europe for diagnostic characters, but Collo populations include a large proportion of strongly modified ecomorphic specimens, all immatures, which are not present in European populations we have seen so far: maxilla and mandible are degenerated and desclerified, chaetae of labium are shortened, eye size is reduced, unguiculus and mucro are shortened, uneven boss of Abd. V is stronger, and dorsal macrochaetae are distinctly capitated.

Ceratophysella tergilobata (Cassagnau, 1954)

Hypogastrura tergilobata Cassagnau, 1954: 239.

Ceratophysella tergilobata – Cassagnau 1959: 502.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 198); Thibaud & Massoud (1980: 515).

DISTRIBUTION. — Mediterranean region, Japan, Southeast Asian (Thibaud *et al.* 2004).

REMARK

Rare in our samples.

Genus *Mesachorutes* Absolon, 1900

Mesachorutes quadriocellatus Absolon, 1900

Mesachorutes quadriocellatus Absolon, 1900: 267.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 205); Thibaud & Massoud (1980: 515).

DISTRIBUTION. — Euro-Mediterranean region (Thibaud *et al.* 2004).

REMARK

Very rare in our samples, a single specimen from rotten wood at Siouane.

Genus *Microgastrura* Stach, 1922

Microgastrura minutissima (Mills, 1934)

Achorutes (*Schöttella*) *minutissimus* Mills, 1934: 14.

Microgastrura minutissima – Stach 1949: 256.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — USA, Canada, Mexico, Western Mediterranean region (Thibaud *et al.* 2004; Thibaud 2017).

REMARK

Very rare in our samples, only recorded in leaf litter from Oued Z'hor.

Genus *Willemia* Börner, 1901

Willemia sp.

NEW DATA. — We separate here two specimens that belong to the genus *Willemia* (no eyes, no pigment, post-antennal organ present, ventral tube with 4 + 4 chaetae, no furca), but could not be identified at the species level.

CITATION OF THE GENUS FROM ALGERIA OUTSIDE COLLO. — The species *Willemia anophthalma* Börner, 1901 has been identified from littoral habitats by Delamare-Deboutteville (1954: 295) cited by Thibaud & Massoud (1980: 515).

DISTRIBUTION. — Cosmopolitan genus.

REMARK

Very rare in our samples, only recorded from Oued Z'hor.

Genus *Xenylla* Tullberg, 1869

Xenylla brevisimilis mediterranea Stach, 1949

Xenylla brevisimilis mediterranea Stach, 1949: 73.

CITATION FROM ALGERIA OUTSIDE COLLO. — Arbea *et al.* (2013: 178).

DISTRIBUTION. — Euro-Mediterranean region (Thibaud *et al.* 2004).

REMARK

Frequent in our samples.



FIG. 2. — Massif of Collo, Oued Z'hor village (Algeria). Photo: S. Hamra-Kroua.

Family BRACHYSTOMELLIDAE Stach, 1949
Genus *Brachystomella* Agren, 1903

Brachystomella parvula (Schäffer, 1896)

Schöttella parvula Schäffer, 1896: 176.

Brachystomella parvula – Stach 1925: 81.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 5, as *Schöttella parvula*); Thibaud & Massoud (1980: 516); Ait-Mouloud *et al.* (2007: 151); Hamra-Kroua & Cancela da Fonseca (2009: 36); Brahim-Bounab *et al.* (2017: 968).

DISTRIBUTION. — Cosmopolitan (Fjellberg 1998), but its presence as native in the tropics and Southern Hemisphere is uncertain (Mari-Mutt & Bellinger 1990; Greenslade 1994; Thibaud 2013).

REMARK

Very rare in our samples, a few juveniles from soil in Oued Z'hor.

Family NEANURIDAE Börner, 1901

Subfamily FRIESEINAE Massoud, 1967

REMARK

With five species of *Friesea* von Dalla Torre, 1895, the Frieseinae fauna of Collo can be considered as rich compared to similar European lowland regions (Izarra 1980 for Massane forest in southeastern Pyrenees, Schulz 2015 for Corsica for instance).

Genus *Friesea* von Dalla Torre, 1895

Friesea afurcata (Denis, 1926)

Polyacanthella afurcata Denis, 1926: 10.

Friesea afurcata – Denis 1931: 87.

NEW DATA. — First record of the species for Algeria, but cited as *Friesea ladeiroi* Gama, 1959 from several localities outside Collo: Hamra-Kroua *et al.* (2009: 65); Hamra-Kroua & Deharveng (2010: 62); Brahim-Bounab *et al.* (2014: 41; 2017: 967).

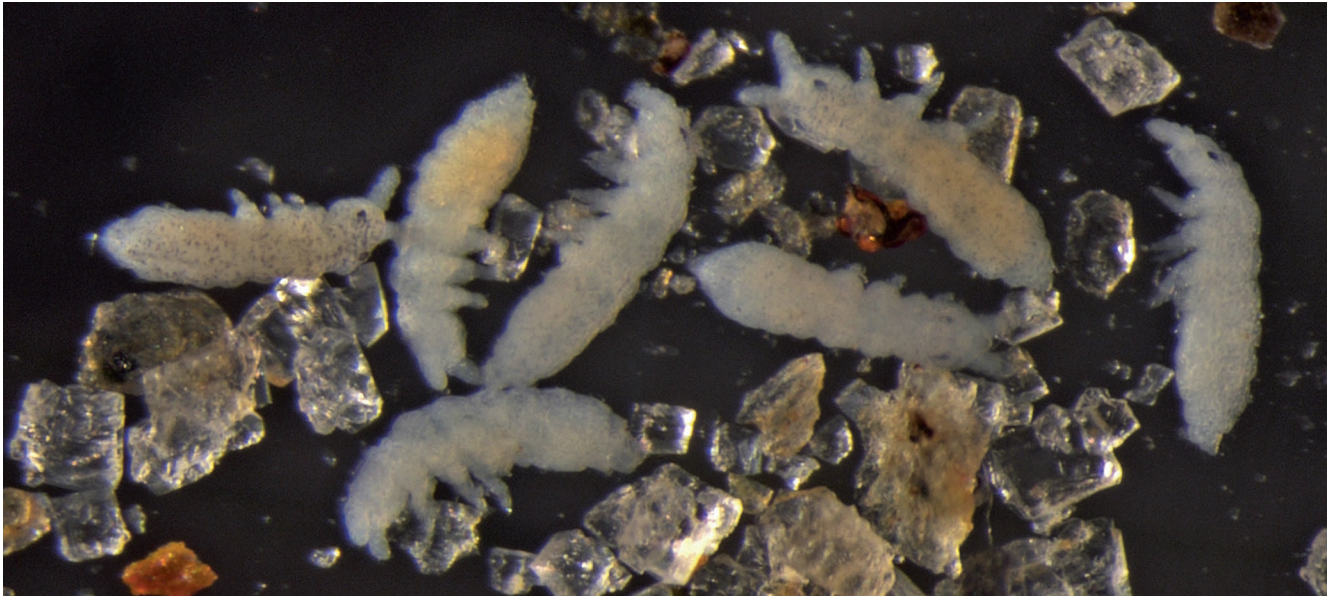


FIG. 3. — *Friesea laouina* Deharveng & Hamra-Kroua, 2004. Body size: 0.8-0.9 mm.

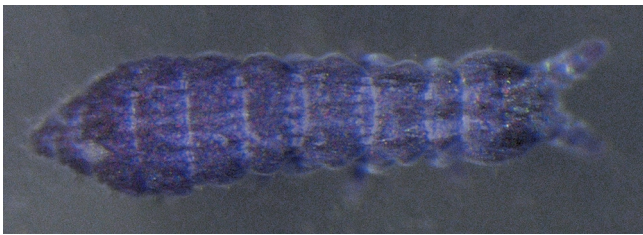


FIG. 4. — *Friesea major* Hamra-Kroua, Jordana & Deharveng, 2009. Body size: 1.2 mm.

DISTRIBUTION. — Europe (Deharveng 2013).

REMARK

Rare in our samples, only recorded in rotten wood from Oued Z'hor. The Collo specimens, and those cited in the literature from Algeria, correspond to *F. afurcata* rather than *F. ladeiroi*. The two species are very similar, but can be distinguished by their posterior chaetae (serrated versus smooth) and the presence vs absence of chaeta a² on the fifth abdominal tergite.

Friesea decemocolata Börner, 1903

Friesea decemocolata Börner, 1903: 134.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Euro-Mediterranean region (Deharveng 2013).

REMARK

Rare in our samples, only in Oued Z'hor and Siouane from litter and rotten wood.

Friesea espunaensis Arbea & Jordana, 1993

Friesea espunaensis Arbea & Jordana, 1993: 9.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Brahim-Bounab *et al.* (2014: 42; 2017: 967).

DISTRIBUTION. — Spain (Arbea & Jordana 1997) and Algeria.

REMARK

Frequent in our samples.

Friesea laouina

Deharveng & Hamra-Kroua, 2004
(Fig. 3)

Friesea laouina Deharveng & Hamra-Kroua, 2004: 141.

TYPE LOCALITY. — Algeria, Edough massif.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Deharveng & Hamra-Kroua (2004: 141); Hamra-Kroua & Deharveng (2010: 62); Thibaud (2013: 234); Brahim-Bounab *et al.* (2014: 42); Brahim-Bounab *et al.* (2017: 967).

DISTRIBUTION. — Endemic of Algeria (Deharveng & Hamra-Kroua 2004).

REMARK

Very frequent in our samples.

Friesea major

Hamra-Kroua, Jordana & Deharveng, 2009
(Fig. 4)

Friesea major Hamra-Kroua, Jordana & Deharveng, 2009: 65.

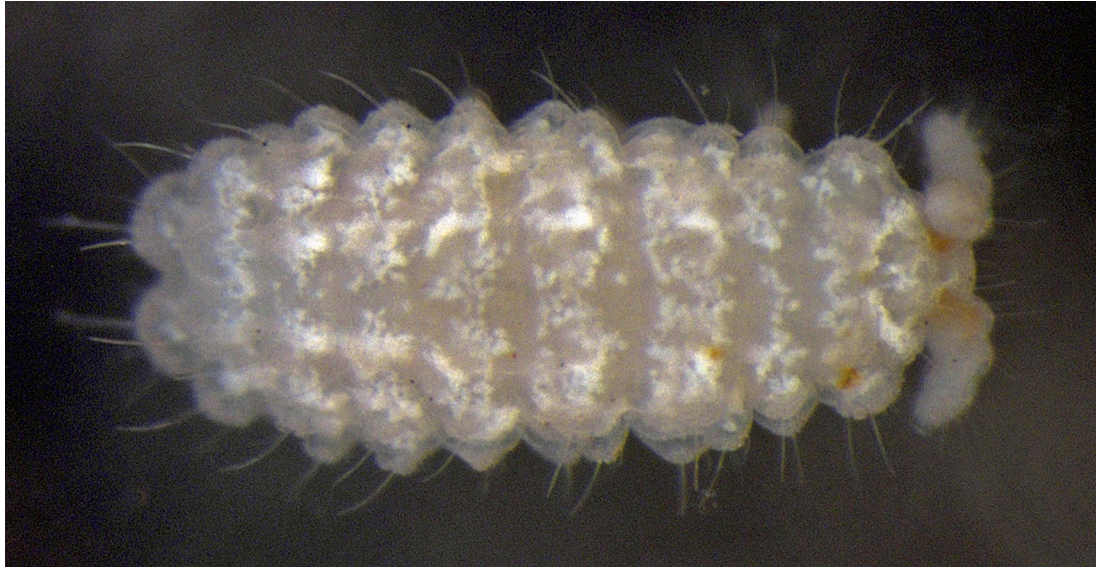


FIG. 5. — *Bilobella aurantiaca* (Caroli, 1912). Body size: 1.5 mm.

TYPE LOCALITY. — Algeria, Edough massif.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Hamra-Kroua *et al.* (2009: 65); Arbea *et al.* (2013: 78); Thibaud (2013: 234); Brahim-Bounab *et al.* (2014: 42; 2017: 967).

DISTRIBUTION. — Endemic of Algeria (Hamra-Kroua *et al.* 2009).

REMARK

Rare in our samples, only recorded in leaf litter and moss from Oued Z'hor.

Subfamily NEANURINAE Börner, 1901

REMARK

With five species in five genera, the Neanurinae of Collo are diversified at a level comparable to other Mediterranean regions of similar size (for example different massifs of the Italian Peninsula: Dallai 1967, 1970, 1971; Dallai & Martinozzi 1980). However, the Neanurinae fauna of Collo is unique by the absence of *Neanura muscorum* (Templeton, 1835), the presence of the morphologically unusual genus *Edoughmura* Deharveng, Hamra-Kroua & Bedos, 2007, and the unexpected discovery of *Sensillanura austriaca* Gama, 1963.

Genus *Bilobella* Caroli, 1912

Bilobella aurantiaca (Caroli, 1912)
(Fig. 5)

Achorutes (Bilobella) aurantiacus Caroli, 1912: 367.

Bilobella aurantiaca – Stach 1951: 88.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1926: 119, as *Achorutes aurantiacus*); Cassagnau (1963: 198, as *Neanura*

aurantiaca); Thibaud & Massoud (1980: 516); Hamra-Kroua & Allatou (2003: 22); Ait-Mouloud *et al.* (2007: 151); Deharveng *et al.* (2007: 57); Baquero *et al.* (2009: 68); Hamra-Kroua & Deharveng (2010: 62); Arbea *et al.* (2013: 178); Brahim-Bounab *et al.* (2017: 967).

DISTRIBUTION. — Mediterranean region (Arbea & Jordana 1997).

REMARK

Very frequent in our samples, especially in rotten wood. Collo is the easternmost location of the species in Northern Africa.

Genus *Deutonura* Cassagnau, 1979

Deutonura zana

Deharveng, Zoughailech, Hamra-Kroua & Porco, 2015
(Fig. 6)

Deutonura zana Deharveng, Zoughailech, Hamra-Kroua & Porco, 2015: 282.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Deharveng *et al.* (2015b: 281); Brahim-Bounab *et al.* (2017: 967).

DISTRIBUTION. — Endemic of Collo and Edough massifs in north-eastern Algeria (Deharveng *et al.* 2015b).

REMARK

Frequent in our samples. Described from the Edough massif, *D. zana* is the only species of *Deutonura* present in Collo. It is morphologically closer to species of the Southern Alps than to Italian species of the genus. A significant genetic differentiation was observed between the populations of *Deutonura zana* from Collo and that from Edough (Deharveng *et al.* 2015b).



FIG. 6. — *Deutonura zana* Deharveng, Zoughailech, Hamra-Kroua & Porco, 2015. Body size: 1 to 1.5 mm.

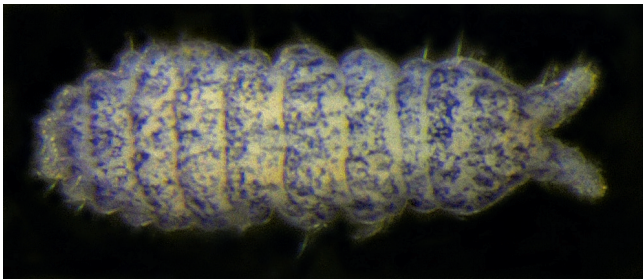


FIG. 7. — *Edoughnura* sp. Body size: 0.7 mm.

Genus *Edoughnura*
Deharveng, Hamra-Kroua & Bedos, 2007

Edoughnura sp.
(Fig. 7)

NEW DATA. — One species of *Edoughnura*, new to science, has been found in the Collo massif.

DISTRIBUTION. — The genus *Edoughnura* was so far represented by a single species (*E. rara* Deharveng, Hamra-Kroua & Bedos, 2007) endemic to the Edough massif.

REMARK

Rather frequent in our samples. The genus *Edoughnura* is morphologically very isolated in the tribe Neanurini by the modification of the distal tooth of its mandibles into a long ciliated flagellum, as well as by several chaetotaxic features. The undescribed species of Collo differs from *E. rara* from Edough by several important characters, such as the tubercle Af not fused with CL on head (vs fused), the dorso-internal tubercles of Abd. IV not fused on the axis (vs fused) and the presence of 2 + 2 dorso-internal chaetae on abd. V (vs 3 + 3).

Genus *Protanura* Börner, 1906

Protanura pseudomuscorum (Börner, 1903)
(Fig. 8)

Neanura pseudomuscorum Börner, 1903: 135.

Protanura pseudomuscorum – Caroli 1912: 358.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Denis (1925: 254); Cassagnau (1963: 198); Thibaud & Massoud (1980: 516); Arbea & Jordana (1997: 425); Deharveng *et al.* (2007: 58); Hamra-Kroua & Deharveng (2010: 62); Brahim-Bounab *et al.* (2017: 967).

DISTRIBUTION. — Mediterranean region (Arbea & Jordana 1997).

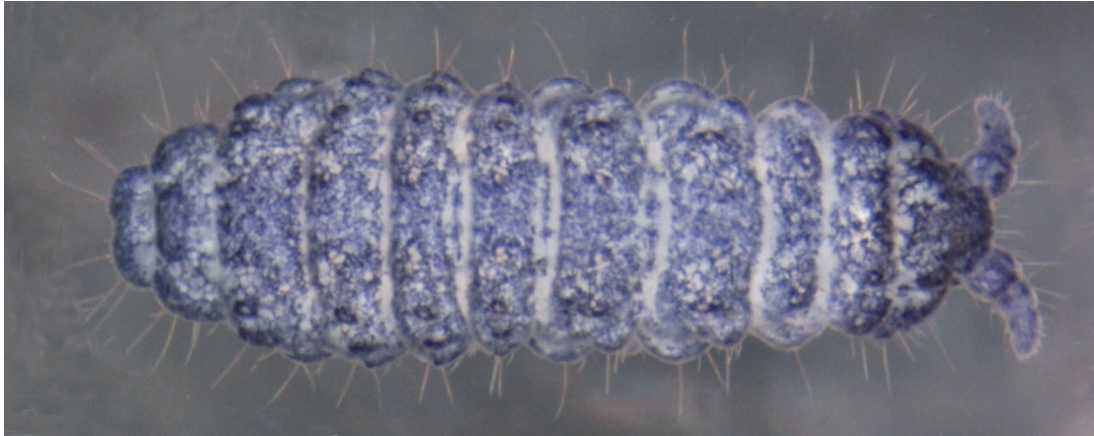


FIG. 8. — *Protanura pseudomuscorum* (Börner, 1903). Body size: 1.7 mm.

REMARK

Very frequent in our samples.

Genus *Sensillanura* Deharveng, 1981

Sensillanura austriaca (Gama, 1963)
(Fig. 9)

Neanura austriaca Gama, 1963: 46.

Sensillanura austriaca – Deharveng 1981: 9.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — French and Austrian Alps (Deharveng 1981), Algeria.

REMARK

Frequent in our samples, locally abundant (Oued Z'hor). *Sensillanura austriaca*, well characterized morphologically among Palaearctic Neanurinae, is the only species of the genus *Sensillanura* and of the tribe Sensillanurini known in Europe (the others being North American). Described from eastern Austria, it is frequently found in forest litter of western margins of French Alps. Its presence in the Collo massif i.e., 1000 km more south than its previous southernmost occurrence, and beyond the Mediterranean Sea, is surprising. It has probably not been introduced, as the species is not rare and has been found in several moderately disturbed locations. *Sensillanura austriaca* has never been recorded in intermediate regions, i.e., southwestern Alps and the whole Italian peninsula, which have been well sampled (Deharveng 1979, Dallai *et al.* 1995). To our knowledge, no other taxon among Euro-Mediterranean invertebrates presents such a gap in its distribution, which cannot be explained by any of the current biogeographical hypotheses concerning the origin of the Maghreb fauna (Jeannel 1956).

Subfamily PSEUDACHORUTINAE Börner, 1906

Genus *Kenyura* Salmon, 1954

Kenyura sp.
(Fig. 10)

NEW DATA. — First record of the genus *Kenyura* Salmon, 1954 for Algeria.

DISTRIBUTION. — *Kenyura* was only known so far by tropical species, from sub-Saharan Africa and tropical America (Massoud 1967).

CITATIONS FROM ALGERIA OUTSIDE COLLO. — The *Kenyura* of Collo belongs to the same, or very similar, species as the specimens previously collected in larger number in Sellaoua - Announa (Guelma) by Hamra-Kroua, which were assigned to the genus *Cephalachorutes* Bedos & Deharveng, 1991 by Arbea *et al.* (2013: 178). It was collected in Collo by Hamra-Kroua in 2006-2008 and in several more recent samples.

REMARKS

Rather frequent in our samples, only from leaf litter. One new species assignable to the genus *Kenyura* is present in our samples in different stations, but mostly as isolated specimens. It has characters of the Subsaharan species of the genus *Kenyura* and of the tropical American genus *Arlesia* Handschin, 1942 as given in Massoud (1967): large size (>1.5 mm), absence of post-antennal organ and reduced number of eyes (6+6). The new species differs from *Cephalachorutes* by its large size and its chaetae S7 on the fourth antennal segment non-hypertrophied (Bedos & Deharveng 1991). Its furca is present, but slightly reduced, hence intermediate between those of *Kenyura* and *Arlesia*. We provisionally assign this new species to the genus *Kenyura*, already known by two species on the African continent. The *Kenyura* species of Collo is also similar to *Pseudachorutes* sp. A and B very briefly described by Denis (1924: 223) from La Bouzarea in Algeria, which probably corresponded to a village near Algiers. These two species are actually not *Pseudachorutes*, as they are devoid of post-antennal organ, and are similar to the new *Kenyura* of



FIG. 9. — *Sensillanura austriaca* (Gama, 1963). Body size: 0.6-0.8 mm.

Collo by their rather large size (1.6 mm), a few long chaetae on tergites, and, for *Pseudachorutes* sp. A, the sixth abdominal tergite slot into the fifth. Both species are represented in the MNHN collections by five slides containing body parts of the two specimens cited by Denis. Though in poor condition, they allow us to observe the presence of six eyes on one side (Denis gives 4 and 6 eyes), the presence of few very long chaetae on the tergites (probably S-chaetae) already mentioned by Denis, and a bumpy body surface. These characters are similar to those of our Algerian specimens, and suggest that Denis' species might be close to the one recorded here. This finding is unexpected as the genus *Kenyura* was so far limited to tropical regions of Africa and America (Palacios-Vargas & Deharveng 2010), while *Arlesia* is only known from tropical America. The presence in the Collo massif of such a species would extend the distribution range of the genus *Kenyura* of more than 3000 km to the Northwest, i.e., the distance from Collo to Abidjan in Ivory Coast, type locality of *K. africana* (Massoud, 1963). It would be also the first record of *Kenyura* in a non-tropical region.

Genus *Micranurida* Börner, 1901

Micranurida candida Cassagnau, 1952
(Fig. 11)

Micranurida candida Cassagnau, 1952: 310.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Europe (Bellinger *et al.* 2018).

REMARK

Rather frequent in our samples.

Genus *Pseudachorudina* Stach, 1949

Pseudachorudina meridionalis (Bonet, 1929)

Pseudachorutes subcrassus var. *meridionalis* Bonet, 1929: 796.

Pseudachorudina meridionalis – Arbea & Jordana 1997: 382.



FIG. 10. — *Kenya* sp. Body size: 2.9 mm.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Delamare Deboutteville (1954: 298, as *Pseudachorudina bougisi* Delamare Deboutteville, 1951); Thibaud & Massoud (1980: 516, as *P. bougisi*); Arbea et al. (2013: 178); Brahim-Bounab et al. (2014: 42); Brahim-Bounab et al. (2017: 967).

DISTRIBUTION. — Euro-Mediterranean region (Arbea & Jordana 1997).

REMARK

Rare in our samples. We follow Arbea & Jordana (1997: 384) who synonymized *Pseudachorudina bougisi* with *P. meridionalis*.

Genus *Pseudachorutella* Stach, 1949

Pseudachorutella asigillata (Börner, 1901)

Pseudachorutes asigillatus Börner, 1901: 36.

Pseudachorutella asigillata – Stach 1949: 81.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Hamra-Kroua & Cancela da Fonseca (2009: 36, as *Pseudachorutella asigillata*, misspelling); Baquero et al. (2009: 68); Hamra-Kroua & Deharveng (2010: 62); Brahim-Bounab et al. (2014: 42, 2017: 967).

DISTRIBUTION. — Palaearctic region (Fjellberg 1998).

REMARK

Frequent in our samples.

Genus *Pseudachorutes* Tullberg, 1871

Pseudachorutes deficiens
Zoughailech, Hamra-Kroua & Deharveng, 2016

Pseudachorutes deficiens Zoughailech, Hamra-Kroua & Deharveng, 2016: 558.

TYPE LOCALITY. — Algeria (Collo massif).

DISTRIBUTION. — Endemic of Algeria (Zoughailech et al. 2016), only known from the type locality.

REMARK

Frequent in our material.

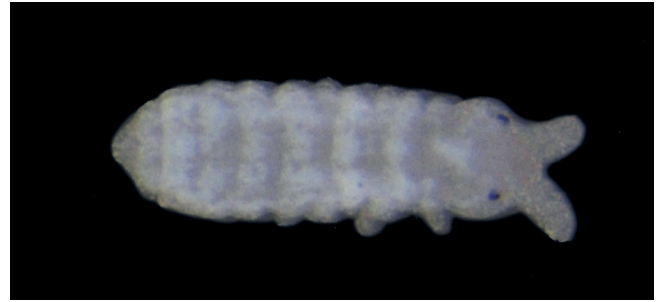


FIG. 11. — *Micranurida candida* Cassagnau, 1952. Body size: 0.4 mm.

Pseudachorutes labiatus

Zoughailech, Hamra-Kroua & Deharveng, 2016

Pseudachorutes labiatus Zoughailech, Hamra-Kroua & Deharveng, 2016: 565.

TYPE LOCALITY. — Algeria (Collo massif).

DISTRIBUTION. — Endemic of Algeria (Zoughailech et al. 2016), only known from Collo.

REMARK

Very rare in our samples.

Pseudachorutes octosensillatus

Zoughailech, Hamra-Kroua & Deharveng, 2016

Pseudachorutes octosensillatus Zoughailech, Hamra-Kroua & Deharveng, 2016: 561.

TYPE LOCALITY. — Algeria (Collo massif).

DISTRIBUTION. — Endemic of Algeria (Zoughailech et al. 2016), only known from the type locality.

REMARK

Rare in our samples, only in rotten wood from Oued Z'hor.

Family ODONTELLIDAE Deharveng, 1982

Genus *Superodontella* Stach, 1949

Superodontella lamellifera (Axelson, 1903)

Xenyllodes lamellifer Axelson, 1903: 3.

Superodontella lamellifera – Cassagnau & Lauga-Reyrel 1992: 371.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Brahim-Bounab et al. (2014: 43, 2017: 968); Delamare Deboutteville (1954: 296, as *Odon-tella lamellifera*); Thibaud & Massoud (1980: 516, as *O. lamellifera*).

DISTRIBUTION. — Possibly cosmopolitan (Fjellberg 1998).

REMARK

Very rare in our samples, a single specimen from Siouane in rotten wood.

Superodontella tayaensis

Arbea, Brahim-Bounab & Hamra-Kroua, 2013

Superodontella tayaensis Arbea, Brahim-Bounab & Hamra-Kroua, 2013: 178.

TYPE LOCALITY. — Algeria (Guelma).

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Arbea *et al.* (2013: 178); Brahim-Bounab *et al.* (2014: 43, 2017: 968).

DISTRIBUTION. — Endemic of Algeria (Arbea *et al.* 2013).

REMARK

Rather frequent in our samples.

Genus *Xenyllodes* Axelson, 1903

Xenyllodes armatus Axelson, 1903

Xenyllodes armatus Axelson, 1903: 4.

CITATION FROM ALGERIA OUTSIDE COLLO. — Brahim-Bounab *et al.* (2017: 968).

DISTRIBUTION. — Holarctic region (Fjellberg 1998).

REMARK

Frequent in our samples.

Family ONYCHIURIDAE Börner, 1913

Genus *Deuteraphorura* Absolon, 1901

Deuteraphorura cebennaria (Gisin, 1956)

Onychiurus cebennarius Gisin, 1956: 348.

Deuteraphorura cebennaria – Pomorski 1996: 52.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Europe (Arbea *et al.* 2011), introduced in southern Hemisphere (Greenslade *et al.* 2012)

REMARK

Frequent in our samples, locally abundant in Oued Z'hor; identified after the key of Jordana *et al.* (2012).

Genus *Protaphorura* Absolon, 1901

Protaphorura armata (Tullberg, 1869)

Lipura armata Tullberg, 1869: 18.

Protaphorura armata – Börner 1909: 102.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Denis (1937: 87) as *Onychiurus armatus* or *O. armatus* species group); Cassagnau (1963: 198, as *O. armatus sensu stricto*); Stomp (1974: 112, as *O. armatus*); Stomp (1983: 192, as *O. armatus*); Thibaud & Massoud (1980: 516); Ait-Mouloud *et al.* (2007: 151, as *Protaphorura* gr. *armata*); Hamra-Kroua & Cancela da Fonseca (2009: 36); Baquero *et al.* (2009: 68); Arbea *et al.* (2013: 178).

DISTRIBUTION. — Cosmopolitan (Fjellberg 1998).

REMARK

Frequent in our samples. Some variability was observed in pseudocelli number of thoracic tergites (formulae 023 or 022 in a same population, including frequent asymmetries).

Protaphorura fimata (Gisin, 1952)

Onychiurus fimatus Gisin, 1952: 11.

Protaphorura fimata – Salmon 1964: 171.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Palaearctic region (Fjellberg 1998), subantarctic islands (Greenslade & Convey 2011).

REMARK

Very rare in our samples, in number in a single sample. Its differences with *P. armata* are weak in Collo.

Protaphorura pannonica (Haybach, 1960)

Onychiurus pannonicus Haybach, 1960: 10.

Protaphorura pannonica – Skarzynski 1992: 59.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Palaearctic region (Fjellberg 1998).

REMARK

Rare in our samples, in soil of only Oued Z'hor.

Family TULLBERGIIDAE Bagnall, 1935

Genus *Mesaphorura* Börner, 1901

Mesaphorura critica Ellis, 1976

Mesaphorura critica Ellis, 1976: 230.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Palaearctic region (Dunger & Schlitt 2011).

REMARK

Very rare in our samples, only in Oued Z'hor.

Mesaphorura macrochaeta Rusek, 1976

Mesaphorura macrochaeta Rusek, 1976: 33.

CITATION FROM ALGERIA OUTSIDE COLLO. — Hamra-Kroua & Cancela da Fonseca (2009: 36).

DISTRIBUTION. — Probably cosmopolitan (Dunger & Schlitt 2011).

REMARK

Rather frequent in our samples, especially in rotten wood.

Order ENTOMOBRYOMORPHA Börner, 1913

Family ISOTOMIDAE Börner, 1913

Genus *Folsomia* Willem, 1902

Folsomia penicula Bagnall, 1939

Folsomia penicula Bagnall, 1939: 57.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Holarctic region (Potapov 2001).

REMARK

The most frequent species of Collembola in our samples.

Folsomia quadrioculata (Tullberg, 1871)

Isotoma quadri-oculata Tullberg, 1871: 152.

Folsomia quadrioculata – Folsom 1919: 8.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Murphy (1958: 526); Thibaud & Massoud (1980: 517); Ait-Mouloud *et al.* (2007: 151).

DISTRIBUTION. — Holarctic region (Potapov 2001).

REMARK

Very rare in our samples.

Genus *Folsomides* Stach, 1922

Folsomides angularis (Axelson, 1905)

Isotoma angularis Axelson, 1905: 791.

Folsomides angularis – Kseneman 1937: 109.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Holarctic region (Potapov 2001).

REMARK

Very rare in our samples, only recorded in moss from Siouane.

Folsomides parvulus Stach, 1922

Folsomides parvulus Stach, 1922: 17.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 198, as *Folsomides parvus* Folsom, 1934); Thibaud & Massoud (1980: 517, as *F. parvus*); Hamra-Kroua & Cancela da Fonseca (2009: 36).

DISTRIBUTION. — Cosmopolitan (Potapov 2001).

REMARK

Rather frequent in our samples.



FIG. 12. — *Isotomiella minor* (Schäffer, 1896). Body size: 0.7 mm.

Genus *Hemisotoma* Bagnall, 1949

Hemisotoma thermophila (Axelson, 1900)

Isotoma thermophila Axelson, 1900: 9.

Hemisotoma thermophila – Bagnall 1949: 95.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 198, as *Isotomina thermophila*); Thibaud & Massoud (1980: 517, as *I. thermophila*); Hamra-Kroua & Allatou (2003: 22, as *Cryptopygus thermophilus*); Ait-Mouloud *et al.* (2007: 151); Baquero *et al.* (2009: 68); Hamra-Kroua & Cancela da Fonseca (2009: 36, as *C. thermophilus*).

DISTRIBUTION. — Cosmopolitan (Potapov 2001).

REMARK

Frequent in our samples.

Genus *Isotoma* Bourlet, 1839

Isotoma viridis Bourlet, 1839

Isotoma viridis Bourlet, 1839: 401.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 5); Thibaud & Massoud (1980: 517); Stomp (1983: 196).

DISTRIBUTION. — Holarctic region (Potapov 2001).

REMARK

Rare species in our samples, only from Oued Z'hor.

Genus *Isotomiella* Bagnall, 1939

Isotomiella minor (Schäffer, 1896)

(Fig. 12)

Isotoma minor Schäffer, 1896: 182.

Isotomiella minor – Bagnall 1939: 95.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 198); Thibaud & Massoud (1980: 517); Hamra-Kroua & Allatou (2003: 22); Ait-Mouloud *et al.* (2007: 151); Hamra-Kroua & Cancela da Fonseca (2009: 36); Baquero *et al.* (2009: 68).



FIG. 13. — *Isotomurus* sp. Body size: 1.4 mm, immature.



FIG. 14. — *Parisotoma notabilis* (Schäffer, 1896). Body size: 0.8 mm.

DISTRIBUTION. — Holarctic region (Potapov 2001).

REMARK

Very frequent in our samples, locally abundant in Oued Z'hor.

Genus *Isotomurus* Börner, 1903

Isotomurus sp.
(Fig. 13)

NEW DATA. — One species of *Isotomurus*, new to science, has been found so far only in the Collo massif.

DISTRIBUTION. — Cosmopolitan genus.

REMARK

Rather frequent in our samples, but only from Oued Z'hor. This species is different by its color pattern from the three species of *Isotomurus* recorded so far from Algeria (Handschin 1926; Stomp 1983; Ait-Mouloud *et al.* 2007).

Genus *Parisotoma* Bagnall, 1940

Parisotoma notabilis (Schäffer, 1896)
(Fig. 14)

Isotoma notabilis Schäffer, 1896: 187.

Parisotoma notabilis – Bagnall 1940: 171.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Ait-Mouloud *et al.* (2007: 151); Baquero *et al.* (2009: 68); Porco *et al.* (2012: 1).

DISTRIBUTION. — Holarctic region (Potapov 2001), introduced in Southern Hemisphere.

REMARK

Frequent in our samples.

Genus *Proctostephanus* Börner, 1902

Proctostephanus sanctiaugustini Cassagnau, 1963
(Fig. 15)

Proctostephanus sancti-augustini Cassagnau, 1963: 200.

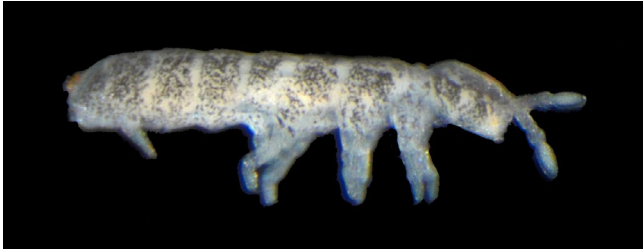


FIG. 15. — *Proctostephanus sanctiaugustini* Cassagnau, 1963. Body size: 1.0 mm.

TYPE LOCALITY. — Algeria (Wilaya of Annaba).

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 198), Thibaud & Massoud (1980: 518); Thibaud (2013: 234).

DISTRIBUTION. — Endemic to Algeria (Potapov 2001).

REMARK

Frequent in our samples, mostly in Oued Z'hor.

Genus *Proisotoma* Börner, 1901

Proisotoma minuta (Tullberg, 1871)

Isotoma minuta Tullberg, 1871: 152.

Proisotoma minuta – Börner 1901: 172.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 198); Thibaud & Massoud (1980: 518); Ait-Mouloud *et al.* (2007: 151).

DISTRIBUTION. — Cosmopolitan (Potapov 2001).

REMARK

The most abundant species of Collembola in our samples, but not the most frequent.

Genus *Subisotoma* Stach, 1947

Subisotoma meridionalis (Dallai, 1973)
(Fig. 16)

Folsomides meridionalis Dallai, 1973: 510.

Subisotoma meridionalis – Potapov 2001: 447.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Only known so far from Eolian islands near Sicilia.

REMARK

Rare in our samples, only from Oued Z'hor, i.e., at the lowest altitude of sampled stations, where it is rather abundant in litter and mosses.

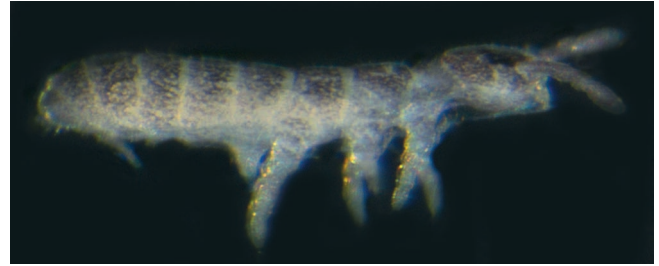


FIG. 16. — *Subisotoma meridionalis* (Dallai, 1973). Body size: 0.7 mm.

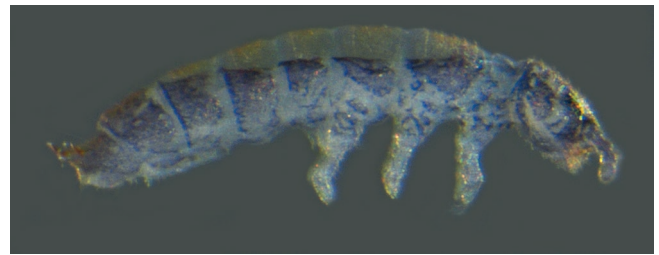


FIG. 17. — *Tetracanthella pilosa* Schött, 1891. Body size: 0.9 mm.

Genus *Tetracanthella* Schött, 1891

Tetracanthella pilosa Schött, 1891
(Fig. 17)

Tetracanthella pilosa Schött, 1891: 192.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Euro-Mediterranean region (Potapov 2001).

REMARK

Very rare in our samples, only in moss from Siouane.

Family ONCOPODURIDAE Denis, 1932

Genus *Oncopodura* Carl & Lebedinsky, 1905

Oncopodura crassicornis Shoebbotham, 1911.

Oncopodura crassicornis Shoebbotham, 1911: 35.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 199); Thibaud & Massoud (1980: 519); Hamra-Kroua & Cancela da Fonseca (2009: 36).

DISTRIBUTION. — Palaearctic region (Fjellberg 2007).

REMARK

Frequent in our samples.



FIG. 18. — *Heteromurus major* (Moniez, 1889). Body size: 2.0 mm.

Family TOMOCERIDAE Schäffer, 1896
Genus *Tomocerus* Nicolet, 1842

Tomocerus minor (Lubbock, 1862)

Macrotoma minor Lubbock, 1862: 598.

Tomocerus minor – Schäffer 1900: 276.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 6); Thibaud & Massoud (1980: 519).

DISTRIBUTION. — Given as cosmopolitan by Fjellberg (2007); more probably limited to the Western Palearctic region and introduced in the Nearctic region (Christiansen & Bellinger 1998).

REMARK

Rather frequent in our samples.

Family CYPHODERIDAE Börner, 1913
Genus *Cyphoderus* Nicolet, 1842

Cyphoderus cf. *albinus* Nicolet, 1842

Cyphoderus albinus Nicolet, 1842: 67.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — As *Cyphoderus albinus* in Handschin (1926: 125); Thibaud & Massoud (1980: 519).

DISTRIBUTION. — Palearctic region (Fjellberg 2007).

Cyphoderus sp.

NEW DATA. — One additional species has been found in Collo, where it is very rare in our samples. It belongs to the group “tridenticulati” *sensu* Delamare Deboutteville, 1948 by its tridentate mucro. It lacks the minute proximal mucronal tooth present in its close relative *C. yugoslavicus* Denis, 1933 that is cited by Baquero

et al. (2009: 68) from Kala Ghora near the border with Tunisia, about 180 km East of Collo.

REMARK

Rare in our samples.

Family ENTOMOBRYIDAE Tömösvary, 1882
Genus *Entomobrya* Rondani, 1861

Entomobrya cf. *multifasciata* (Tullberg, 1871)

Degeeria multifasciata Tullberg, 1871: 148.

Entomobrya multifasciata – Brooks 1884: 275.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 6); Thibaud & Massoud (1980: 518); Ait-Mouloud *et al.* (2007: 151), all cited as *Entomobrya multifasciata*.

DISTRIBUTION. — Holarctic region (Jordana 2012).

REMARK

Rare in our samples, only from Oued Z’hor. Identified from color pattern after Jordana (2012).

Genus *Heteromurus* Wankel, 1860

Heteromurus major (Moniez, 1889)
(Fig. 18)

Templetonia major Moniez, 1889: 26.

Heteromurus major – Börner 1901: 78.

CITATION FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 7); Cassagnau (1963: 198); Thibaud & Massoud (1980: 518); Hamra-Kroua & Allatou (2003: 23); Ait-Mouloud *et al.* (2007: 151); Hamra-Kroua & Cancela da Fonseca (2009: 36); Baquero *et al.* (2009: 68).



FIG. 19. — *Heteromurus tetrophthalmus* Börner, 1903. Body size: 1.5 mm.

DISTRIBUTION. — Euro-Mediterranean region, with possible introductions elsewhere (Mari-Mutt 1980).

REMARK

Very frequent in our samples.

Heteromurus tetrophthalmus Börner, 1903
(Fig. 19)

Heteromurus tetrophthalmus Börner, 1903: 156.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Denis (1937: 87) cites the species but it is unclear if the specimens he examined came from Algeria. It was later cited as *Heteromurus tetrophthalmus* (misspelled) in Stomp (1974: 114; 1983: 196); Thibaud & Massoud (1980: 518). The specimens recorded as *Heteromurus nitidus* (Templeton, 1835) in various papers probably correspond also to this species: Handschin (1926: 125); Thibaud & Massoud (1980: 518); Hamra-Kroua & Allatou (2003: 23); Ait-Mouloud *et al.* (2007: 151); Baquero *et al.* (2009: 68).

DISTRIBUTION. — Mediterranean region (Gisin 1960).

REMARK

This species of Collo, frequent in our samples, is provisionally assigned to *H. tetrophthalmus* Börner, 1903 described from Italy. Denis (1937) mentioned *H. tetrophthalmus* while describing *H. peyerimhoffi* Denis, 1937 from Djurdjura in Algeria, but it is unclear if the exemplars were from Algeria or other Mediterranean country. It was cited from Algeria by Stomp (1974), but subsequently synonymized with *H. nitidus* (Templeton, 1835) by Mari-Mutt (1980). It continued to be recognized in several papers, but the proposed synonymy has never been discussed on modern standards. According to Mari-Hutt (1980), the only difference between the two species is the presence of an unguicular tooth in *H. nitidus* (absent in *H. tetrophthalmus*). Re-examining the

types of *H. tetrophthalmus*, he did not find any difference, and proposed therefore to synonymize the two species. In fact, Mari-Mutt working on slide specimens, missed a much more evident character, the coloration of the body. Having seen a very large number of *H. nitidus* from Europe, we can confirm that the eyes in adults are not black but reddish to brown, and the body is always clearly spotted with reddish-orange pigments as stated in the original description (“[...] eyes reddish brown. Thoracic and abdominal rings pale, with innumerable reddish brown streaks and spots [...]”). In contrast, *H. tetrophthalmus* described by Börner (1903) is pale yellowish without such darker spots (“[...] Farbe ganz weissgelb, ohne braunes Pigment [...]”). All *Heteromurus* with 2 + 2 eyes we have seen from Collo (and other places in Algeria) are always white or pale yellowish like *H. tetrophthalmus*. Eye color is not described in the original description, but they are black in all specimens we have seen from Collo. On this basis and pending a redescription of *H. tetrophthalmus* from its type localities in Italy, we therefore assign the Collo specimens to this species.

Genus *Lepidocyrtus* Bourlet, 1839

Lepidocyrtus lignorum (Fabricius, 1775)

Podura lignorum Fabricius, 1775: 302.

Lepidocyrtus lignorum – Gervais 1844: 410.

CITATION FROM ALGERIA OUTSIDE COLLO. — Ait-Mouloud *et al.* (2007: 151).

DISTRIBUTION. — Holarctic region (Fjellberg 2007).

REMARK

Rather frequent in our samples, only from Oued Z’hor. Distal row of labral chaetae clearly branched.



FIG. 20. — *Lepidocyrtus* sp. Body size: 1.8 mm.

Lepidocyrtus sp.
(Fig. 20)

NEW DATA. — One additional species of *Lepidocyrtus* has been found in our samples, where it is rather frequent. This large species is characterized by the presence of an apical bulb, scales on antennae and legs, and whitish body with pigmented coxal region, like *Lepidocyrtus apicalis* Mateos & Petersen, 2012 from Sardinia.

Genus *Orchesella* Templeton, 1835

Orchesella quinquefasciata (Bourlet, 1841)
sensu Gisin (1960)

Aetheocerus quinquefasciata Bourlet, 1843: 111.

Orchesella quinquefasciata – Lucas 1844: 289.

CITATION FROM ALGERIA OUTSIDE COLLO. — Hamra-Kroua & Allatou (2003: 23).

DISTRIBUTION. — Europe (Gisin 1960), Algeria.

REMARK

Rather frequent in our samples. The species needs redescription. Probably under-sampled in humid regions of Northern Africa rather than introduced, given its presence in semi-natural habitats.

Genus *Pseudosinella* Schäffer, 1897

REMARK

Two species of *Pseudosinella* have been found in our samples and are for the moment not yet identified.

Pseudosinella sp. 1
(Fig. 21)

NEW DATA. — New to science, this species has only been found so far in the Collo massif where it is rare. It is remarkable by its cili-

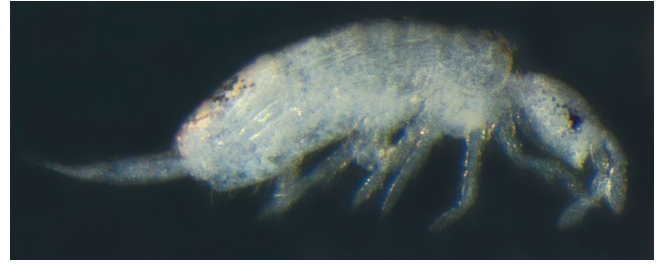


FIG. 21. — *Pseudosinella* sp. 1. Body size: 0.6 mm, immature.

ated labral chaetae and its apical bulb on antenna, a combination of characters only known amongst *Pseudosinella* in the blind species *Pseudosinella najtae* Jordana & Baquero, 2017, described from a cave of Spain (Jordana *et al.* 2017). The Collo species has eyes constituted of 3-5 ommatidia by side, pigmented in black.

Pseudosinella sp. 2

NEW DATA. — A second species of *Pseudosinella* has also been collected in Collo, but is very rare in our samples and limited to soil habitats. It is the first blind *Pseudosinella* recorded from Algeria, while all other *Pseudosinella* reported so far from the country are oculated: *P. alba* (Packard, 1873) and *P. octopunctata* (Börner, 1901) cited by Hamra-Kroua & Allatou (2003: 22); *Pseudosinella* sp. A and sp. B cited by Ait-Mouloud *et al.* (2007: 151); *P. alba* and *Pseudosinella* sp. 2 cited by Hamra-Kroua & Cancela da Fonseca (2009: 36).

Genus *Seira* Lubbock, 1869

Seira domestica (Nicolet, 1842)

Degeeria domestica Nicolet, 1842: 76.

Seira domestica – Lubbock 1870: 279.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Denis (1924: 248, as *Sira* groupe *domestica-subdomestica*); Thibaud & Massoud (1980: 519); Ait-Mouloud *et al.* (2007: 151).

DISTRIBUTION. — Euro-Mediterranean region (Gisin 1960).

REMARK

Rather frequent in our samples. Possible contamination during extraction in Constantine.

Seira sp.

REMARKS

Another species of *Seira*, with color pattern, is present, but very rare, in our samples. The condition of the material did not allow specific identification.

Outside Collo, several species of *Seira* are cited from Algeria by Denis (1924, 1925), Jacquemart (1974), Thibaud & Massoud (1980) and Baquero *et al.* (2009).

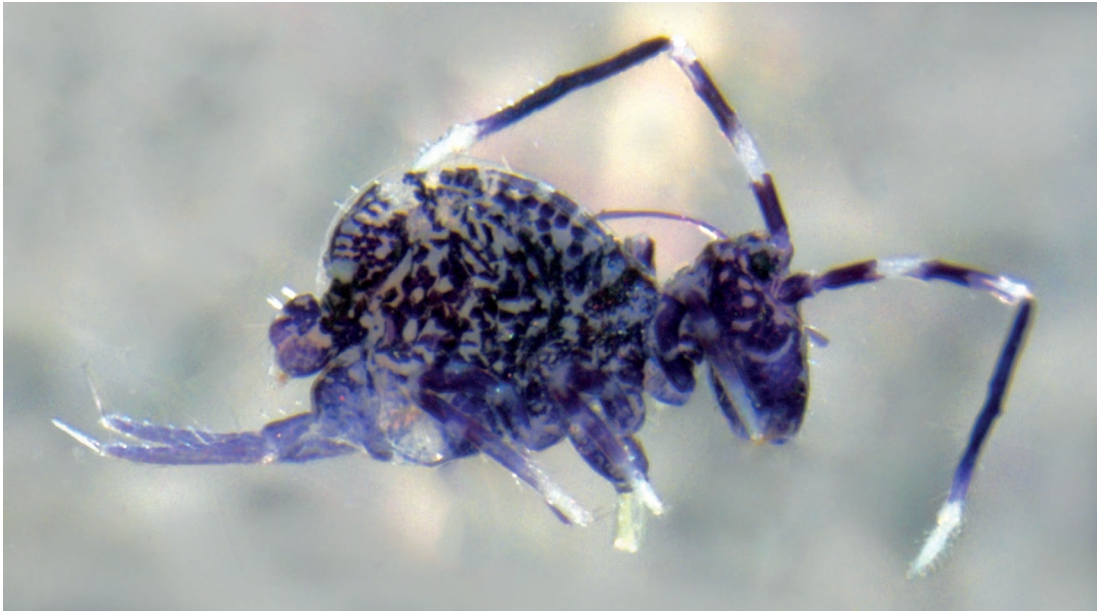


FIG. 22. — *Ptenothrix italica* Dallai, 1973. Body size: 1.4 mm, immature.

Order SYMPHYPLEONA Börner, 1901
Family ARRhopALITIDAE Richards, 1968
Genus *Arrhopalites* Börner, 1906

Arrhopalites cf. *infrasecundarius*
Loksa & Rubio, 1966

Arrhopalites infrasecundarius Loksa & Rubio, 1966: 154.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Hungary (Bretfeld 1999).

REMARK
Frequent in our samples.

Family DICyRTOMIDAE Börner, 1906

REMARKS
Several species of Dicyrtomidae are cited from Algeria outside Collo by Handschin (1928), Thibaud & Massoud (1980) and Bretfeld (2001).

We collected two juvenile specimens from Oued Z'hor, which do not belong to the genus *Ptenothrix* Börner, 1906. Very rare in our samples.

Genus *Dicyrtomina* Börner, 1903

Dicyrtomina ornata (Nicolet, 1842)

Smyntaurus ornatus Nicolet, 1842: 83.

Dicyrtomina ornata – Carr 1916: 66.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1926: 126); as *Dicyrtomina minuta* var. *couloni* (Nicolet, 1841); Thibaud & Massoud (1980: 520); Bretfeld (2001: 101).

DISTRIBUTION. — Western palaeartic region (Bretfeld 1999).

REMARK
Very rare in our samples.

Genus *Ptenothrix* Börner, 1906

Ptenothrix italica Dallai, 1973
(Fig. 22)

Ptenothrix italica Dallai, 1973: 570.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Mediterranean region (Bretfeld 2001).

REMARK
Very rare in our samples. This colorful large size species is reported here to *P. italica* rather than the Algerian species *P. blidana* Bretfeld, 2001 for its second antennal segment with two white band on a violet background, considered as a diagnostic character by Bretfeld (2001).

Family KATIANNIDAE Börner, 1913
Genus *Sminthurinus* Börner, 1901

Sminthurinus niger (Lubbock, 1868)

Smyntaurus niger Lubbock, 1868: 297.

Sminthurinus niger – Börner 1901: 101.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 8); Thibaud & Massoud (1980: 520); Ait-Mouloud *et al.* (2007: 151); Baquero *et al.* (2009: 68).

DISTRIBUTION. — Palaearctic region (Bretfeld 1999).

REMARK

Frequent in our samples.

Sminthurinus signatus (Krausbauer, 1898)

Sminthurus aureus var. *signatus* Krausbauer, 1898: 496.

Sminthurinus signatus – Deharveng 1976: 81.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Probably Europe (not recognized in Bretfeld 1999).

REMARK

Very rare in our samples. The literature about this species is confusing. It is listed in Bretfeld (1999), who follows Stach (1956), as a subspecies of *Sminthurinus elegans*, with Krausbauer, 1902 given as author. In fact, it was described by this last author as *Sminthurus aureus* var. *signatus* in 1898, and briefly but clearly characterized by its color pattern. It is very characteristic and common in western Europe (Thibaud 2017), and fully deserves a specific status.

Family SMINTHURIDAE Börner, 1913

Genus *Allacma* Börner, 1906

Allacma sp.

REMARK

We sorted out one species of *Allacma* from our samples, only collected in Oued Z'hor where it is very rare. Outside Collo, species of the genus *Allacma* have been recorded from Algeria by several authors: *A. fusca* (L. 1758) by Handschin (1928: 9) and Thibaud & Massoud (1980: 520), *A. gallica* (Carl, 1899) by Bretfeld (2001: 91), and an unnamed species by Ait-Mouloud *et al.* (2007: 151). The Collo specimens are juveniles and have not been identified.

Genus *Caprainea* Dallai, 1970

Caprainea echinata (Stach, 1930)

Sminthurus echinatus Stach, 1930: 72.

Caprainea echinata – Dallai 1970: 52.

CITATION FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 199, as *Sminthurus echinatus*); Thibaud & Massoud (1980: 520); Bretfeld (2001: 99, as *Caprainea marginata* (Schött, 1893).

DISTRIBUTION. — Mediterranean region (Gisin 1960).

REMARK

Frequent in our samples. The synonymy with *Caprainea marginata* proposed by Bretfeld (1999), based on dorsal chaetotaxy similarity, is not accepted here as it is in sharp contradiction with color patterns as figured in Stach (1956). The specimens seen by Bretfeld (2001) clearly correspond to *C. echinata*.

Genus *Lipothrix* Börner, 1906

Lipothrix lubbocki (Tullberg, 1872)

Sminthurus Lubbockii [sic] Tullberg, 1872: 33.

Lipothrix lubbocki – Richards 1968: 34.

CITATION FROM ALGERIA OUTSIDE COLLO. — Handschin (1928: 125, as *Sphyrotheka lubbocki*); Thibaud & Massoud (1980: 520, as *Sphyrotheca lubbocki*); Bretfeld (2001: 116).

DISTRIBUTION. — Western Palaearctic (Bretfeld 1999).

REMARK

Frequent in our samples.

Family SMINTHURIDAE Börner, 1906

Genus *Sminthurides* Börner, 1900

Sminthurides signatus (Krausbauer, 1898)

Sminthurus signatus Krausbauer, 1898: 496.

Sminthurides signatus – Axelson 1907: 133.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Palaearctic region (Bretfeld 1999).

REMARK

Very rare in our samples, only from Oued Z'hor.

Genus *Sphaeridia* Linnaniemi, 1912

Sphaeridia pumilis (Krausbauer, 1898)

Sminthurus pumilis Krausbauer, 1898: 495.

Sphaeridia pumilis – Gisin 1944: 110.

CITATIONS FROM ALGERIA OUTSIDE COLLO. — Cassagnau (1963: 199); Thibaud & Massoud (1980: 520); Bretfeld (2001: 129, as *Sphaeridia pumilis sensu stricto*); Ait-Mouloud *et al.* (2007: 151); Baquero *et al.* (2009: 68).

DISTRIBUTION. — Holarctic region, Australia (Bretfeld 1999).

REMARK

Frequent in our samples.

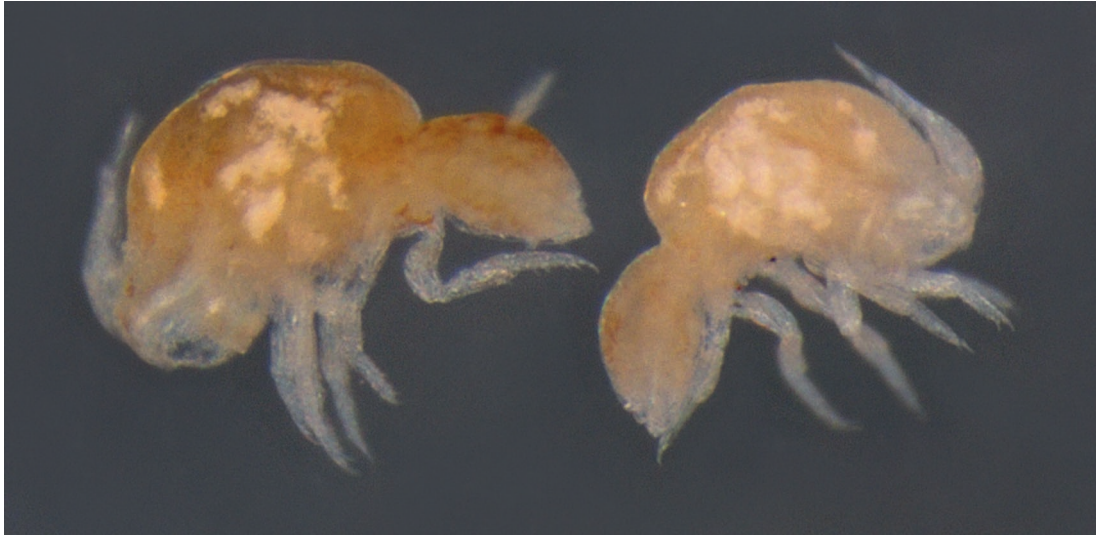


FIG. 23. — *Neelus murinus* Folsom, 1896. Body size: 0.6 mm.

Order NEELIPLEONA Folsom, 1896
Family NEELIDAE Folsom, 1896

Genus *Megalothorax* Willem, 1900

Megalothorax perspicillum
Schneider & D'Haese, 2013

Megalothorax perspicillum Schneider & D'Haese, 2013: 340.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — France (Schneider & D'Haese 2013).

REMARK

Very frequent in our samples. The species might be widespread, as it could have been confused with *M. minimus* Willem, 1900, cited from Algeria by Cassagnau (1963: 199).

Genus *Neelus* Folsom, 1896

Neelus murinus Folsom, 1896
(Fig. 23)

Neelus murinus Folsom, 1896: 391.

NEW DATA. — First record of the species for Algeria.

DISTRIBUTION. — Cosmopolitan (Fjellberg 2007).

REMARK

Rather frequent in our samples.

DISCUSSION

This study highly contribute to the knowledge of the Collembolan fauna of Algeria. From four species recorded before this work, the richness of Collo in Collembola reaches today 74 species, making this massif the richest spot of Collembolan diversity documented so far for Algeria. It is also the most studied. Based on published taxonomical descriptions and preliminary unpublished faunistic data, the Edough massif, about 50 km to the east and comparable to Collo in microclimate, geology, vegetation and altitude, should harbor a similar level of diversity (Hamra-Kroua & Deharveng 2010). Two peat bogs of Kabylia studied by Ait-Mouloud *et al.* (2007) yielded 53 species, but less diverse habitats were sampled there, suggesting that the richness of this spot could be of the same order of magnitude as the two cited massifs. Other Algerian regions have been more loosely surveyed.

As expected from their proximity and their eco-geographical and geological similarity, the massifs of Collo and Edough have a similar fauna of soil Collembola. However, there are also some clear cases of vicariance between them, spanning from moderate genetic divergence level (between populations of *Deutonura zana*, the only species investigated in this respect, see Deharveng *et al.* 2015b) to well-marked species level (like *Edoughnura rara* from Edough vs *Edoughnura* sp. from Collo). More examples will be probably detected in investigating more thoroughly the Edough fauna of Pseudachorutinae.

The number of taxa recognized as undescribed illustrates the potential biodiversity of the Collo massif. Four are mentioned in the checklist. More can be expected among the seven not yet identified species, as well as within identified species that may actually correspond to clusters of species like *Deuteraphorura cebennaria*, *Heteromurus major* or *Sphaeridia pumilis*. We estimate on this ground that at least 10% of the listed species are new to science.

Another major interest of this faunistic study is the discovery of a number of biogeographically unexpected taxa, in particular the new species of *Kenyura*, thousands of kilometers apart from its African congeners, or *Sensillanura austriaca* with its unusual disjunction pattern Collo-Northern Alps.

Most regions of Algeria remain however under sampled or, more frequently, not sampled at all for their Collembolan fauna. Even in the best studied areas, several habitats known to be rich in original species have not or hardly been surveyed, like littoral habitats, deep soil layers, caves, moss on exposed rocks and on vegetation, and a number of new species are expected to be discovered. The aim of on-going investigations is to fill methodically these gaps, i.e., as first steps describing the new taxa listed here, sampling the under surveyed habitats of Collo, and completing the knowledge of the Edough Collembolan fauna.

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REFERENCES

- AIT-MOULOUD S., LEK-ANG S. & DEHARVENG L. 2007. — Fine scale changes in biodiversity in a soil-water ecotone: Collembola in two peat bogs of Kabylia (Algeria). *Vie et Milieu* 57 (3): 149-157.
- ARBEA J. I. & JORDANA R. 1997. — Familia Neanuridae, in RAMOS M. *et al.* (eds), *Collembola, Poduromorpha, Fauna Iberica*, vol. 8. Museo Nacional de Ciencias Naturales, CSIC, Madrid: 272-477.
- ARBEA J. I., PÉREZ T. & CARRASCO P. 2011. — *Deuteraphorura cebennaria* (Gisin, 1956) primera cita para la fauna de la Península Ibérica (Collembola, Onychiuridae). *Boletín de la Sociedad Entomológica Aragonesa* 48: 351-357.
- ARBEA J. I., BRAHIM-BOUNAB H. & HAMRA-KROUA S. 2013. — Collembola Poduromorpha from Guelma Province (Northeastern Algeria), with description of a new *Superodontella* species (Collembola: Odontellidae). *Zootaxa* 3709 (2): 177-184. <https://doi.org/10.11646/zootaxa.3709.2.5>
- BAQUERO E., HAMRA-KROUA S. & JORDANA R. 2009. — A new species of *Entomobrya* from northern Algeria (Collembola: Entomobryidae). *Entomological News* 120: 65-75. <https://doi.org/10.3157/021.120.0113>
- BEDOS A. & DEHARVENG L. 1991. — *Cephalachorutes* gen. n., a new genus of tropical Neanuridae (Collembola). *Tijdschrift voor Entomologie* 134: 145-153.
- BELLINGER P. F., CHRISTIANSEN K. A. & JANSSENS F. 2018. — *Checklist of the Collembola of the World*. <http://www.collembola.org>
- BÖRNER C. 1903. — Über neue Altweltliche Collembolen, nebst Bemerkungen zur Systematik der Isotominen und Entomobryinen. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin* 3: 129-182. <https://doi.org/10.5962/bhl.part.29866>
- BRAHIM-BOUNAB H., ZOUGHAILECH A. & HAMRA-KROUA S. 2014. — The Collembola Poduromorpha families: Neanuridae and Odontellidae of some localities of Northeastern Algeria. *Sciences & Technologie C* 39: 40-45.
- BRAHIM-BOUNAB H., BENDJABALLAH M. & HAMRA-KROUA S. 2017. — Some Poduromorpha (Hexapoda: Collembola) of Northeastern Algeria. *Journal of Entomology and Zoology Studies* 5 (4): 966-971.
- BRETFELD G. 1997. — Redescription and new descriptions of *Sphaeridia* species (Insecta, Collembola) from Algeria, Gambia, Peru, and Spain. *Abhandlungen und Berichte des Naturkundemuseums* 69 (3): 1-14.
- BRETFELD G. 1999. — Synopses on Palaearctic Collembola, Volume 2. Symphypleona. *Abhandlungen und Berichte des Naturkundemuseums* 71 (1): 1-318.
- BRETFELD G. 2001. — Symphypleona from Northwest and West Africa, collected in the years, 1979-1986, by Johans Mertens, Gent. *Senckenbergiana biologica* 80: 87-131.
- CASSAGNAU P. 1963. — Les Collemboles d'Afrique du Nord. Étude de quelques espèces du Nord Constantinois. *Bulletin de la Société d'Histoire naturelle de Toulouse* 98 (1/2): 197-206.
- CHRISTIANSEN K. & BELLINGER P. 1998. — *The Collembola of North America north of the Rio Grande, second edition*. Grinnell College, Grinnell, IA, 1520 p.
- DALLAI R. 1967. — Ricerche sui Collemboli. II. Collemboli della riviera Livornese. *Archivio Botanico e Biogeografico Italiano* 12 (4): 425-449.
- DALLAI R. 1970. — Ricerche sui Collemboli. XIV. Le Alpi Apuane. *Lavori della Società Italiana di Biogeografia, N.S.* 1: 433-482.
- DALLAI R. 1971. — Ricerche sui Collemboli. XV. I Monti Reatini ed alcuni rilievi abruzzesi. *Lavori della Società Italiana di Biogeografia, N.S.* 2: 322-378.
- DALLAI R. & MARTINOZZI I. 1980. — Ricerche sui Collemboli. XXV. La Val di Farma. *Atti dell'Accademia dei Fisiocritici, Siena, Serie XIV* 12: 1-51.
- DALLAI R., MALATESTA E. & RAMELLINI P. 1995. — 'Aperygota': Collembola, Protura, Microcoryphia e Zygentoma (=Thysanura s.l.), Diplura, in MINELLI A., RUFFO S. & LA POSTA S. (eds), *Checklist delle Specie della Fauna Italiana*. Calderini, Bologna 33: 1-25.
- DEHARVENG L. 1979. — Contribution à la connaissance des Collemboles Neanurinae de France et de la Péninsule Ibérique. *Travaux du Laboratoire d'Écobiologie des Arthropodes édaphiques* 4: 1-61.
- DEHARVENG L. 1981. — La chétotaxie dorsale de l'antenne et son intérêt phylogénétique chez les Collemboles Neanuridae. *Nouvelle Revue d'Entomologie* 11 (1): 3-13.
- DEHARVENG L. 2004. — Recent advances in Collembola systematics. *Pedobiologia* 48: 415-433. <https://doi.org/10.1016/j.pedobi.2004.08.001>
- DEHARVENG L. 2013. — Collembola. In *Fauna Europaea* version 2017.06. <https://fauna-eu.org>
- DEHARVENG L. & HAMRA-KROUA S. 2004. — Une nouvelle espèce de *Friesea* Dalla Torre, 1885, du massif de l'Edough, nord-Constantinois, Algérie (Collembola, Neanuridae). *Bulletin de la Société entomologique de France* 109 (2): 141-143.
- DEHARVENG L., HAMRA-KROUA S. & BEDOS A. 2007. — *Edoughmura* rara n. gen., n. sp., an enigmatic genus of Neanurinae Collembola from the Edough Massif (Algeria). *Zootaxa* 1652: 57-61.
- DEHARVENG L., AIT-MOULOUD S. & BEDOS A. 2015a. — A new species of *Deutonura* (Collembola: Neanuridae: Neanurinae) from Algeria, with revised diagnosis of the genus and key to western Palaearctic species. *Zootaxa* 4000 (4): 464-472. <https://doi.org/10.11646/zootaxa.4000.4.5>
- DEHARVENG L., ZOUGHAILECH A., HAMRA-KROUA S. & PORCO D. 2015b. — A new species of *Deutonura* (Collembola: Neanuridae: Neanurinae) from north-eastern Algeria, and characterisation of two intraspecific lineages by their barcodes. *Zootaxa* 3920 (2): 281-290. <https://doi.org/10.11646/zootaxa.3920.2.4>
- DELAMARE DEBOUTTEVILLE C. 1948. — Recherches sur les Collemboles Termitophiles et Myrmécophiles. *Archive de Zoologie Expérimentale et Générale* 85: 261-425.
- DELAMARE DEBOUTTEVILLE C. 1954. — Collemboles marins de la zone souterraine humide des sables littoraux. *Vie et Milieu* 4 (2): 290-319.

- DENIS J. R. 1924. — Sur les Collemboles du muséum de Paris. *Bulletin de la Société entomologique de France* 93: 211-260.
- DENIS J. R. 1925. — Sur les Collemboles d'Afrique du Nord. *Bulletin de la Société d'Histoire naturelle d'Afrique du Nord* 16: 254-256.
- DENIS J. R. 1937. — Sur les Collemboles de l'Afrique du Nord (4^e note). *Bulletin de la Société d'Histoire naturelle d'Afrique du Nord* 28: 85-87.
- DUNGER W. & SCHLITT B. 2011. — Synopses on Palaearctic Collembola, Volume 6/1. Tullbergiidae. *Soil Organisms* 83 (1): 1-168.
- FJELLBERG A. 1998. — The Collembola of Fennoscandia and Denmark. Part I: Poduromorpha. *Fauna Entomologica Scandinavica* 35: 1-183.
- FJELLBERG A. 2007. — The Collembola of Fennoscandia and Denmark. Part II: Entomobryomorpha and Symphyleona. *Fauna Entomologica Scandinavica* 42: 1-216.
- GISIN H. 1960. — *Collembolenfauna Europas*. Museum d'Histoire Naturelle, Genève, 312 p.
- GREENSLADE P. 1994. — Collembola, in HOUSTON W. W. K. (ed.), *Zoological catalogue of Australia*. Volume 22. *Protura, Collembola, Diplura*. Melbourne, CSIRO, Australia, 19-138.
- GREENSLADE P. & CONVEY P. 2011. — Exotic Collembola on subantarctic islands: pathways, origins and biology. *Biological Invasions* 14 (2): 405-447. <https://doi.org/10.1007/s10530-011-0086-8>
- GREENSLADE P., POTAPOV M., RUSSELL D. & CONVEY P. 2012. — Global Collembola on Deception Island. *Journal of Insect Science* 12: 111. <https://doi.org/10.1673/031.012.11101>
- HAMRA-KROUA S. 2005. — Les Collemboles (Hexapoda, Arthropoda) du Nord-est algérien: Taxonomie, Biogéographie et Ecologie. Thèse de doctorat d'État en sciences naturelles. Université Mentouri, Constantine, 266 p.
- HAMRA-KROUA S. & ALLATOU D. 2003. — Les Collemboles du Nord-est Constantinois. *Sciences & Technologie* 20: 21-24.
- HAMRA-KROUA S. & CANCELA DA FONSECA J. P. 2009. — Dynamique saisonnière du peuplement de Collemboles d'un sol agricole de la ferme pilote d'El-Baaraouia (Wilaya de Constantine, Algérie). *Bulletin de l'Institut scientifique, section Sciences de la Vie*, Rabat, 31 (1): 33-43.
- HAMRA-KROUA S. & DEHARVENG L. 2010. — Les Neanuridae (Collembola, Arthropoda) du massif forestier de l'Edough (Annaba, Algérie). In Actes de la VI^e conférence internationale Francophone d'Entomologie. *Travaux de l'Institut Scientifique, Série Zoologie*, Rabat 47 (1): 61-65.
- HAMRA-KROUA S., JORDANA R. & DEHARVENG L. 2009. — A new Friesea of the *mirabilis*-group from Algeria (Collembola: Neanuridae: Frieseinae). *Zootaxa* 2074: 65-68.
- HANDSCHIN E. 1926. — Collembolen aus Algerien. *Neue Beiträge zur systematischen Insektenkunde* 3 (13/14): 117-126.
- HANDSCHIN E. 1928. — Über die von H. Gauthier in dem Sumpfen Algeriens gesammelten Collembolen. *Archiv für Naturgeschichte* 92 (7): 1-18.
- IZARRA D. C. DE. 1980. — Les Collemboles de la forêt de la Massane, Pyrénées Orientales. *Travaux du Laboratoire d'Écobiologie des Arthropodes édaphiques*, Toulouse, 2 (4): 1-7.
- JACQUEMART S. 1974. — Résultats de la mission anthropologique belge au Niger. Collemboles nouveaux du Sahara. *Bulletin de l'Institut royal des Sciences naturelles de Belgique, Entomologie* 50: 1-46.
- JEANNEL R. 1956. — *Le Pselaphide de l'Afrique du nord : essai de biogéographie berbère*. Muséum national d'Histoire naturelle, Paris, 233 p. (Mémoires du Muséum national d'Histoire naturelle, Sér. A – Zoologie; 14).
- JORDANA R. 2012. — Synopses on Palaearctic Collembola. Volume 7/1. Capbryinae and Entomobryini. *Soil Organisms* 84 (1): 1-390.
- JORDANA R., HAMRA-KROUA S. & BAQUERO E. 2009. — Redescription of *Isotominella geophila* Delamare Deboutteville, 1948 from Algeria (Collembola, Entomobryomorpha, Isotomidae), a second world record for an Ivory Coast species. *Zootaxa* 2169: 63-68.
- JORDANA R., BAQUERO E., REBOLEIRA S. & SENDRA A. 2012. — Reviews of the genera *Schaefferia* Absolon, 1900, *Deuteraphorura* Absolon, 1901, *Plutomurus* Yosii, 1956 and the *Anurida* Laboulbene, 1865 species group without eyes, with the description of four new species of cave springtails (Collembola) from Krubera-Voronya cave, Arabika Massif, Abkhazia. *Terrestrial Arthropod Reviews* 5: 35-85. <https://doi.org/10.1163/187498312X622430>
- JORDANA R., BARRANCO P., AMEZCUA A. & BAQUERO E. 2017. — Two new species of Collembola (Hexapoda) from Saliente Cave (Almería, Spain). *Zoosystema* 39 (1): 103-115. <https://doi.org/10.5252/z2017n1a12>
- KRAUSBAUER T. 1902. — *Die Collembola der Lahngegend*. Inaugural Dissertation zur Erlangung der Doktorwürde der Hohen philosophischen Fakultät der Königlichen Universität, Marburg.
- LUCAS H. 1846. — Aperçu des espèces nouvelles d'insectes qui se trouvent dans nos possessions françaises du Nord de l'Afrique. *Revue de Zoologie* 9: 252-256.
- MARI-MUTT J. A. 1980. — A Revision of *Heteromurus* s. str. (Insecta: Collembola: Entomobryidae). *Transactions of the Illinois State Academy of Science* 72 (3): 29-50.
- MARI-MUTT J. A. & BELLINGER P. F. 1990. — *A Catalog of the Neotropical Collembola, including Nearctic Areas of Mexico*. Flora & Fauna Handbook, N°5. Sandhill Crane Press, Florida, 237 p.
- MASSOUD Z. 1967. — Monographie des Neanuridae, Collemboles Poduromorphes à pièces buccales modifiées. In *Biologie de l'Amérique Australe*, vol. III. CNRS ed., Paris, 7-399.
- MEBARKI A. 2003. — Cartographie automatique des précipitations: application à l'est algérien. *Sciences & Technologie* 20: 100-107.
- MURPHY D. H. 1958. — *Isotoma vaillanti* sp. nov., a new species of Collembola from Algeria. *Journal of Natural History* 1 (8): 524-526. <https://doi.org/10.1080/00222935808650977>
- PALACIOS-VARGAS J. G. & DEHARVENG L. 2010. — A new species of *Kenyura* (Collembola: Neanuridae: Pseudachorutinae) from Nicaragua. *Brenesia* 73-74: 85-88.
- PORCO D., POTAPOV M., BEDOS A., BUSMACHIU G., WEINER W. M., HAMRA-KROUA S. & DEHARVENG L. 2012. — Cryptic diversity in the ubiquitous species *Parisotoma notabilis* (Collembola, Isotomidae): a long used chimeric species? *PLoS One* 7 (9): e46056. <https://doi.org/10.1371/journal.pone.0046056>
- POTAPOV M. 2001. — Synopses on Palaearctic Collembola, Volume 3. Isotomidae. *Abhandlungen und Berichte des Naturkundemuseums* 73 (2): 1-602.
- POTAPOV M., BABENKO A. & FJELLBERG A. 2006. — Taxonomy of the *Proisotoma* complex. Redefinition of genera and description of new species of *Scutisotoma* and *Weberacantha* (Collembola, Isotomidae). *Zootaxa* 1382: 1-74.
- SCHNEIDER C. & D'HAESE C. A. 2013. — Morphological and molecular insights on *Megalothorax*. The largest Neelipleona genus revisited (Collembola). *Invertebrate Systematics* 27 (3): 317-364. <https://doi.org/10.1071/IS13002>
- SCHULZ H. J. 2015. — Die Collembolenfauna von Korsika – ein aktueller Beitrag. *Mitteilungen internationale entomologie Vereinigung* 40 (1/2): 9-23.
- STACH J. 1956. — *The Apterygotan Fauna of Poland in relation to the World-Fauna of this group of Insects. Family: Sminthuridae*. Polska Akademia Nauk, Krakow, 287 p.
- STOMP N. 1974. — Collemboles cavernicoles des Causses (Insecta). *Annales de Spéléologie* 29 (1): 105-108.
- STOMP N. 1983. — Collemboles cavernicoles d'Afrique du Nord. II (Insectes). *Revue suisse de Zoologie* 90 (1): 191-198. <https://doi.org/10.5962/bhl.part.81972>
- THIBAUD J. M. 2013. — Essai sur l'état des connaissances de la diversité des Collemboles de l'Empire Africano-Malgache. *Russian Entomological Journal* 22 (4): 233-248.
- THIBAUD J. M. 2017. — Catalogue des collemboles de France. *Zoosystema* 39 (3): 297-436. <https://doi.org/10.5252/z2017n3a1>
- THIBAUD J. M. & MASSOUD Z. 1980. — Etude des Collemboles de certains milieux du Maroc et considérations biogéographiques sur la faune du Maghreb. *Revue suisse de Zoologie* 87 (2): 513-548. <https://doi.org/10.5962/bhl.part.85530>

THIBAUD J. M., SCHULZ H. J. & DA GAMA ASSALINO M. M. 2004. — Synopses on Palaearctic Collembola, Volume 4. Hypogastruridae. *Abhandlungen und Berichte des Naturkundemuseums* 75: 1-287.

ZOUGHAILECH A., HAMRA-KROUA S. & DEHARVENG L. 2016. — New species of *Pseudachorutes* (Collembola: Neanuridae from Northeastern Algeria. *Zootaxa* 4158 (4): 557-568. <http://doi.org/10.11646/zootaxa.4158.4.7>

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