

THE TERRESTRIAL ISOPODA OF THE AZORES ¹

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Terrestrial Isopoda are abundant in the Azores and several reports have been published on their taxonomy and distribution. Present knowledge has been summarized by Vandel (1957). The material by Dr. and Mrs. Per Brinck and Dr. and Mrs. Erik Dahl is very large and adds several interesting species and much information.

LIST OF SPECIES

Family *Tylidae*

1. *Tylos latreillei* Audouin, 1825

Faial: Horta, Porto Pim, 7.IV.1957. 1 immature specimen collected among stones on sandy grassy ground near the coast. Loc. 94.

In the Azores, the species has previously been recorded from Graciosa (Dollfus 1889, Soika 1954). The Azorean specimens belong to the ssp. *europaeus* Arc., while in Madeira there is a forma of the subsp. *sardous* (Soika). This species from marine beaches has a very wide distribution.

Family *Ligiidae*

2. *Ligia italica* Fabricius, 1798.

São Miguel: Vila Franca do Campo, 28.II.1957. Sandy beach with scattered basalt blocks. Below the high water level scattered specimens, above the high water level among stones on sand many specimens (3 ♀♀, incl. 1 ovigerous specimen). Loc. 2.—São Pópulo, 7.5 km. E of Ponta

1) Report No. 52 from the Lund University Expedition in 1957 to the Azores and Madeira.

2) Laboratoire de Zoologie, Faculté des Sciences, 118, Route de Narbonne 31—Toulouse, France.

Delgada, 4.III.1957, lava rocks, in the Littorina zone scattered Ligia, around the high water level several specimens (1 immature specimen + 7 ♀♀ incl. 1 ovigerous were collected). Loc. 10. — Same place, 12.III.1957. Sandy beach, above the high water level with scattered tufts of grass. Scattered specimens. Loc. 26. — Valley of Ribeira Quente, 4 km. SE of Furnas, 11.III.1957. Among stones on sandy beach, 1 ♀ + 1 immature specimen. Loc. 23.

Terceira: 0.5 km. E of Angra do Heroísmo, 28.III.1957. Sandy Beach, 1 immature specimen. Loc. 70.

In the Azores this species from marine shores was previously recorded from Flores, São Miguel and Santa Maria. The species is widespread in the Macaronesian groups of islands, in the Mediterranean and on the coast of the Black Sea (Vandel 1957).

Family *Styloniscidae*

3. *Cordioniscus stebbingi* (Patience, 1907)

São Miguel: River NW of Água Retorta, 23.III.1957. Among debris at stones on the shore of stream, 1 ♂. Loc. 57.

This is the first record of the species from the Macaronesian islands. It probably originates from Spain but is frequent in greenhouses in Great Britain, Belgium, Netherlands, Germany and the United States.

Family *Trichoniscidae*

4. *Androniscus dentiger* Verhoeff, 1908

São Miguel: Ponta Delgada, 15.III.1957. Under stone in garden, 1 ♂. Loc. 9. — 3 km. S of Pico da Pedra, 25.III.1957. Under stone on old lava field, overgrown by *Edyrium* and *Lauraceae*, 1 ♀. Loc. 64.

Faial: 2 km. SW of Praia do Norte, 2.IV.1957. On fairly recent lava field; exposed parts covered by lichens and mosses, sheltered parts with *Erica*, *Vaccinium* and *Lauraceae*. Among mosses and old tufts of grass 1 ♂. Loc. 79.

This is the first record of the species from the Macaronesian islands. Its origin is the Southern Alps. Secondly it has dispersed in Europe and part of the Mediterranean region (Vandel 1960 b). The species is an inhabitant of humus rich soil where it is often met with under large stones.

5. *Trichoniscus pusillus* Brandt, 1833

The species is represented in the Azores by the partenogenetic typical form (*pusillus pusillus*) which has been recorded from Faial, Pico, Terceira and São Miguel, and by the bisexual form (*ssp. provisorius* Racovitza), previously recorded from São Miguel (Vandel 1957).

The typical form is represented from the following localities:

Santa Maria: 2 km. ENE of Almageira, Mirador dos Picos. Alt. 440 m. 19.III.1957. Under stone on Calluna heath with much Rubus, 12 ♀♀ incl. 7 ovigerous specimens. Loc. 39. — Pico Alto, alt. 550 m. 19.III.1957. Among mosses at spring on mountain slope, 5 ♀♀ incl. 1 ovigerous specimen. Loc. 42. — Águas dos Moros, SE of Pico Alto, 19.III.1957. Among mosses at spring on mountain slope 1 ♀. Loc. 43.

São Miguel: Charco do Madeira, 6 km. N of Ponta Delgada, 1.III.1957. Under dense thickets of vegetation (mainly Tradescantia) near pool in open country 4 ♀♀, incl. 1 ovigerous specimen. Loc. 4. — 1 km N of Feteiras, 2.III.1957. In sheltered ravine with dense vegetation of Edyechium gardnerianum, near stream, among mosses 5 ♀♀ incl. 1 ovigerous specimen. Loc. 5. — Lomba da Cruz, 3 km NW of Feteiras, 2.III.1957. Under stone near well at spring side 9 ♀♀. Loc. 6. — Sete Cidades, inner crater side, about 50 m. above Lagoa Azul, at spring among mosses and along the lake outflow 6 ♀♀ incl. 2 ovigerous specimens. Loc. 7. — Sete Cidades, at spring near Lagoa Verde, 2.III.1957. 3 ♀♀. Loc. 8. — Fonte Grande, SE of Feteiras, 6.III.1957. At spring in precipice, under stones 2 ♀♀ incl. 1 ovigerous specimen. Loc. 12. — Lagoa do Pau Pique, 7.III.1957. Under stone on exposed lake shore 4 ♀♀ incl. 2 ovigerous specimens. Loc. 15. — Caldeira das Sete Cidades, 8.III.1957. Under stones, mosses and grass in wet ravine on the outside of the crater, near stream 7 ♀♀ incl. 5 ovigerous specimens. Loc. 18:4; at same locality, among debris in Cryptomeria plantation 1 ♀. Loc. 18:3; at same locality, on open ground, among stones, grasses and mosses at bay of Lago Azul 16 ♀♀ incl. 14 ovigerous specimens. Loc. 18:2. — 2 km. SW of Porto Formoso, 11.III.1957. Among leaves and other debris at well by the side of the road 5 ♀♀ incl. 1 ovigerous specimen. Loc. 21. — Valley of Ribeira Quente, 2 km. SE of Furnas, 11.III.1957. Under stone and among debris on humid, sheltered slope 1 ♀. Loc. 23. — River 5 km. SSE of Ribeira Grande, 14.III.1957. Among debris in wet ravine 1 ♀. Loc. 29. — Relva, nascente dos Lagos, 15.III.1957. At spring in precipice, under stone 1 ♀. Loc. 32. — Tanque, 1 km. SE of Lagoa do Congro, 16.III.1957.

Under stone on meadow near pool 3 ♀♀ incl. 2 ovigerous specimens. Loc. 33.—Fonte at Casas Telhadadas, SW of Ribeira Grande, 18.III.1957. Under stones at well on open ground 2 ♀♀ incl. 1 ovigerous specimen. Loc. 36.—Caldeira das Sete Cidades, Lagoa Azul, 21.III.1957. Under stone in dense vegetation on crater side 1 ovigerous ♀. Loc. 50.—Lagoa do Fogo, 22.III.1957. Among mosses on crater side 17 ♀♀ incl. 1 ovigerous specimen. Loc. 54.—Pico de Azeitona, NE of Ponta da Garça, 22.III.1957. Under decaying plants on meadow 4 ♀♀ incl. 1 ovigerous specimen. Loc. 56.—River NW of Água Retorta, 23.III.1957. Among mosses, stones and debris near stream in ravine 6 ♀♀ incl. 3 ovigerous specimens. Loc. 44.—Pico Verde, 24.III.1957. Under stones and mosses in shallow ravine on mountain heath 4 ♀♀. Loc. 61.—3 km. S of Pico da Pedra, 25.III.1957. Under stone on old lava field overgrown with *Edyichium* and 1 ♀. Loc. 64.

Terceira: Caldeira de Guilherme Moniz, 27.III.1957. Under stone at stream running through old lava field, 10 ♀♀ incl. 1 ovigerous specimen. Loc. 65.

Pico: Volcano Pico, west side, at 1000—1100 m. alt., near snow line, 8.IV.1957. Under moss and stones in *Erica* bush 2 ♀♀ incl. 1 ovigerous specimen. Loc. 95.—Volcano Pico, west side, at about 800 m alt., 8.IV.1957. Among *Sphagnum* at spring (limnocrene) 3 ♀♀. Loc. 97.—Volcano Pico, west side, at about 600—650 m. alt., 8.IV.1957. Under stone in cave mouth, surroundings grazed ground, 2 ♀♀ incl. 1 ovigerous specimen. Loc. 98.—Volcano Pico, west side, about 350 m. alt., 8.IV.1957. Under stone on meadow at secondary bush and forest 2 ♀♀. Loc. 101.—10 km. NNW of Lajes, high plain with remains of indigenous vegetation (*Vaccinium*, *Erica*, *Juniperus*), 9.IV.1957. Under stone in *Erica* bush 7 ♀♀, incl. 2 ovigerous specimens. Loc. 102.

Faial: Horta, Ribeira dos Flamengos, 31.III.1957. Under stone and debris in humid ravine 4 ♀♀ incl. 2 ovigerous specimens.—Praia do Almo-xarife, 1.IV.1967. Under stone at dry stream 1 ovigerous ♀. Loc. 72.—0.5 km. WNW of Ribeirinha, 1.IV.1957. Under stones and among debris in sheltered ravine 17 ♀♀ incl. 1 ovigerous specimen. Loc. 73.—Porto da Boca da Ribeira, 1 km. E of Ribeirinha, 1.IV.1957. Among debris at dry stream near sea shore 1 ♀. Loc. 74.—Porto do Salão, 1.IV.1957. Under stone on grass field near sea shore 4 ♀♀. Loc. 75.—Ribeira das Cabras, 1 km. NE of Praia do Norte, 2.IV.1957. Among wet moss at stream in ravine 10 ♀♀ incl. 5 ovigerous specimens. Loc. 76.—Baia da Areia das Fontes, 1 km.

N of Praia do Norte, 2.IV.1957. Under stone on grass-covered patches in lava field 2 ♀♀ incl. 1 ovigerous specimen. Loc. 77.—Fajã, 2 km. W of Praia do Norte. Under stone in lava field with scattered *Pittosporum* 4 ♀♀ incl. 2 ovigerous specimens. Loc. 78.—2 km. SW of Praia do Norte, 2.IV.1957. Under stones in grass and moss-covered parts of fairly recent lava field 9 ♀♀ incl. 3 ovigerous specimens. Loc. 79.—Zona do Mistério, 2 km. W of Praia do Norte, 2.IV.1957. Among debris on ground in old forest area 9 ♀♀ incl. 4 ovigerous specimens. Loc. 80.—Costa da Nau, 3 km. NW of Capêlo, 4.IV.1957. Among debris in *Erica* bush 1 ♀. Loc. 88.—Cabeço do Canto, 4.IV.1957. Among debris in old and indigenous *Erica* forest 3 ovigerous ♀♀. Loc. 89.—1 km. ESE of Cabeço do Fogo, 4.IV.1957. Among debris and liverworts in indigenous *Erica* bush 15 ♀♀ incl. 7 ovigerous specimens. Loc. 90.—Ribeira dos Flamengos, 2 km. WNW of Flamengos, 4.IV.1957. Among debris at pools in sheltered ravine 5 ♀♀ incl. 4 ovigerous specimens. Loc. 91.—3 km. WNW of Pedro Miguel, 5.IV.1957. Under stone on grass field near pool 1 ovigerous ♀. Loc. 92.—Nasce Água, 3 km. S of Cedros, 5.IV.1957. Alt. 600 m. Under stones on grass field near stream 9 ♀♀. Loc. 93.—Caldeira, 10.IV.1957. Among vegetation and debris on the crater bottom at *Erica*- and *Juniperus*-bush 7 ♀♀ incl. 2 ovigerous specimens. Loc. 105.

Flores: Ribeira d'Alem da Fazenda, 14.IV.1957. Under stones on meadow in slope near stream 6 ♀♀ incl. 2 ovigerous specimens. Loc. 108.—Central Plateau S and SE of Caldeira Comprida, 14.IV.1957. Among mosses and debris on wet heath (*Calluna* and *Juniperus*) 1 ♀. Loc. 109.

The following samples from the island of Faial belong to subsp. *provisorius*:

Faial: Horta, Ribeira dos Flamengos, 31.III.1957. In sheltered ravine with much humus and sides covered with *Vinca*, *Tradescantia* and ferns. 3 ♂♂ + 3 ♀♀. Loc. 71.—0.5 km. WNW of Ribeirinha, 1.IV.1957. In sheltered ravine with dense vegetation, in thick layer of detritus and humus 2 ♂♂ + 5 ♀♀ incl. 2 ovigerous specimens. Loc. 73.

T. pusillus is a widespread European species whose parthenogenetic race has been imported into North America.

T. pusilles occurs in various habitats, mostly among leaves and other debris in ravines, bush or at other sheltered places.

6. *Trichoniscus pygmaeus* Sars, 1899

Santa Maria: Limestone area, South coast 20.III.1957. Humus-rich

slope with dense vegetation. Under stones 2 ♂♂ + 2 ♀♀ + 1 pullus. Loc. 48.

São Miguel: São Pópulo. 7.5 km. E of Ponta Delgada, 4.III.1957. On open rocky lava beach with patches of sand and scattered vegetation, 1 ♀. Loc. 10.

Faial: 0.5 km. WNW of Ribeirinha, 1.IV.1957. In sheltered ravine with dense vegetation, with a thick layer of detritus and humus, 1 ♀. Loc. 73.—Costa da Nau, 3 km. NW of Capêlo, 4.IV.1957. Volcanic ash plain, under Mesembryanthemum thicket, 1 ♂. Loc. 88.—Cabeço do Fogo, 4.IV.1957. Indigenous Erica forest on hill side. Among moss 1 ♂. Loc. 90.

The species has not been recorded from the Azores before. It is widespread in Europe, was found on Madeira and has been imported into the United States (Vandel 1960 a). It is primarily an inhabitant of humus rich soils.

7. *Miktoniscus chavesi* (Dollfus, 1889)

Santa Maria: 2 km. ENE of Almagreira, Mirador dos Picos, altitude 440 m. 19.III.1957. Under stones on Calluna heath with much Rubus 4 ♀♀. Loc. 39.—Limestone area, south coast, humus-rich slope with dense vegetation. Under stone 1 pullus. Loc. 48.

São Miguel: Fonte Grande, SE of Feteiras, 6.III.1957. Under stones and among mosses around spring on slope 210 pulli + 12 ♀♀, incl. 3 ovigerous specimens. Loc. 12.—Lagoa do Carvão 7.III.1957. Under stone at lake shore 1 ♀. Loc. 13.—Caldeira das Sete Cidades, 8.III.1957. Under stone and debris in Cryptomeria plantation 2 ♀♀ incl. 1 ovigerous specimen. Loc. 18:3; under mosses on wet ravine slope (loc. 18:1) 1 ♂ + 1 ♀; under stone at lake shore (loc. 18:2) ♀♀ + 1 pullus.—At river 5 km. SSE of Ribeira Grande, 14.III.1957. In the lower part of ravine among leaves of Edyrium and Eucalyptus 1 ♀ + 3 pulli. Loc. 29.—Caldeira das Sete Cidades, Lagoa Azul, 21.III.1957. Among debris in Cryptomeria plantation 1 ovigerous ♀. Loc. 50.

Faial: Horta, Ribeira dos Flamengos, 31.III.1957. Under stone and low vegetation in humus-rich ravine 1 ovigerous ♀. Loc. 71.—0.5 km. WNW of Ribeirinha, 1.IV.1957. Among leaves and debris in sheltered ravines 1 ♂ + 1 ♀. Loc. 73.—Ribeira das Cabras, 1 km. NE of Praia do Norte, 2.IV.1957. Among wet mosses at stream in ravine 1 ovigerous female. Loc. 76.—2 km. SW of Praia do Norte, 2.IV.1957. Among grass

and mosses on recent lava field 1 ♀. Loc. 79. — Zona do Mistério, 2 km. N of Praia do Norte, 2.IV.1957. Among debris in old forest area 2 ovigerous ♀♀. Loc. 80. — Cabeço do Fogo, 4.IV.1957. In humus and among debris in indigenous Erica forest 1 ♀. Loc. 89. — 1 km. ESE of Cabeço do Fogo. 4.IV.1957. Among liverworts in indigenous Erica bush 2 ♀♀, incl. 1 ovigerous specimen. Loc. 90. — Caldeira, 10.IV.1957. Among mosses and under stones at the bottom of the crater, in indigenous environments 2 ♀♀. Loc. 105.

Flores: Ribeira d'Alem da Fazenda, 14.IV.1957. Under stone in bush at side of ravine 1 ovigerous ♀. Loc. 108.

M. chavesi belongs to an Atlantic group of species—European and American—and is very closely related to *M. patiencei* Vandel from the Atlantic coast of France and from Madeira. It was recorded from Madeira and the Azorean islands São Miguel, Terceira, Pico, Faial and Flores (Vandel 1960 a). It is usually met with in wet surroundings among mosses and under stones in humus and debris, also in indigenous environments.

8. *Haplophthalmus danicus* Budde-Lund, 1885

Chavesia costulata Dollfus, 1889 (*vide* Vandel 1957, p. 252).

São Miguel: Caldeira das Sete Cidades, 8.III.1957. Among moss and under stones near stream in ravine on the open crater side 2 ♂♂ + 1 ♀. Loc. 18:1. — Caldeira das Sete Cidades, 8.III.1957. Among debris in Cryptomeria plantation 1 ♂ + 1 ♀. Loc. 18:3. — 2 km. SW of Porto Formoso, 11.III.1957. Among leaves at road-side spring 1 ovigerous ♀. Loc. 21.

Faial: Porto da Boca da Ribeira, 1 km. E of Ribeirinha, 1.IV.1957. Among debris in dry stream, near the sea shore 3 ♀♀, incl. 1 ovigerous specimen. Loc. 74.

The species has been recorded from São Miguel by Dollfus (1889, sub nom. *Chavesia costulata*) and Vandel (1957). It is a Mediterranean element which has a very wide distribution (Europe, North America, Japan). It has also been introduced in Madeira and Teneriffe (Vandel 1960 a). It is often found among rotten wood or other plant debris.

9. *Haplophthalmus mengei* (Zaddach, 1844)

Haplophthalmus perezii Legrand, 1942.

São Miguel: Caldeiras, 5 km. SE of Ribeira Grande, 14.III.1957. Under stone in ravine with dense secondary vegetation (*Edyechium*, *Vinca* etc.) near spring 1 ♀. Loc. 28. — Fonte at Casas Telhadas, SW of Ribeira

Grande, 18.III.1957. Under stone among grass and bush at well 1 ovigerous ♀. Loc. 36.

The species is widespread in western Europe and has been recorded from Terceira and São Miguel by Vandel (1957). It occurs under stones and among decaying plant detritus.

Family *Squamiferidae*

10. *Platyarthrus schöbli* Budde-Lund, 1889 ssp. *herculensis* Vandel
nom. nov. pro parisii Vandel *nec* Arcangeli 1930

Santa Maria: South coast, limestone area, 20.III.1957. Under stone on slope with dense vegetation 1 ♀. Loc. 48.

This is the first record of this myrmecophilous species from the Azores. *P. schöbli* s.l. is widespread in the Mediterranean region; the ssp. *herculensis* is a North African subspecies.

11. *Trichorhina tomentosa* (Budde-Lund, 1893)

São Miguel: Caldeiras, 5 km. SE of Ribeira Grande, 4.III.1957. Among leaves at hot springs, in ravine with fairly dense vegetation 1 ♀. Loc. 28.

This is the first record of this parthenogenetic species from the Macaronesian islands. It originates from tropical America but has been widely dispersed and is met with in greenhouses in western Europe (Vandel 1962).

Family *Oniscidae*

12. *Armadilloniscus littoralis* (Budde-Lund, 1885)

The typical form of this marine littoral species which is widespread in the Mediterranean has been recorded from the Azorean islands Pico and Santa Maria (Vandel 1957 and 1962). In the present material there is the Madeiran race, subsp. *madeirae* Arcangeli, 1957.

Faial: Porto do Salas, 1.IV.1957. On rock near the coast 1 ♀. Loc. 75.

13. *Armadilloniscus candidus* Budde-Lund, 1885
Armadilloniscus tuberculatus Dollfus (*vide* Vandel 1957)

This is a marine littoral species from the West Mediterranean. It was recorded from São Miguel (Capêlas) by Dollfus (sub. nom. *tuberculatus*). It is not represented in the present material.

14. *Halophiloscia couchi* (Kinahan, 1858)

São Miguel: Vila Franca do Campo, 28.III.1957. Among stones on the beach 1 ♀. Loc. 2.

Faial: Praia do Almoxarife, 31.III.1957. Among plant debris on the beach 1 ♀. Loc. 72.—Porto do Salão, 1.IV.1957. On rock near the shore 1 ♀. Loc. 75.—Horta, Porto Pim, 7.IV.1957. Among debris on volcanic sand beach 1 ♀. Loc. 94.

Flores: Ribeira d'Além da Fazenda, 14.IV.1957. On beach near the outflow of stream 1 ♂ + 1 ♀. Loc. 108.

This species from marine beaches is widespread along the coasts of the Mediterranean, the Black Sea and the Atlantic coast of western Europe. It occurs in Madeira and has been recorded from the Azorean islands Santa Maria, Faial and Graciosa (Vandel 1957).

15. *Chaetophiloscia guernei* (Dollfus, 1887)

Santa Maria: Pico Alto, altitude 590 m. 19.III.1957. Among plant debris on poor *Calluna* heath 1 ♀. Loc. 40.—Pico Alto, altitude 550 m. 19.III.1957. Among mosses at spring on open mountain slope 1 ♀. Loc. 42.

São Miguel: Sete Cidades, Lagoa Azul, 2.III.1957. Among stones and wet plant debris near small stream 1 ♀. Loc. 7. Fonte Grande, SE of Feteiras, 6.III.1958. Under stones and among plant debris at spring in exposed steep 2 ♂♂ + 20 ♀♀ incl. 1 ovigerous specimen + 15 pulli or juvenes. Loc. 12.—Fonte at Casas Telhadas, SW of Ribeira Grande, 18.III.1957. Under stone on open grass field near well 1 ♀. Loc. 36.

Pico: Volcano Pico, west side, altitude about 350 m. 8.IV.1957. Under stone on small meadow near forest plantation 1 ♀. Loc. 99.

Faial: 0.5 km. WNW of Ribeirinha, 1.IV.1957. Among plant debris in sheltered wet ravine 1 ♂. Loc. 73.—Cabeço do Canto, 4.IV.1957. Among debris in old indigenous *Erica* forest 3 ♀♀ incl. 1 ovigerous specimen. Loc. 89.—Cabeço do Fogo, 4.IV.1957. Among mosses in indigenous *Erica* forest 3 ♂♂ + 8 ♀♀ incl. 1 ovigerous specimen. Loc. 90.—Caldeira, 10.IV.1957. Among detritus at the crater bottom 1 ♀. Loc. 105.

Ch. guernei is the only species which is known only from the Azores where it has been recorded from Santa Maria, São Miguel, Terceira, Faial, Pico, Flores and Corvo (Vandel 1957). Evidently the species is widespread and fairly common all through the Azorean archipelago. The genus is sparsely represented in southwestern Europe while several species occur

in the eastern Mediterranean. As a matter of fact *Ch. guernei* is very closely related to certain Greek species (*Ch. penteliconensis* Verhoeff and *Ch. hadjissarantosi* Strouhal) and it may be that it is identical with a species of this group of the genus, thus like so many others introduced to the islands. Because of lack of material the question cannot be settled for the present.

16. *Oniscus asellus* (Linnaeus, 1758)

São Miguel: Charco do Madeira, 6 km. N of Ponta Delgada, 1.III.1957. Under stones and plant debris on the exposed shore of freshwater pool 4 ♂♂ + 3 ♀♀. Loc. 4.—1 km. N of Feteiras, 2.III.1957. Among mosses and plant debris in sheltered ravine 2 ♀♀. Loc. 5.—Lomba da Cruz, 3 km. NW of Feteiras, 2.III.1957. Under stones on slope, overgrown by *Edychemium*, near well 5 ♂♂ + 3 ♀♀ + 2 pulli. Loc. 6.—Sete Cidades, at Lagoa Azul, 2.III.1957. Among plants at spring on crater slope 2 ♀♀. Loc. 7.—Sete Cidades, at Lagoa Verde, 2.III.1957. Under stones on the lake shore 2 ♀♀. Loc. 8.—Fonte Grande, SE of Feteiras, 6.III.1957. Under stones near spring in steep 3 ♂♂ + 2 ♀♀ + 3 pulli. Loc. 12.—Lagoas Empadadas, 7.III.1957. Under stones on lake shore 4 ♂♂ + 3 ♀♀. Loc. 14.—Lagoa do Pau Pique, 7.III.1957. Under stones on lake shore 1 ♂ + 1 ♀. Loc. 15.—Caldeira das Sete Cidades, 8.III.1957. In ravine at outflow from Lagoa Azul 1 ♂ + 4 ♀♀. Loc. 18:4.—Caldeira das Sete Cidades at Lagoa Azul, 8.III.1957. Under stones at the lake 7 ♂♂ + 5 ♀♀. Loc. 18:2.—Lagoa das Furnas, 10.III.1957. Among plant debris in *Cryptomeria* plantation 7 ♂♂ + 5 ♀♀. Loc. 22:4.—Lagoa das Furnas, 10.III.1957. Among plant debris in park 1 ♀. Loc. 22:1. Lagoa das Furnas, 10.III.1957. Among stones and plant debris on the lake shore 2 ♂♂ + 2 ♀♀. Loc. 22:3.—Valley of Ribeira Quente, 2 km. SE of Furnas, 11.III.1957. Under stones and among plant debris at stream in sheltered wet valley 4 ♂♂ + 3 ♀♀. Loc. 23.—Furnas, 11.III.1957. Among plant debris in park 5 ♂♂ + 3 ♀♀. Loc. 24.—3 km. N of Furnas, 11.III.1957. Open *Calluna* heath, under stone 6 ♂♂ + 2 ♀♀. Loc. 25.—Ribeira da Praia, 3 km. W of Vila Franca do Campo, 13.III.1957. Among stones and plant debris at stream 3 ♂♂ + 4 ♀♀. Loc. 27.—Relva, tanque da Rocha Quebrada, 15.III.1957. Among plant debris on shore of pool 1 ♀. Loc. 31.—Relva, nascente dos Lagos, 15.III.1957. Under stones at spring in steep 3 ♂♂ + 4 ♀♀. Loc. 32.—Tanque, 1 km. SE of Lagoa do Congro, 16.III.1957. Under stone at pool 1 ♀ + 1 pullus. Loc. 33.—Lagoa do Congro, 16.III.1957. Among leaves in *Eucalyptus* and

Cryptomeria plantation at lake 5 ♂♂ + 8 ♀♀ incl. 2 ovigerous specimens + 3 immatures. Loc. 34.—Caldeira das Sete Cidades, at Lagoa Azul 21.III.1957. Under stones at the lake 3 pulli. Loc. 50.—Lagoa do Fogo, 22.III.1957. Among stones on lake shore 3 ♂♂ + 4 ♀♀. Loc. 54:3.—Lagoa do Fogo, 22.III.1957. Under stones in Calluna and Vaccinium heath on crater brim 1 ♂ + 4 ♀♀. Loc. 54:2.—River NW of Água Retorta, 23.III.1957. Among stones and plant debris at stream 5 ♂♂ + 4 ♀♀ + 1 pullus. Loc. 57.—1 km. N of Povoação, Ribeira dos Lagos, 24.III.1957. Among stones and leaves in wet steep 3 ♂♂ + 4 ♀♀. Loc. 60.—3 km. S of Pico da Pedra, 25.III.1957. Under scrubs (Lauraceae) in old lava field 1 ♀. Loc. 64.—Pico Verde, 24.III.1957. Under wet moss in ravine (Myrica—Calluna heath) 5 ♂♂ + 5 ♀♀. Loc. 61.—3 km. E of Ribeirinha, 25.III.1957. Under stones in wet ravine 2 ♀♀. Loc. 63.—Bodes Mountains, SE of Furnas, 23.III.1957. Among stones in steep 1 ♂ + 3 ♀♀. Loc.

Terceira: Caldeira de Guilherme Moniz, 27.III.1957. Among moss and stone at cold stream 5 ♂♂ + 4 ♀♀ + 1 pullus. Loc. 65.—Lagoa do Ginjal, 27.III.1957. Under stone at small lake 1 ♂ + 3 ♀♀ incl. 1 ovigerous female. Loc. 66.

Pico: Volcano Pico, west side, at about 350 m. a. S. l., 8.IV.1957. Under stone at entrance of cave (Furna de Frei Mathias) 1 ♂ + 1 ♀ + 1 pullus. Loc. 99.—São João, 9.IV.1957. Under stone at rocks near sea shore 1 ♀. Loc. 103.

Faial: Horta, Ribeira dos Flamengos, 31.III.1957. Among plant debris in sheltered wet ravine 3 ♂♂ + 1 ♀. Loc. 71.—0.5 km. WNW of Ribeirinha, 1.IV.1957. Among plant debris in sheltered wet ravine 5 ♂♂ + 3 ♀♀ incl. 2 ovigerous specimens. Loc. 73.—Ribeira das Cabras, 1 km. NE of Praia do Norte, 2.IV.1957. Under stone at stream in ravine 4 ♀♀ + 1 pullus. Loc. 76.—Baia da Areia das Fontes 1 km. N of Praia do Norte. Under stone in grass patches in lava field with scattered Pittosporum 1 ♂. Loc. 77.—Fajã, 1.5 km. W of Praia do Norte, 2.IV.1957. Under Pittosporum in lava field 2 ♀♀. Loc. 78.—2 km. SW of Praia do Norte, 2.IV.1957. Under moss and stone in recent lava field 1 ♂ + 4 ♀♀. Loc. 79.—Zona do Mistério, 2 km. W of Praia do Norte, 2.IV.1957. Among plant debris in Eucalyptus plantation (in old forest area) 4 ♂♂ + 2 ♀♀ + 1 pullus. Costa da Nau, 3 km. NW of Capêlo, 4.IV.1957. Among debris in Erica bush 3 ♂♂ + 2 ♀♀. Loc. 88.—3 km. WNW of Pedro Miguel, 5.IV.1957. Under stone on grassy ground at pond 2 ♀♀ incl. 1 ovigerous specimen. Loc. 92:1.

Flores: Ribeira d'Além da Fazenda, 14.IV.1957. Under stone on slope near spring 1 ♂. Loc. — 108. — Same locality, on meadow near stream 3 ♂♂. Loc. 108.

O. asellus is primarily a species of the broadleaf forests where it inhabits humid places under stones, logs, among plant debris and in the soil. It has spread with man and is widely distributed through Europe and North America. It has been introduced in Madeira and the Azores and is now more or less abundant. It has been recorded from several of the Azorean islands, viz. São Miguel, Terceira, Faial, Graciosa, São Jorge (Barrois 1888), São Miguel (Budde-Lund 1906), São Miguel, Faial (Dollfus 1889) and Pico and Flores (above).

Family *Porcellionidae*

17. *Agabiformius lentus* (Budde-Lund, 1885)

São Miguel: Fonte Grande, SE of Feteiras, 6.III.1957. Under stone at spring in steep 1 ♀. Loc. 12.

This is the first record of the species from the Azores. Its main distribution is in the eastern Mediterranean whence it has spread westwards along the beaches. With man it has been transported to areas far from its distributional centre (Vandel 1960a). Primarily an inhabitant of dry biotopes.

18. *Leptotrichus panzeri* (Audouin, 1825)

São Miguel: São Pópulo, 7.5 km. E of Ponta Delgada, 1.III.1957. Under thicket of *Mesembryanthemum* on sand beach sparsely covered with grass 1 ♂ + 6 ♀♀. Loc. 3 — Same place, 4.III.1957. On sand beach sparsely covered with grass 1 pullus. Loc. 10.

This is the first record of the species from the Azores. The species is widespread in the Mediterranean and has spread to the Macaronesian islands (Vandel 1960a). It inhabits dunes and other dry sandy areas.

19. *Metoponorthus sexfasciatus* (Budde-Lund, 1879)

Santa Maria: Aeroporto, 19-20.III.1957. On wet sandy ground and among stones in field with poor antropochorous vegetation 4 ♀♀ + 5 ovigerous ♀♀ + 1 pullus. Locs. 44-45. — Praia, 20.III.1957. Under stone on sand beach 1 ♂ + 2 ♀♀ incl. 1 ovigerous specimen. Loc. 47.

São Miguel: Ribeira Grande, 27.II.1957. Among plant debris in dunes (among *Arundo*) 1 ♂ + 2 ♀♀. Loc. 1.—Vila Franca do Campo, 28.II.1957. Among stones on sand beach sparsely covered with grass 3 ♀♀ incl. 1 ovigerous specimen. Loc. 2.—São Pópulo, 7.5 km. E of Ponta Delgada, 1.III.1957. On ground sparsely covered with grass, near the sea 1 ♀ + 1 immature specimen. Loc. 3.—Same place, 4.III.1957. Under stone on grass covered sandy ground 1 ovigerous specimen. Loc. 10.—Ponta Delgada, 5.III.1957. In garden 1 ♀ + 1 ovigerous specimen. Loc. 9.—Fonte Grande, SE of Feteiras, 6.III.1957. Under stones at spring in exposed steep 3 ♂♂ + 3 ♀♀. Loc. 12.—Caldeira das Sete Cidades, 8.III.1957. In ravine at the outflow from Lagoa Azul 2 ♂♂. Loc. 18:4—Lagoa das Furnas, 10.III.1957. Under stones at the lake shore 1 ♂ + 1 ♀. Loc. 22:3.—Valley of Ribeira Quente, 2 km. SE of Furnas, 11.III.1957. Among plant debris in sheltered wet valley 7 ♂♂ + 7 ♀♀ incl. 4 ovigerous specimens. Loc. 23.—Furnas, 11.III.1957. In garden 2 ♀♀. Loc. 24.—Relva, tanque da Rocha Quebrada, 15.III.1957. Among plant debris at pool with open shores 2 ♂♂ + 4 ♀♀ incl. 2 ovigerous specimens. Loc. 31.—Relva, nascente dos Lagos, 13.III.1957. Among stones in exposed steep, at spring 1 ♀. Loc. 32.—Fonte at Casas Telhadas, SW of Ribeira Grande, 18.III.1957. Under stones on open ground at well 2 ♂♂ + 5 ♀♀ incl. 1 ovigerous specimen. Loc. 36.—Ribeira Seca, W of Ribeira Grande, 22.III.1957. Among plant debris and stones on dunes and sand beach 2 ♂♂ + 5 ♀♀ incl. 2 ovigerous specimens. Loc. 37.—1 km. W of Ribeira Seca, W of Ribeira Grande, 22.III.1957. Among stones at sand beach sparsely covered with grass 2 ♂♂ + 2 ♀♀ incl. 1 ovigerous specimen. Loc. 53.—1 km. N of Povoação, Ribeira dos Lagos, 24.III.1957. Among plant debris in wet slope 1 immature specimen. Loc. 60.—1.5 km. S of Maia, 25.III.1957. Under debris at stream in ravine 1 ♂. Loc. 62.—2 km. SW of Porto Formoso, 11.III.1967. On stony slope 2 ♂♂ + 4 ♀♀. Loc. 25 b.

Terceira: 4 km. S of Vila Nova, 27.III.1957. Among plant debris at stream 1 ovigerous ♀. Loc. 67.—0.5 km. S of Praia da Victória, 27.III.1957. Under stone at sandy beach 1 ♀. Loc. 69. 0.5 km. S of Angra do Heroísmo, 28.III.1957. Under stone in sheltered ravine 1 ♂. Loc. 70.

Pico: Volcano Pico, west side, alt. 350 m., 8.IV.1957. Under stone in meadow 1 ovigerous ♀. Loc. 99.—São João, 9.IV.1957. Among leaves at rocks near sea shore 1 ♀. Loc. 103.—1 km. S of Arcia Larga, 11.IV.1957. On stony sea shore 1 ovigerous ♀. Loc. 107:3.

Faial: Ribeira dos Flamengos, 31.III.1957. Among plant debris at sea shore in mouth of ravine 4 ♂♂ + 4 ♀♀ incl. 1 ovigerous specimen. Loc. 71. —Praia do Almoxarife, 31.III.1957. On grass covered sand dune 3 ♂♂ + 4 ♀♀ incl. 1 ovigerous specimen. Loc. 72. — Same place and date. On sandy beach 5 ♂♂ + 6 ♀♀ incl. 1 ovigerous specimen + 1 immature specimen. Loc. 72. —Porto da Boca da Ribeira, 1 km. E of Ribeirinha, 1.IV.1957. On grass covered sand beach, under stone 5 ♂♂ + 6 ♀♀ incl. 4 ovigerous specimens + 1 pullus. Loc. 74. —Baia da Areia das Fontes, 1 km. N of Praia do Norte, 2.IV.1957. Under stones on grass covered patches near stony sea shore 3 ♂♂ + 6 ♀♀ incl. 1 ovigerous specimen + 2 immature specimens. Loc. 77. —Costa da Nau, 3 km. NW of Capêlo, 4.IV.1957. Among plant debris in Erica bush 2 ♀♀. Loc. 88. —Horta, Porto Pim, 7.IV.1957. Under stone on sandy beach 1 ♂. Loc. 94.

Flores: Ribeira d'Além da Fazenda, 14.IV.1957. Under stones at beach 2 ♂♂ + 1 ♀. Loc. 108:2.

M. sexfasciatus is a common and widespread species in the islands. So far it has been recorded from exact localities in the following islands: Santa Maria, São Miguel, Terceira, Graciosa, Pico, Faial and Flores.

This species of the western Mediterranean is primarily an inhabitant of marine shores. Its typical race has invaded the Macaronesian islands and occupies various habitats from coastal dunes to wet slopes and shores of lakes and streams in high mountains.

20. *Metoponorthus pruinosus* (Brandt, 1833)

This species was not collected by the Swedish expedition but has been reported from Faial and Flores (Dollfus 1889) besides various general statements of the Azores (vide Vandel 1957). It is an east Mediterranean species which has spread with man and is now cosmopolitan. It occurs under stones and among plant debris in various habitats.

21. *Acaeroplastes melanurus* (Budde-Lund, 1879)

This species was not collected by the Swedish expedition but has been reported by Dollfus (*Metoponorthus barroisi* n.sp., 1889) and by Vandel (1957) from specimens collected in São Miguel. It is a west Mediterranean species inhabiting marine shores, particularly sandy beaches

22. *Porcellio scaber* Latreille, 1804

São Miguel: Caldeira das Sete Cidades, at Lagoa Azul, 21.III.1957. Among stones and plant debris near the lake 1 ♀ + 1 immature specimen, among lichens on tree trunk 1 immature specimen, among plant debris in *Cryptomeria* plantation 1 ♂. Loc. 50.

This is probably a Lusitanian species which because of its extraordinary capacities of adaptation has followed man and become cosmopolitan (vide Vandel 1960 b). The apparently very restricted distribution of the species in the Macaronesian islands is strange. It has not been recorded from Madeira and there are only a few general records from the Azores, evidently based on Dollfus (1889) who had received specimens collected by A. Furtado, probably in São Miguel.

23. *Porcellio dilatatus* Brandt, 1833

São Miguel. Vila Franca do Campo, 28.III.1957. Among stones near sandy beach, covered by grass 1 ♂ + 4 ♀♀ incl. 1 ovigerous specimen. Loc. 2 — Ponta Delgada, 15.III.1957. In garden 1 ♂. Loc. 9. — Fonte Grande, SE of Feteiras, 6.III.1957. Among stones at spring in steep 3 ♂♂ + 1 ♀ + 2 immature specimens. Loc. 12. — Fonte at Casas Telhadas, SW of Ribeira Grande, 18.III.1957. Among stones at well 1 ♀. Loc. 36.

Pico: 1 km. S of Areia Larga, 11.IV.1957. Among stones near the beach 1 ♂ + 1 ovigerous female. Loc. 107.

Faial. Horta, Ribeira dos Flamengos, 31.III.1957. Under stones and among plant debris in wet sheltered ravine 5 ♀♀ incl. 4 ovigerous specimens. — Porto da Boca da Ribeira, 1 km. E of Ribeirinha. Among debris in ravine 1 ♀. Loc. 74. Baía da Areia das Fontes, 1 km. N of Praia do Norte, 2.IV.1957. Among stones in grass covered patches in lava field near the coast 1 ♀. Loc. 77. — Costa da Nau, 3 km. NW of Capêlo, 4.IV.1957. Among low and dense vegetation in volcanic ash field 1 ♀. Loc. 88. — Horta, Porto Pim, 7.IV.1957. Under stones at rock and on sandy beach 3 ovigerous ♀♀ + 2 immature specimens. Loc. 94.

P. dilatatus has been widely spread by man. Its geographic origin is unclear, perhaps the Iberian peninsula (Vandel 1962). It prefers habitats with high and comparatively constant humidity. There are several general records of the Azores, but so far detailed localities are known only from São Miguel, Pico and Faial. Although widespread in these islands the species is by no means common. The only safe previous records of the

species from the Azores (São Miguel) were by de Guerne 1888 and Barrois 1888.

24. *Porcellio laevis* Latreille, 1804

São Miguel: Vila Franca do Campo, 28.II.1957. Among stones on grass covered sandy slope near sand beach 2 ♂♂. Loc. 2.—Ribeira Seca, W of Ribeira Grande, 18.III.1957. On grass covered dune, in dry surroundings 1 ♀. Loc. 37.

Faial: Horta, Porto Pim, 7.IV.1957. On sandy ground near beach 1 ♀. Loc. 94.

This species, probably North African by origin, has spread widely with man and is now almost cosmopolitan (Vandel 1962). Under natural conditions it prefers sunny and comparatively exposed habitats. From the Azores there are detailed records from São Miguel, Pico and Faial. It has previously been recorded from Faial by Dollfus (1889).

25. *Porcellio lamellatus* (Uljanin) Budde-Lund, 1879

Faial: Praia do Almoxarife, 31.III.1957. In grass covered dunes above sandy beach 1 ♀. Loc. 72.—Baía da Areia das Fontes, 1 km. N of Praia do Norte, 2.IV.1957. On sandy, grass covered ground above stony shore 1 ♀. Loc. 77.

A species of the shores of the western Black Sea, the western Mediterranean and adjoining parts of the Atlantic. It has spread to most of the Macaronesian islands: in the Azores it has been recorded from Santa Maria (Dollfus 1889, Vandel 1956), São Miguel and Faial. It inhabits the upper parts of the sea shores.

26. *Porcellio laevissimus* Dollfus, 1898

Faial: Nasce Água, 3 km. S of Cedros, 5.IV.1957. Under stone near stream in ravine, grazed surroundings, 1 ♂. Loc. 93.

Pico: Volcano Pico, west side, altitude 600-650 m., 8.IV.1957. Under stones in the cave Furna de Frei Mathias 1 ♂. Loc. 98.

Flores: Ribeira d'Além da Fazenda, 14.IV.1957. Among debris and stones in ravine near stream, remains of several specimens. Loc. 108.

This is the first record of the species from the Azores. So far it had only been known from the Canaries (La Palma): 3 ♀♀ (cf. Vandel 1954).

Family *Armadilliidae*27. *Eluma purpurascens* Budde-Lund, 1879

Santa Maria: 2 km. ENE of Almagreira, Miradouro dos Picos, altitude 440 m., 19.III.1957. Under stone on Calluna heath 5 ♂♂ + 5 ♀♀ + 6 immature specimens. Loc. 39.—Pico Alto, altitude 590 m., 19.III.1957. Under stone on the Calluna heath at the top 6 ♂♂ + 14 immature specimens. Loc. 40.—Pico Alto, alt. 575 m., 19.III.1957. In Calluna heath 1 ♂. Loc. 41.—Pico Alto, alt. 550 m., 19.III.1957. Under stone at spring on mountain slope 1 ♂ + 1 pullus. Loc. 42.—Águas dos Moros, SE of Pico Alto, 19.III.1957. Under stone at well 2 ♂♂. Loc. 43.—South coast, limestone area, 20.III.1957. Under stone in dense vegetation 1 ♀. Loc. 48

São Miguel: Vila Franca do Campo, 28.II.1957. On grass covered sand slope above the beach 3 ♂♂ + 2 immature specimens. Loc. 2.—São Pópulo, 7.5 km. E of Ponta Delgada, 1.III.1957. On grass covered sandy ground above the beach, under low and dense vegetation 7 ♂♂ + 21 ♀♀ + 10 immature specimens. Loc. 3.—Charco do Madeira, 6 km. N of Ponta Delgada, 1.III.1957. On shore of pool, among dense vegetation 2 ♂♂ + 8 ♀♀ + 20 immature specimens. Loc. 4.—1 km. N of Feteiras, 2.III.1957. Among debris in wet and sheltered ravine 2 ♀♀ + 2 pulli. Loc. 5.—Lomba da Cruz, 3 km. NW of Feteiras, 2.III.1957. Under stone at well on slope 1 immature specimen. Loc. 6.—Sete Cidades, Lagoa Azul. Under stone at spring above sea shore 1 ♂ + 10 ♀♀. Loc. 7.—Under stones at lake shore 2 ♀♀. Loc. 8.—Ponta Delgada, 5.III.1957. In garden 2 immature specimens. Loc. 9.—São Pópulo, 7.5 km. E of Ponta Delgada. On grass covered sandy ground near the sea 2 ♂♂ + 8 ♀♀. Loc. 17.—Fonte da Rocha, near Relva, 4.5 km. W of Ponta Delgada, 5.III.1957. Under stones at spring in steep 1 ♂ + 1 ♀ + 3 immature specimens. Loc. 11.—Fonte Grande, SE of Feteiras, 6.III.1957. Under stones at spring in steep 1 ♂ + 2 ♀♀ + 17 immature specimens. Loc. 12.—Lagoas Empadadas, 7.III.1957. Among debris at the lake 3 ♀♀ + 1 immature specimen. Loc. 14.—Lagoa do Pau Pique, 7.III.1957. Among debris at the lake 4 ♂♂ + 6 ♀♀ + 6 pulli. Loc. 15.—Lagoa do Canário, 1 km. S of Porto Formosa, 9.III.1957. Among decaying leaves at shore 1 ♀. Loc. 17.—Caldeira das Sete Cidades 8.III.1957. Under stone at lake (loc. 18:2) 2 ♂♂ + 4 ♀♀, in ravine at lake outflow (loc. 18:4) 8 ♂♂ + 11 ♀♀ + 8 immature specimens. Among plant debris in Cryptomeria plantation (loc. 18:3) 5 ♂♂ + 5 ♀♀ + 9 im-

mature specimens.—3 km. SW of Porto Formoso, 11.III.1957. Among stones at roadside slope 1 ♂ + 2 ♀♀ + 7 immature specimens. Loc. 20.—Lagoa das Furnas, 10.III.1957. Among debris on shore 2 ♀♀ + 4 immature specimens. Loc. 22:3.—3 km. N of Furnas, 11.III.1957. Under stone on exposed *Calluna* heath 1 immature specimen. Loc. 25.—Ribeira da Praia, 3 km. W of Vila Franca do Campo, 13.III.1957. Among stones and decaying leaves in ravine at stream 3 ♀♀. Loc. 27.—Caldeiras, 5 km. SE of Ribeira Grande, 14.III.1957. Among decaying leaves in sheltered ravine 1 ♂ + 3 ♂♂ + 5 immature specimens. Loc. 28.—Relva, tanque da Rocha Quebrada, 15.III.1957. Among vegetation and under stone at pool 2 ♂♂ + 6 ♀♀. Loc. 31.—Relva, nascente dos Lagos, 15.III.1957. Under stone at spring in steep 2 ♀♀ + 3 immature specimens. Loc. 32.—Tanque, 1 km. SE of Lagoa do Congro, 16.III.1957. Under stones at pool ♂♂ + 4 ♀♀ + 3 immature specimens. Loc. 33.—Ribeira Seca, W of Rio Grande, 18.III.1957. Under stone on sandy ground near the beach 1 ♀. Loc. 37.—Caldeira das Sete Cidades, Lagoa Azul, 21.III.1957. On the east side of the crater, among leaves and stones in *Eucalyptus* plantation 5 ♀♀ + 3 immature specimens; among lichens on trunk 1 ♂; in *Cryptomeria* plantation 1 ♀ + 1 immature specimen; among wet leaves (*Edyechium* and *Platanus*) and moss at the crater brim 1 ♂ + 2 ♀♀. Loc. 50:2.—Lagoa do Fogo, 22.III.1957. Under stone at the lake shore 5 ♂♂ + 6 ♀♀ + 3 immature specimens (loc. 54:3), among stones on heath at the crater brim (loc. 54:2) 1 ♂ + 2 ♀♀.—Pico da Azeitona, NE of Ponta da Garça, 22.III.1957. Among decaying leaves on meadow 9 immature specimens. Loc. 56.—1.5 km. of Maia, 25.III.1957. Under stones at stream in ravine 1 ♂ + 3 ♀♀. Loc. 62.—River NW of Água Retorta, 23.III.1957. Among debris at stream 1 ♂. Loc. 57.—3 km. E of Ribeirinha (N coast). Under stone in exposed, grazed ravine 1 ♀. Loc. 63.—3 km. S of Pico da Pedra, 25.III.1957. Under stone in scrub on lava field 3 ♂♂ + 5 ♀♀ + 3 immature specimens. Loc. 64.

Terceira: Caldeira de Guilherme Moniz, 27.III.1957. Under stone at stream 3 ♂♂ + 1 ♀ + 2 immature specimens. Loc. 65.—Lagoa do Ginjal, 27.III.1957. Under stone on lake shore 1 ♀. Loc. 66.—4 km. S of Vila Nova, 27.III.1957. Among debris at stream 1 ♂. Loc. 67.—0.5 km. E of Angra do Heroísmo, 28.III.1927. Among plant debris in ravine 1 ♀. Loc. 70.

Pico: Volcano Pico, west side, altitude 1000-1100 m. Among moss at the snow line, under *Erica* bush 1 ♂. Loc. 95.—Volcano Pico, west side, alt. about 800 m. Among moss and stones at spring 3 ♀♀ + 2

immature specimens. Loc. 97.—Volcano Pico, west side, alt. about 350 m. Under stones on meadow in forest plantation 1 ♂ + 3 ♀♀ + 13 immature specimens. Loc. 99.—4 km. WNW of Lajes, 9 IV.1957. Under stone in *Pittosporum* plantation 1 ♂ + 5 ♀♀. Loc. 101.

Faial: Ribeira dos Flamengos, 31.III.1957. Among debris in damp ravine 2 ♀♀. Loc. 71.—Praia do Almojarife, 31.III.1957. Among dry plant debris at dunes above sandy beach 3 ♂♂ + 4 ♀♀ + 2 immature specimens. Loc. 72.—0.5 km. WNW of Ribeirinha, 1.IV.1957. Under stone and among decaying leaves in sheltered ravine 4 ♂♂ + 9 ♀♀ + 1 pullus. Loc. 73.—Porto da Boca da Ribeira, 1 km. E of Ribeirinha. Under stone on grass-covered sandy ground 1 ♂. Loc. 74. Ribeira das Cabras, 1 km. NE of Praia do Norte, 2.IV.1957. Under stone at stream in ravine 1 ♂ + 1 ♀. Loc. 76.—Baia da Areia das Fontes, 1 km. N of Praia do Norte, 2.IV.1957. On grass covered patches of lava field 1 ♂ + 1 ♀. Loc. 77.—Fajã, 2 km. W of Praia do Norte, 2.IV.1957. On moss covered ash field 1 pullus. Loc. 78.—2 km. SW of Praia do Norte, 2.IV.1957. Under moss and grass at the road side (old lava field) 2 immature specimens. Loc. 79.—Zona do Mistério, 2 km. W of Praia do Norte, 2.IV.1954. Among debris in plantation (mainly *Eucalyptus*) 2 ♂♂. Loc. 80.—Costa da Nãu, 3 km. NW of Capêlo, 4.IV.1967. Under low vegetation on volcanic ash field 7 immature specimens; among debris in *Erica* bush 3 ♂♂ + 6 ♀♀ + 18 immatures specimens. Loc. 88.—Cabeço do Canto, 4.IV.1957. Among plant debris in *Erica* forest on hill top 2 ♂♂ + 4 ♀♀ + 19 immature specimens. Loc. 89.—Pool 1 km. ESE of Cabeço do Fogo, 4.IV.1957. Among moss and plant debris in *Erica* forest on hill side 6 ♂♂ + 5 ♀♀ + 2 pulli. Loc. 90.—Ribeira dos Flamengos, 2 km. WNW of Flamengos, 4.IV.1957. In sheltered ravine, among debris at stream 1 ♂ + 1 ♀. Loc. 91.—3 km. WNW of Pedro Miguel, 5.IV.1957. Under stones on meadow at pool 2 ♂♂ + 6 ♀♀ + 1 immature specimen. Loc. 92:1.—Nasce Água, 3 km. S of Cedros, 5.IV.1957. Under stone at well 4 ♂♂ + 5 ♀♀ + 3 immature specimens (loc. 93:1), under moss on rock with overflowing water 1 ♀ (loc. 93:3).—Caldeira, 10.IV.1957. In the crater: In *Erica* bush among debris 4 pulli, among debris at lake shore 6 ♂♂ + 5 ♀♀ + 3 immature specimens. Loc. 105.

Flores: Ribeira d'Além da Fazenda, 14.IV.1957. Under stones in rocky steep, partly grass covered, near river mouth 1 ♀ + 8 immature specimens (loc. 108:2), under stones in wet slope above stream 1 ♂ + 1 ♀ +

1 immature specimen (loc. 108:1). — Central plateau S and SE of Caldeira Comprida, among moss and under stones on heath (Calluna, Juniperus, Sphagnum patches) near pool 2 ♂♂ + 5 ♀♀. Loc. 109.

E. purpurascens is probably originally a species of the border mountains in the Iberian peninsula and NW Africa (Vandel 1962) but has been spread by man, amongst others to various Atlantic islands. In the Azores it is abundant in many habitats and is widely spread. So far there are detailed records from the following islands: Santa Maria, São Miguel, Terceira, Graciosa, Pico, Faial, Corvo and Flores. Dollfus (1889) recorded the species from São Miguel, Faial, Flores and Graciosa

28. *Armadillidium granulatum* Brandt, 1833

This species is not represented in the material collected by the Swedish expedition. Since long it has been recorded from the Azores with doubt only based upon the record «Iles Açores» by A. Morelet (1890), (cf. Dollfus 1889). Its occurrence in the Azores is very doubtful.

A. granulatum is an inhabitant of marine beaches, spread in the Mediterranean and adjoining parts of the Atlantic coasts.

29. *Armadillidium assimile* Budde-Lund, 1879

This species is not represented in the Swedish material. It was recorded from one locality in São Miguel by Vandel (1957). It has wide geographic distribution, was spread by man, and occurs in various habitats, also gardens.

30. *Armadillidium album* Dollfus, 1887

Faial: Porto do Salão, 1.IV.1957. Under stone on rocky shore with patches of grass covered sand 1 ♂. Loc. 75.

This is the first record of the species from the Azores. From the Adriatic region of the Mediterranean it has spread along the coasts of western Europe where it inhabits sandy beaches.

31. *Armadillidium vulgare* (Latreille, 1804)

São Miguel: São Pópulo, 7.5 km. E of Ponta Delgada. Under stones and among vegetation on sandy ground: 1 ♀, 1.III.1957. (Loc. 3), 2 ♀♀, 4.III.1957 (loc. 10). — Charco do Madeira, 6 km. N of Ponta Delgada, 1.III.1957. Among dense vegetation at pool 1 ♀. Loc. 4. — Ponta Delgada.

In gardens: 1 ♀, 3.III.1957, 17 immature specimens 5.III.1957, 1 ♂ + 2 ♀♀ 13.III.1957, 2 ♂♂ + 1 ♀, 15.III.1957, and 1 ♀, 16.III.1957. Loc. 9.—Fonte Grande, SE of Feteiras, 6.III.1957. Under stones at well in steep 2 ♂♂. Loc. 12.—Relva, tanque da Rocha Quebrada, 15.III.1957. Among vegetation on shore of pond 1 ♀. Loc. 31.—1 km. W of Ribeira Seca, W of Ribeira Grande, 22.III.1957. Among stones on sandy beach 1 ♂ + 1 ♀. Loc. 53.

Terceira: 4 km. S of Vila Nova, 27.III.1957. At stream 2 ♀♀ + 1 immature specimen. Loc. 67.—Freshwater lagoon N of Praia da Victória, 27.III.1957. Among vegetation on shore 1 ♀. Loc. 68.—0.5 km. S of Praia da Victória, 27.III.1957. Among vegetation on sandy beach 1 ♀. Loc. 69.

Pico: 1 km. S of Areia Larga, 11.IV.1957. Among stones on rocky shore 4 ♂♂ + 4 ♀♀ + 2 pulli. Loc. 107.

Faial: Praia do Almoxarife, 1.IV.1957. Among dry plant debris at dunes near sand beach 5 pulli. Loc. 72.—Porto da Boca da Ribeira, 1 km. E of Ribeirinha, 1.IV.1957. Among stones on grass covered sandy ground near beach 1 ♂ + 1 ♀. Loc. 74.—Horta, at the coast N of the town 3 ♂♂ + 1 ♀. Loc. 82. Horta. In garden 1 ovigerous ♀. Loc. 84.—Costa da Nau, 3 km. NW of Capêlo, 4.IV.1957. Under plant debris in Erica bush on volcanic ash plain 1 ♂ + 3 pulli. Loc. 88.—Horta, Porto Pim. Among stones and debris above sandy beach 1 ♂ + 7 ♀♀. Loc. 94.

A. vulgare, primarily a species of the Mediterranean calcareous hills, has spread widely with man and is now cosmopolitan, inhabiting various habitats. In the Azores it has been recorded from São Miguel, Terceira, Graciosa, Faial and Pico.

GENERAL DISCUSSION

Isopoda are abundant in most terrestrial habitats in the Azores and constitute a predominant element of the soil mesofauna. Like the terrestrial Amphipoda (cf. Dahl 1967) they seem to be greatly favoured by certain environmental factors, mainly the climate.

Thirty-one species of terrestrial Isopoda have been found so far in the islands. Their distribution among the islands is in relation to the size of the islands, their exploitation by man, the development of the transport between the islands and the European main land, and finally the number of visits paid by investigators (cf. table 1). Size, exploitation, communications and visits are all intimately connected factors.

Twenty-one of the species have also been met with in Madeira, but none of the typically Atlantic supra-specific taxa found in Madeira occur in the Azores (Vandel 1960 a). Most of the Azorean species are originally European, as far as can be established usually from the Mediterranean and its adjoining Atlantic area. There is one exception: *Trichorhina tomentosa*, which was first recorded by the Swedish expedition, is primarily American. By man it has been spread also in other parts of the world.

One species is endemic to the islands, as far as is known, viz. *Chaetophiloscia guernei* which is widespread in the archipelago (cf. table 1). The fact that most localities inhabited by the species are more or less habitats with indigenous vegetation — while it does not occur in the numerous exploited habitats populated by many of the other species — may indicate that it is an autochthone element. On the other hand the species belongs to an East Mediterranean group of species and may be identical with some of its members (cf. above pp. 13 & 14).

Miktoniscus chavesi besides the Azorean islands inhabits Madeira. It is very closely related to a species of the Atlantic coast of France. It was collected in habitats with indigenous vegetation but also populates many exploited localities. It is widespread in the Azorean archipelago, prefers damp habitats (moss, humus, plant debris in wet surroundings, often habitats with indigenous vegetation) and is morphologically more variable in the Azores than in Madeira. In spite of this the species may have come with some of the numerous early plant transports from Madeira to the Azores.

Porcellio laevissimus was described from the Canary Islands and was found in the Azores by the Swedish expedition (Faial, Pico and Flores). Too little is known about the species but its occurrence in the Azores may be secondary.

From an ecological point of view the various Azorean species may be distributed in the following main groups:

1. Marine litoral species: *Tylos latreillei*, *Ligia italica*, *Armadilloniscus littoralis*, *A. candidus*, *Halophiloscia couchi*, *Porcellio lamellatus*, *Armadillidium album*.
2. Para-litoral, mainly sabulicolous species: *Leptotrichus panzeri*, *Acaeroplastes melanurus*.

3. Species invading secondary inland habitats: *Cordioniscus stebbingi*, *Androniscus dentiger*, *Trichoniscus pusillus*, *T. pygmaeus*, *Miktoniscus chavesi*, *Haplophthalmus danicus*, *H. mençei*, *Platyarthrus schöbli*, *Trichorhina tomentosa*, *Oniscus asellus*, *Agabiformius lentus*, *Metoponorthus sexfasciatus*, *M. pruinosis*, *Porcellio scaber*, *P. dilatatus*, *P. laevis*, *P. laevis*, *Eluma purpurascens*, *Armadillidium assimile*, and *A. vulgare*.
4. Species mainly occurring in more or less habitats with indigenous vegetation: *Chaetophiloscia guernei*.

The third group is composite, consisting of 1) ubiquitous and cosmopolitan species with a great capacity of expansion, 2) species of gardens and green houses, introduced with the numerous plants imported to the islands, 3) species which are restricted as regards distribution and habitats in their original areas but have dispersed well and propagate in many Azorean habitats because of favourable environmental conditions.

The marine littoral species like those inhabiting sandy areas near beaches may have reached the islands without support by man, though because of the direction of the sea currents it seems more probable that in most cases they were imported with ballast sand (cf. Lindroth 1957).

Generally, the very low endemicity and the great number of expansive species abounding in the various habitats indicate that most of the species were introduced by man.

Vandel in 1957 concluded that the Azorean terrestrial Isopoda should be regarded as an imported fauna of recent origin. The present material supports this opinion.

Table 1.—Geographic distribution of terrestrial Isopoda in the Azores.

	Santa Maria	São Miguel	Terceira	Graciosa	São Jorge	Pico	Faial	Corvo	Flores
1. <i>Tylos latreillei</i> ssp. <i>europaeus</i>	-	+	-	+	-	-	+	-	-
2. <i>Ligia italica</i>	+	+	+	-	-	-	-	-	+
3. <i>Cordioniscus stebbingi</i>	-	+	-	-	-	-	-	-	-
4. <i>Androniscus dentiger</i>	-	+	-	-	-	-	+	-	-
5a <i>Trichoniscus pusillus</i> f. typ.	+	+	+	-	-	+	+	-	+
5b ssp. <i>provisorius</i>	-	+	-	-	-	-	+	-	-
6. <i>Trichoniscus pygmaeus</i>	+	-	-	-	-	-	+	-	-
7. <i>Miktoniscus chavesi</i>	+	+	+	-	-	+	+	-	+
8. <i>Haplophthalmus danicus</i>	-	+	-	-	-	-	+	-	-
9. <i>Haplophthalmus mengei</i>	-	+	+	-	-	-	-	-	-
10. <i>Platyarthrus schöbli</i> ssp. <i>herculensis</i>	+	-	-	-	-	-	-	-	-
11. <i>Trichorhina tomentosa</i>	-	+	-	-	-	-	-	-	-
12a <i>Armadilloniscus littoralis</i> f. typ.	+	-	-	-	-	+	-	-	-
12b ssp. <i>littoralis maderae</i>	-	-	-	-	-	-	+	-	-
13. <i>Armadilloniscus candidus</i>	-	+	-	-	-	-	-	-	-
14. <i>Halophiloscia couchi</i>	+	+	-	+	-	-	+	-	+
15. <i>Chaetophiloscia guernei</i>	+	+	+	-	-	+	+	+	+
16. <i>Oniscus asellus</i>	-	+	+	+	+	+	+	-	+
17. <i>Agabiformius lentus</i>	-	+	-	-	-	-	-	-	-
18. <i>Leptotrichus panzeri</i>	-	+	-	-	-	-	-	-	-
19. <i>Metoponorthus sexfasciatus</i>	+	+	+	-	-	+	+	-	+
20. <i>Metoponorthus pruinosus</i>	-	-	-	-	-	-	+	-	+
21. <i>Acaeroplastes melanurus</i>	-	+	-	-	-	-	-	-	-
22. <i>Porcellio scaber</i>	-	+	-	-	-	-	-	-	-
23. <i>Porcellio dilatatus</i>	-	+	-	-	-	+	+	-	-
24. <i>Porcellio laevis</i>	-	+	-	-	-	+	+	-	-
25. <i>Porcellio lamellatus</i>	+	+	-	-	-	+	+	-	-
26. <i>Porcellio laevis</i>	-	-	-	-	-	+	+	-	+
27. <i>Eluma purpurascens</i>	+	+	+	+	-	+	+	+	+
28. <i>Armadillidium granulatum</i> *	-	+	-	-	-	-	-	-	-
29. <i>Armadillidium assimile</i>	-	+	-	-	-	-	-	-	-
30. <i>Armadillidium album</i>	-	-	-	-	-	-	+	-	-
31. <i>Armadillidium vulgare</i>	-	+	+	+	-	+	+	-	-
Total	11	24	9	5	1	11	20	2	10

* No precise locality

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