

## A new location for the rare French endemic woodlouse *Alloschizidium pruvoti* (Racovitza, 1907) (Oniscidea: Armadillidiidae)

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### Introduction

Whilst sampling for woodlice for a dissertation project in south eastern France in June 2019, three poorly pigmented, enrolling woodlice were found on 5.vi.2019 under deeply embedded andesitic rocks near a grotto entrance (known locally as ‘La Grotte Mystérieuse’) in a ravine due west of Villeneuve-Loubet, Alpes-Maritime (43.650169, 7.122942) (Fig. 1A). The specimens were initially assumed to belong to the genus *Paraschizidium* Verhoeff due to their small size c. 3mm, ovoid body shape when enrolled and the presence of a distinct schisma on the posterior corner of the first pereonite (Vandel, 1962; Taiti & Ferrara, 1996).

A re-visit to the site on 10.vi.2019 turned up several more individuals, of which two specimens were documented at a length of c. 7mm - putting the original consideration of *Paraschizidium* into question as their size was considerably greater than any known member of this genus in France (Vandel, 1962; Juchault & Legrand, 1962). Examination of photographs taken in-situ on the same date (Fig. 1B), revealed characteristics more akin to *Alloschizidium* Verhoeff - notably the presence of a well-developed and distinct postscutellar line (Vandel, 1962; Taiti & Ferrara, 1996). Of the five known *Alloschizidium* in France, only *A. pruvoti* (Racovitza) and *A. racovitzai* (Vandel) are recorded from the mainland, with the remaining species being endemic to Corsica and Sardinia (Séchet & Noël, 2015). The specimens collected here were provisionally attributed in the field to *A. pruvoti* due to the lack of ommatidia and the trapezoidal telson, easily distinguishing it from *A. racovitzai* which has three ommatidia and a triangular telson (Racovitza, 1907; Vandel, 1954, 1962).

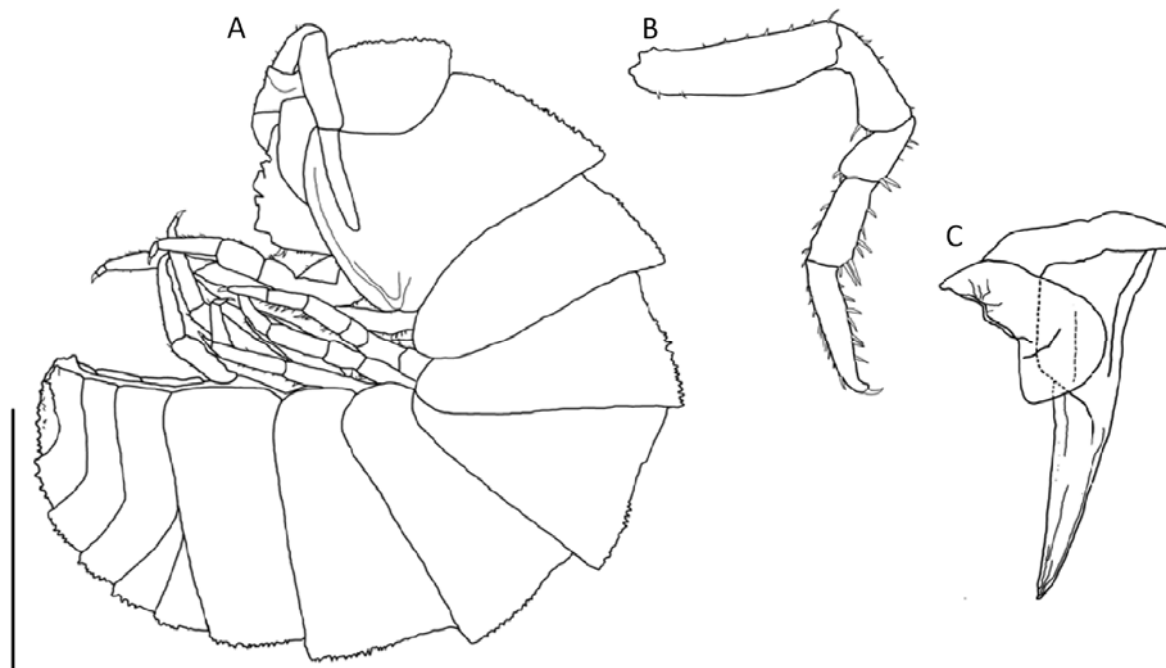


Figure 1: A) Cave entrance, Villeneuve-Loubet; B) *A. pruvoti* in-situ.

*A. pruvoti* is believed to be endemic to the Alpes-Maritime department (Fig. 3). The type locality was a small cave in the gardens of a presbytery in Le Colombier (Roquefort-les-Pins), which was sadly destroyed during the development of a chapel (Racovitza, 1907; Jeannel & Racovitza, 1907; Vandel, 1954, 1962; Juchault & Legrand, 1962). A single gravid female was later collected on the Île Saint-Honorat (Cannes) and reared in captivity until a male specimen became available for identification (Juchault & Legrand, 1962); however, no further individuals were ever found at this location. In August 2012, after a 50 years hiatus, it was rediscovered whilst trialing Owen-Lopes-Oromi pitfall traps in a private garden in Contes by J.M. Lemaire (Noël, 2012). Further use of these traps by the Association Troglorites recovered *A. pruvoti* in 3 public gardens in Monaco in 2016 (Lemaire & Raffaldi, 2016).

Therefore, due to the limited number of modern records a further study of the grotto entrance was undertaken on 13.vi.2019 to fully document the habitat type and locate more individuals.

On return from the field, dissection of 1♂ collected on 5.vi.2019 later validated the identification as *A. pruvoti*. As a result, a description with illustrations is provided here, revealing *A. pruvoti* at its fifth location and its third extant site for the Alpes-Maritime department.



**Figure 2: *Alloschizidium pruvoti* male**

A) Adult specimen, lateral view, scale bar 1mm; B) Pereiopod 7; C) Pleopod 1

## Description

### Family Armadillidiidae

#### *Alloschizidium pruvoti* (Racovitza, 1907)

Syn. *Armadillidium pruvoti* Racovitza, 1907

**Specimens examined** — 2♂, 1♀, Villeneuve-Loubet, Provence-Alpes-Côte d'Azur, 43.650169, 7.122942, under deeply embedded andesitic rocks near 'La Grotte Mystérieuse' entrance, leg/det. T. Hughes, 5.vi.2019. (Specimens retained in the author's collection)

## Appearance

Although Vandel (1962) suggests a complete lack of pigmentation, all individuals sampled here showed clear evidence of longitudinal orange subcuticular regions along the dorsal surface (Fig. 1B). This pigmentation rapidly faded in alcohol and likely represented dietary rather than cuticular pigmentation. The surface is visually smooth and covered in obtusely angled triangular scale-setae (Racovitza, 1907; Vandel, 1962). It is able to roll into a perfect, ovoid ball. The eyes are clearly absent, and the cephalon has semi-circular post-scutellar lines. Pereonite 1 has a clear schisma present just shy of the posterior-lateral corner (Fig. 2A) and the telson is a trapezoidal shape.

## Male Sexual Characteristics

Pereiopod 7 (Fig. 2B) with no discernible sexual modifications. Pleopod 1 exopod with a rounded posterior point and the endopod weakly angled medially with a pointed distal process (Fig. 2C).

## Habitat

*A. pruvoti* was harvested from mixed semi-deciduous woodland of Holm Oak (*Quercus ilex*), Glutinous Alder (*Alnus glutinosa*), Field Elm (*Ulmus minor*) and several other hardwood tree species, creating a strongly enclosed canopy. The associated woodlouse community included; *Agabiformius lentus* (Budde-Lund), *Chateophiloscia* sp., *Cylisticus esterelanus* Verhoeff, *Haplophthalmus* sp., *Helleria brevicornis* von Ebner and *Trichoniscus biformatus* Racovitza, under large andesitic boulders typically resting at a depth of c. 30cm within a 20m radius of the grotto entrance. *Armadillidium sordidum* Dollfus, *A. vulgare* (Latrielle) and *Philoscia affinis* Verhoeff were also recorded in leaf litter at the same site. Measurements taken mid-afternoon on the 13.vi.2019 recorded an ambient surface temperature of 24.3°C, contrasting with a below-rock temperature of 21.0°C. The soil was very compacted, slightly moist and full of voids. The grotto entrance was north easterly facing and within 25m of a slow-running stream, creating a humid environment. No further individuals of *A. pruvoti* were sampled further up this ravine, suggesting a potentially strong association with a specific microhabitat around the grotto entrance.

La Grotte Mystérieuse itself is likely of artificial origin; containing a Madonna and alter at its rear and being used as a refuge for locals during the bombardments of the second world war (City of Villeneuve-Loubet, n.d.). However, due to its 'mysterious' history it is still unknown whether it was man-made.

## Discussion

Racovitza (1907) originally suggested *A. pruvoti* was an endogenous (subterranean) species, but Vandel (1962) later considered it to be cavernicolous and stated that the only endogenous *Alloschizidium* local to the region of Grasse was *A. racovitzai*. However, based on current observations Racovitza is likely correct. The examples collected in Contes and Monaco represented an entirely subterranean existence, whilst those represented here, although associated with a grotto entrance did not exhibit a cavernicolous lifestyle (i.e. living within the grotto itself).

The distribution of *A. pruvoti*, is likely due to the presence of a specific subterranean domain referred to as the Milieu Souterrain Superficiel or Mesovoid Shallow Substratum (MSS) (Juberthie *et al.*, 1980). The MSS is a void rich contact zone between the soil base and the bedrock and is a habitat commonly found in southern France (F. Noël, pers. comm.). As *A. pruvoti* has mainly been harvested within different types of MSS it is likely it occupies a particular niche within it (F. Noël, pers. comm.). In fact, the observations made here at Villeneuve-Loubet were made under large Andesitic boulders which likely acted as a sampling interface with the subterranean alluvial MSS along the stream bank (Ortuño *et al.*, 2013).

Although sporadic, the present *A. pruvoti* distribution (Fig. 3) appears to mirror the extent of the Var as it looked during the Early Miocene (c. 5.33-2.58mya) when it was flooded by a ria during the expansion of the Ligurian Sea (Clauzon, 1978). This distribution is very uncharacteristic compared to other Alpes-Maritime endemics. For instance, observations by Vandel (1962) found woodlice such as *Cylisticus esterelanus*, *Helleria brevicornis* and *Trichoniscus biformatus* abundant west of the Var, but were not recorded eastwards of it, implying the Var and its ancient ria has been a significant factor in their biogeography. Therefore, the present and unusual distribution of *A. pruvoti* may suggest it evolved within the MSS prior to or during the formation of this Miocene ria, although further observations would be needed to fully support this pattern.



**Fig. 3.** - *Alloschizidium pruvoti* Distribution map, Alpes-Maritime Department, France.

## Conclusions

This new location for *A. pruvoti* has a good representative woodlouse community of the area, including species of potential scientific interest such as *A. sordidum* which is recorded here outside of its known range on mainland France. *A. pruvoti*, although rare, may be abundant within its range and is very likely under-recorded due to its subterranean lifestyle and small size.

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