NEW INSIGHTS IN THE PORCELLIONIDES PRUINOSUS COMPLEX (ISOPODA, ONISCIDEA): BIOLOGICAL, BEHAVIOURAL, AND MORPHOLOGICAL APPROACHES

BY

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ABSTRACT

The terrestrial isopod, Porcellionides pruinosus (Brandt, 1833) is commonly viewed as one of the most widespread species of woodlice, mainly because of its synanthropic nature. Recent investigations have, however, suggested that some populations, although morphologically closely similar, may consist in fact of separate species. In this study, six populations from distant localities were examined in a taxonomic perspective. Laboratory crossings first confirmed the reproductive isolation between two groups of populations. Behavioural tests then revealed a pre-zygotic reproductive isolating mechanism in the absence of sexual recognition between males and females from the two groups. These results, together with previously found molecular data, gave congruent evidence for the existence of two well-defined species. Yet, morphological investigations failed to detect any meristic characters that would allow a strict discrimination between P. pruinosus and the other species. From the literature, it was impossible to assign the herein recognized sibling species to any previously described taxa. This study gives new insights in the P. pruinosus complex but also highlights the difficulties to identify and name species in the absence of revised and updated diagnoses of the genus Porcellionides.

RÉSUMÉ

L’isopode terrestre Porcellionides pruinosus (Brandt, 1833) est considéré comme l’une des espèces de cloportes les plus répandues de par le monde, principalement en raison de son caractère synanthropique. Des études récentes ont cependant suggéré que certaines populations, bien que morphologiquement très proches, pourraient en fait correspondre à des espèces différentes. Dans cette étude, six populations géographiquement éloignées ont été examinées dans une perspective taxonomique. Des séries de croisements en laboratoire ont tout d’abord confirmé l’isolement reproductif entre deux groupes de populations. Par la suite, des tests de comportement ont mis en évidence une barrière d’isolement pré-zygotique, en l’absence de reconnaissance sexuelle entre mâles et femelles de ces deux groupes. Ces résultats, ainsi que ceux issus d’analyses moléculaires préalables, apportent des preuves convergentes de l’existence de deux espèces séparées. L’examen
morphologique n’a pas permis de déceler de caractères méristiques autorisant une discrimination stricte entre *Porcellionides pruinosus* et l’autre espèce. À partir de la littérature existante, il n’a pas été possible d’assigner l’espèce jumelle à aucun des taxons déjà décrits. Cette étude apporte une lumière nouvelle sur le complexe *P. pruinosus*, mais révèle aussi la difficulté à identifier et nommer les espèces en l’absence de diagnoses révisées et actualisées du genre *Porcellionides*.

**INTRODUCTION**

The terrestrial isopod, *Porcellionides pruinosus* (Brandt, 1833) has a confusing taxonomic history (see Vandel, 1962; Garthwaite & Sassaman, 1985). It belongs to the family Porcellionidae Brandt & Ratzeburg, 1831, in the suborder Oniscidea Latreille, 1829. According to Vandel (1962), *P. pruinosus* originates from the oriental Mediterranean region (Asia Minor), and has spread throughout the world as the result of human activities. This synanthropic species is commonly viewed as the most widely distributed terrestrial isopod (Dollfus, 1897; Vandel 1960, 1962). Specimens identified as this species have been reported from Europe, Africa, America, Asia, and many islands of the Pacific, Atlantic, Austral, and Indian oceans (Garthwaite & Sassaman, 1985, and references therein). In fact, it seems that only polar regions have not been colonized by *P. pruinosus*. Authors also reported an extensive polymorphism in *P. pruinosus*, with numerous subspecies recognized throughout the world (Vandel, 1962; Kensley et al., 2005). However, subspecific taxa were based solely on morphological criteria, and their biological validity has been questioned repeatedly.

In 1985, Juchault et al. met with difficulties when attempting to cross specimens from France and Togo. In the same year, Garthwaite & Sassaman (1985) used laboratory crossings and morphological characters to identify a new species from North America, which they named *Porcellionides floria*. They suggested, as Racovitza (1908) did many years before, that *P. pruinosus* (Brandt, 1833) might consist of a number of distinct and localized species rather than represent one cosmopolitan species. Recently, genetic results revealed distinct mitotypes and high nucleotide divergences between French, Tunisian, Greek, and Réunion Island populations (Marcadé et al., 1999; Michel-Salzat et al., 2001). Results of crossings also suggested that the French populations on the one hand, and the other three populations on the other, may belong to different species (Marcadé et al., 1999).

In the present study, the taxonomic status of these two groups was re-examined. Additional populations were investigated as they could represent geographical clines. First, laboratory crossings were performed and results were compared to those previously obtained by Marcadé et al. (1999). Second, male-female encounters were analysed to assess the existence of a pre-zygotic reproductive isolation between the two groups of populations. Third, a morphological study