

ORIBATID MITES IN THE FLEVOPARK IN AMSTERDAM (ACARI: ORIBATIDA)

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The Flevopark is one of the most special green areas of Amsterdam with a rich nature. Twelve oribatid mite species were collected here in 2014 from bark and mosses on trees. *Liacarus acutus* and *Perlohmanna dissimilis* are reported for the first time from the Netherlands. It is not clear if the newly recorded species have always been overlooked or are recent immigrants.

INTRODUCTION

Mites (Acari) are small arthropods. They form an extremely diverse and abundant group of arachnids with approximately 55,000 species worldwide (Doğan et al. 2003, Krantz & Walter 2009). They have successfully adapted to a wide range of habitats from the sea and freshwater to all terrestrial habitats (Eisenbeis 2006, Gulvik 2007, Doğan et al. 2015).

Oribatida, also known as moss mites, armoured mites or beetle mites, is a suborder of mites, in the order Sarcoptiformes within the superorder

Acariformes (Krantz & Walter 2009, Yalçın et al. 2013). Oribatids belong to the soil fauna, being actively involved in the decomposition of organic matter, nutrient cycles and soil formation. The active instars feed on a variety of resources, including living and dead plant and fungal material, lichens and carrion; some are predaceous, but none are parasitic (without the Astigmatina, now considered as a part of the Oribatida) (Ocak et al. 2008, Krantz & Walter 2009). Oribatids have proven useful as bioindicators, especially of heavy metal pollution (Siepel 1995, Walter et al. 2013). They are probably the most numerous of the soil

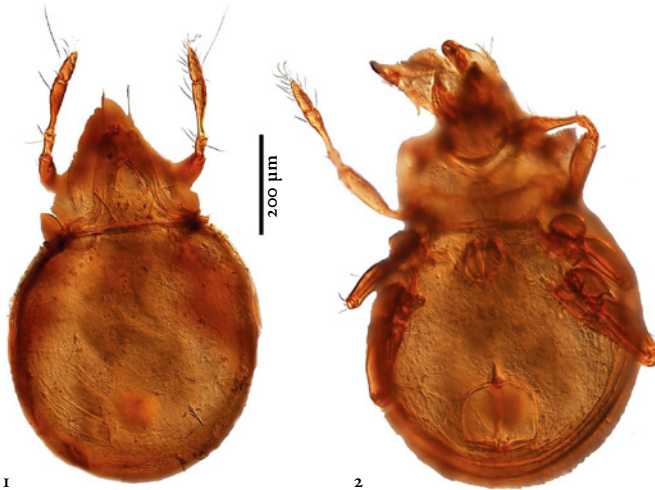


Figure 1-2. *Liacarus (Dorycranosus) acutus*, 1. dorsal view, 2. ventral view. Photos Salih Doğan & Hasan Hüseyin Özbek.
Figuur 1-2. *Liacarus (Dorycranosus) acutus*, 1. dorsaal, 2. ventraal. Foto's Salih Doğan & Hasan Hüseyin Özbek.

Table 1. Oribatid mites found in the Flevopark in Amsterdam.

Tabel 1. Mosmijten aangetroffen in het Flevopark in Amsterdam.

Hypochthoniidae	<i>Hypochthonius rufulus</i> Koch, 1835
Nothridae	<i>Northrus anauniensis</i> Canestrini & Fanzago, 1876
	<i>Northrus pratensis</i> Sellnick, 1929
Oribatellidae	<i>Oribatella quadricornuta</i> (Michael, 1880)
Tectocephidae	<i>Tectocephus alatus</i> Berlese, 1913
Liacaridae	<i>Liacarus acutus</i> Pschorn-Walcher, 1951
Achipteriidae	<i>Achipteria coleoprata</i> (Linnaeus, 1758)
Perlohmanniidae	<i>Perlohmannia dissimilis</i> (Hewitt, 1908)
Punctoribatidae	<i>Punctoribates</i> spec.
Euphthiracaridae	<i>Acrotritia ardua</i> (Koch, 1841)
Phthiracaridae	Phthiracaridae spec.
Oppiidae	Oppiidae spec.

mites, with more than 10,000 species being listed worldwide (Subías et al. 2012).

The city of Amsterdam is situated in a green zone in the province of North Holland, and is sometimes referred to as the greenest city in Europe. It is home to a large variety of fauna and flora. There are 28 parks in Amsterdam. The Flevopark, located on the eastern boundary of Amsterdam, is one of the greenest areas of the city (fig. 3, 4). Construction of the Flevopark started in 1928. In those days, the area was part of a large polder, a marshland reclaimed in 1631. This city park has a very high biodiversity, and is very important to the urban ecological structure (Vereniging Flevopark 2014).

The mite fauna of the Flevopark is poorly investigated. With our study on oribatid mite fauna we want to contribute to the knowledge of the biological diversity of Amsterdam. The study materials were collected from bark and mosses on trees at the Flevopark in Amsterdam, the Netherlands, 23 September 2014 and 14 October 2014, collected by first and last author. Methods used for the collection, extraction and preparation of the mite specimens followed Doğan & Ayyıldız (2003) and Doğan (2006). The mite

specimens were examined and identified with the aid of a Leica DM 4000 B phase contrast and Olympus B×63 DIC microscopes. Materials examined are deposited in the collection of the Acarology Laboratories of Erzincan University, Turkey.

RESULTS

During this study a total of 12 oribatid species have been collected from the samples: nine identified species belonging to eight families, one unidentified species of the genus *Punctoribates* in the family Punctoribatidae and one undetermined genus in each of the families Phthiracaridae and Oppiidae (table 1). Of these species, *Liacarus acutus* and *Perlohmannia dissimilis* are new records for the Dutch fauna.

Liacarus (Dorycranosus) acutus Pschorn-Walcher, 1951 (fig. 1, 2)

The genus *Liacarus* comprises four subgenera, including *Dorycranosus*. The humeral region of this species has two pairs of setae (*c1* and *c2*), placed near each other; the bothridial seta are claviform; the cuspidium with an internal, well



Figure 3. Location of the Flevopark. Illustration Ozan Arif Kesik.
 Figuur 3. Locatie van het Flevopark. Illustratie Ozan Arif Kesik.



Figure 4. Flevopark, habitat of the two newly recorded mite species. Photos Salih Doğan.
 Figuur 4. Flevopark, leefgebied van de twee nieuwe mijten. Foto's Salih Doğan.

and sharply developed tip; the setae *le* inserted away from the end of the tip. The morphology of the juvenile was studied by Ermilov (2012).

This species occurs mainly in forest soil (Weigmann 2006). *Liacarus acutus* has a Western Palearctic distribution (Subías & Shtanchaeva 2012, Subías et al. 2012, 2013), and has already

been recorded in the Balkan Peninsula and Russia (Mahunka & Mahunka-Papp 2008, Ermilov 2012, Mahunka et al. 2013). We found eight specimens, which represent the first record for the Netherlands (Van der Hammen 1952, Siepel et al. 2009, 2012, Siepel & Dimmers 2010).



Figure 5. *Perlohmannia dissimilis*. Photos Salih Doğan & Hasan Hüseyin Özbek.

Figuur 5. *Perlohmannia dissimilis*. Foto's Salih Doğan & Hasan Hüseyin Özbek.

***Perlohmannia dissimilis* (Hewitt, 1908)
(fig. 5)**

The rostrum is rounded frontally; the rostral setae arise in a row; the lamellar setae are considerably shorter than the rostral setae and especially shorter than the interlamellar setae; the lateral rim of notogaster is narrow; the setae of the median row of the notogaster are shorter than the lateral and pygidial setae; the genital plate is longer than wide.

This species occurs mainly on forest floors, on the soil surface and in moss. It is considered mesohydrophilic (Weigmann 2006, Arroyo et al. 2013), also known to cause damage to the root systems of potato, strawberry and tulip and could be found on strawberries and tulips in greenhouses (Zhang 2003). *Perlohmannia dissimilis* has a

Palearctic and Oceanian distribution and is known from central and southern Europe, western Central Asia and east Asiatic Russia and Hawaii (Subías & Shtanchaeva 2012, Subías et al. 2012, 2013) and in Europe has been recorded in Great Britain and Ireland (Luxton 1996, Mortazavi Lahijani et al. 2010, Arroyo et al. 2013). This species is not reported in the lists of the oribatid mites of the Netherlands (Van der Hammen 1952, Siepel et al. 2009), nor in later works carried out in the country (Siepel et al. 2012, Siepel & Dimmers 2010). We found one specimen, which therefore is the first record from the Netherlands.

DISCUSSION

Determining urban mite diversity is important because human developments cause rapid change to natural lands, and great losses in biodiversity. Biodiversity conservation in urban environments is possible by protecting green areas and adding biodiversity friendly habitats within urban landscapes (Steinke 2014).

In this paper, we have found two new species for the Netherlands: *Liacarus acutus* and *Perlohmannia dissimilis*. This raises the total number of Oribatida species for the Netherlands to 338. These new records indicate that the actual number of Oribatida species in the Netherlands might be much higher. This would demand further studies by examining more habitats and locations.

Some oribatid species originate from southern Europe and probably came in the Netherlands by transport of soil (as part of plant soil with park plants or trees), dispersal via other animals (phoresy) or on air currents. Both new species have a southern distribution, but it is not possible to know if they entered the Netherlands aided by man.

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SAMENVATTING

Mosmijten in het Flevopark in Amsterdam (Acari: Oribatida)

In 2014 werd een kort onderzoek uitgevoerd naar de mosmijten van het Flevopark in Amsterdam. In totaal werden 12 soorten aangetroffen, waarvan twee nieuwe soorten voor de Nederlandse fauna: *Liacarus acutus* and *Perlobmannia dissimilis*. Het is niet duidelijk of deze soorten altijd over het hoofd zijn gezien of dat het recente immigranten zijn.

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