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Mangora acalypha new to Finland, with notes on other araneid species spreading northwards (Araneae, Araneidae)

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Two specimens of *Mangora acalypha* (Walckenaer, 1802) were found in a rich pine fen in Hammarland on the Åland Islands in 2015. The possible connection of global climate change with five recently (within the last 15 years) recorded araneid species as new to Finland is discussed. These are, in addition to *M. acalypha*, *Agalenatea redii* (Scopoli, 1763), *Argiope bruennichi* (Scopoli, 1772), *Larinioides sclopetarius* (Clerck, 1757), *Neoscona adianta* (Walckenaer, 1802).

Mangora acalypha

Two specimens of the araneid spider *Mangora acalypha* (Walckenaer, 1802) were found by the first author in a small semi-open rich pine fen in Hammarland on the Åland Islands on June 9, 2015. The first one was found in the middle of its orb web (Fig. 1) and the second one by sweeping low grassy vegetation. Both specimens were juveniles but the species is recognisable by its overall appearance.

The specimens are apparently the first ones found in Finland. However, in the publication of the Nordic mire fauna based on material mainly collected during the 1930s, Krogerus (1960) listed *Mangora acalypha* in the category of species occurring as ”a few” (includes also single findings) individuals in *Ledum-Calluna* peat bog(s) in southernmost mainland Finland (western Uusimaa). In the publication on Finnish Araneidae (Palmgren 1974), there is no mention of *Mangora*, nor is it later listed in the checklist of Finnish spiders by the same author (Palmgren 1977), even though the publication by Krogerus (1960) occurs in both reference lists. At least part of the material of Krogerus is deposited in the Zoological Museum in Helsinki, but among these no specimens determined as *M. acalypha* have been found. So the possible older observation has remained unsolved. Therefore the species is also omitted from the latest checklist of spiders in Finland (Koponen & Fritzén 2013).

Mangora acalypha occurs mainly on low vegetation in different kinds of open to semi-open habitats and is fairly common throughout Europe, excluding the northernmost parts (Roberts 1995, Hänggi et al. 1995, Nentwig et al. 2015).

Southern araneids recently found in Finland

During the last 15 years, five araneid species have been found as new to the Finnish spider fauna. These are *Agalenatea redii* (Scopoli, 1763), *Argiope bruennichi* (Scopoli, 1772), *Larinioides sclopetarius* (Clerck, 1757), *Neoscona adianta* (Walckenaer, 1802) and the present *Mangora acalypha*.

Neoscona adianta was found near Helsinki in 2001 (Koponen et al. 2007) and the second observation is from the westernmost part of the Archipelago National Park, Jungfruskär in Houtskär, 2007 (SK). *Agalenatea redii* was recorded for the first time in Finland on the Åland Islands in 2003, and two years later it was found in mainland Finland on the Hanko (Hangö) peninsula (Fritzén 2005). From 2006 up to the early summer of 2014 it was additionally found twice in Hanko and at its apparently northernmost locality in Europe near the biological station of Valsörarna in Korsholm (Mustasaari) (63°25'N) (Fritzén 2015). Later in 2014 *A. redii* was found in Helsinki, which is the easternmost locality in Finland (TP & R.A. Väisänen) and in 2015 together with *Mangora* again on the Åland Islands (NRF) (Fig 2.). In 2003, *Larinioides sclopetarius* was found on the Åland Islands, at the Nåtö Biological station in Lemland and at the harbour in Mariehamn (Fritzén 2005). Nowadays it is widely distributed throughout the Åland Islands, and there are several records in southwestern coastal areas of Finland. The northernmost locality is Lampaluoto in Pori (61°38'N; R. Pajarre) and the easternmost ones are Espoo and Helsinki. *Argiope bruennichi* was photographed near Helsinki in 2005 (Koponen et al. 2007), and by 2011 we had 16 observations (17 specimens) and also two egg sacs with live spiderlings inside (Terhivuo et al. 2011). Today there are records from more than 30 localities, seven of which were received through

Fig. 1. One of the two specimens of *Mangora acalypha* found on the Åland Islands on June 9, 2015. Photo: N.R. Fritzén.

Fig. 2. A female of *Agalenatea redii* found together with *Mangora acalypha* in 2015. The several records of *A. redii* along the south coast of Finland and on the Åland Island indicate that the species is already established in southern Finland. Photo: N.R.Fritzén.

an inquiry to the public in 2013 (Koponen et al. 2014). The northernmost record is from Seinäjoki (62°50'N; M. Anttila). The situation of spider records up to the end of 2013 is shown by Koponen et al. (2013).

Whether the dispersal of these five species (four of which occurring on open and sunny places) and the establishment of them in southern Finland (of at least *Agelenatea redii, Larinioides sclopetarius* and *Argiope bruennichi)* is connected to global climate change is open to discussion. The rapid dispersal of *A. bruennichi* to North Europe has often been considered a result of climate change (e.g. Kumschick et al. 2011). Krehenwinkel & Tautz (2012) suggested that, in addition to climate change, admixture of different genetic lineages is a reason for the capability to disperse to cold, northern areas. Many records in Finland (14 of the total 33) are from the year 2011, which was very warm (the second warmest ever measured) but also rainy in southern Finland. Taking these warm years with new records of southern species into account makes the unverified older record of *M. acalypha* perhaps more likely, because it was probably from a warm period of the 1930s (Krogerus 1960).

When searching "spiders + climate change" on the internet, many results, reflecting people's fear of spiders, relate to warnings that "dangerous" spiders (such as *Loxosceles, Latrodectus, Tegenaria*) will disperse to the north, invade houses and probably become larger, quicker and therefore more terrifying. But also in reality, climate change will be an important factor in research on the ecology and biogeography of spiders. One main question in future studies on biogeographic patterns will be how the spider species will respond to climate change (Gillespie 2013).

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