The enemy of the *Meta menardi* egg-sac

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In their excellent review, Bee, Oxford & Smith (2017) cover many aspects of spiders. Among other things, 47 different types of egg-sacs are described, marked with a pictogram showing whether female attend the egg-sac or not. In the case of females carrying their egg-sac (i.e. wolf spiders), the presence clearly means guarding. In some *Tegenaria* species, the female is never present on the egg-sac, but foreign substances inside and adhereing to the surface of the egg-sac may provide protection.

To my surprise, the female *M. menardi* was categorized as never present with the egg sac. According to my observations in Hungary (Fig. 1), the female is almost always on the egg-sac between June and October. A significant part of the literature present the same conclusion. According to Hörweg, Blick & Zaenker (2011), the female guards the egg-sac until her death, while according to Mammola & Isaia (2014) the female guards it until the spiders hatch. The fact of guarding can therefore be accepted for *M. menardi* (at least in continental Europe), so the question arises as to what enemy the egg-sacs are protected from.

Fig. 1: *Meta menardi* (Latreille, 1804) female guarding egg-sac. © Géza Szabó.

M. menardi is a species adapted to caves. At a sufficient distance from the cave entrance, there are very few or indeed no enemies of the species or its egg-sacs. I have observed that *M. menardi* mostly prefers to live in certain places, while avoiding other, similar places. A male stayed in one place for a month and a half (Szabó, 2016). In the caves, I observed several times some of the egg-sacs were in the same places year after year and, interestingly, I could not find the empty ones from the previous year.

I hypothesize that the female of *M. menardi* guards its egg-sac, and its ideal location, from other females preparing to lay eggs. In this way, the time of protection adapts to the time of making the egg-sac. This hypothesis could be experimentally tested, but is practically difficult.

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The comb-footed spider *Theridion hannoniae* Denis, 1945 in Sweden and Denmark

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Theridion hannoniae Denis, 1945 was unknown to Northern Europe just a few decades ago. During the last thirty years or so it has expanded its range considerably in Central and Northern Europe (Bink & Helsdingen, 2014; Bosmans *et al*., 1994; Warmingham & Merrett, 2009; Řezáč *et al*., 2021). The original distribution included Western Europe, the Mediterranean and Macaronesia (Knoflach *et al*., 2009). Climate change is likely to have aided its northward expansion of range. It appears that *T. hannoniae* largely has occupied man made xerothermic habitats such as harbour, industrial and railway wastelands (Figs. 1–2). This is true for Denmark and Sweden, only one record is from a hothouse in a garden centre. The species seems unable to colonize natural habitats which would be among stones in sun exposed conditions. This could indicate that the spread of the species is coupled to human transportation of goods rather than by natural ballooning. Spread seems facilitated by rail in particular, as nearly all records are from railway wasteland. It has been proposed that species introduced to man made xerothermic habitats could be subject to less competition from established populations of native species (Řezáč *et al*., 2021), which may explain why there has been little or no spread to natural habitats where competition could be fiercer. Another explanation could be that man made xerothermic habitats are warmer than most natural habitats of Northern Europe.

Fig. 1: Railway wasteground at Halmstad, Sweden, typical habitat of *Theridion hannoniae* Denis, 1945. In such habitat it is found in very hot conditions under sheet metal, black rubber, or dark stones, all of which absorb much heat from sunlight. © Lars J. Jonsson.

Theridion hannoniae was first recorded in Denmark in 2007 from railway wasteland at Kalundborg. A few years later, after a period of more intense collection efforts targeted at railway wastelands, it became clear that the species was already fairly widespread. Thus, not much is known about how and when *T. hannoniae* expanded its range in Denmark. Such unnoticed expansion is also known as cryptic invasion. The species was first detected in Sweden in 2012 from railway wasteland in Gothenburg (Fig. 3). Later, it was realized that unidentified juvenile theriidids collected in 2008 in Ystad by the second author also belonged to this species. In 2016, adults were collected from the same locality, confirming the presence of this species in Ystad. Further Swedish records came from Malmö and Halmstad. The distribution in Sweden and Denmark is mapped in Fig. 4.

The species is quite variable when it comes to colouration of abdomen (Figs. 3, 5–6). Usually, abdomens are whitish-grey with black spots or blotches lining a paler

 ISSN 0959-2261

Fig. 2: Underside of a piece of rusty sheet iron with retreat built by a female *T. hannoniae*. © Lars J. Jonsson.

Fig. 3: *Theridion hannoniae* live male from Gothenburg, Sweden, yellow colour form. Right image shows venter, note the two white dots behind the epigastric furrow characteristic of the species. © Jørgen Lissner.

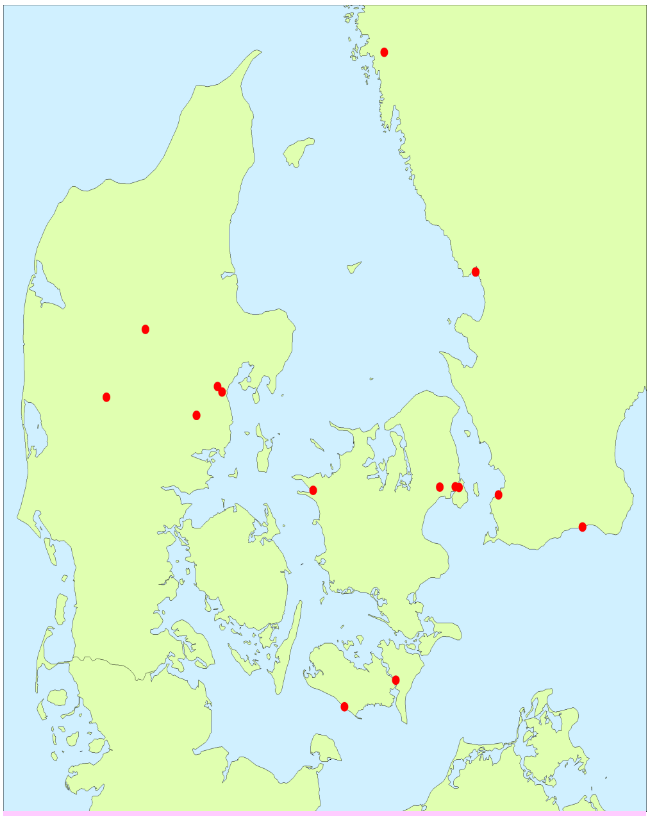

Fig. 4: Map showing the currently known distribution of *T. hannoniae* in Denmark and Sweden. © Jørgen Lissner.

Fig. 5: *Theridion hannoniae* variable colouration of abdomens (live specimens photographed). © Jørgen Lissner.

median band (Figs. 2, 5), only some specimens have markings in yellow or red (Figs. 3, 6). Some specimens are rather dark since the black blotches occupy a relatively large area of the abdomen (Fig. 5, bottom image). Reddish

Fig. 6: *Theridion hannoniae* live female from Skanderborg, Denmark. A less common colour form with a reddish abdomen. © Jørgen Lissner.

specimens may superficially resemble *Theridion familiare* O. Pickard-Cambridge, 1871, but they lack the bicoloured carapace characteristic of this species (Fig. 6).

Material examined

Denmark: Amager, Grønjordsvej, industrial wasteland; 55.6551°N, 12.5933°E; 18th August 2018; 3♀♀; leg. J. Lissner; coll. NHMD; Aarhus, Billig Blomst Garden Centre, hothouse; 56.1765°N, 10.1300°E; 20th August 2018; 1♂; leg. J. Lissner; coll. NHMD; Kalundborg, railway wasteland; 55.6773°N, 11.1020°E; 20th July 2007; 1♀; leg. J. Lissner; coll. NHMD; Aarhus, Godsbanen, railway wasteland; 56.1502°N, 10.1853°E; 31st May 2020; 2♀♀; leg. J. Lissner; coll. NHMD; Rødbyhavn, railway wasteland; 54.6570°N, 11.3613°E; 5th November 2010; 1♀; leg. J. Lissner; coll. NHMD; Copenhagen, Otto Busses Vej, railway wasteland; 55.6603°N, 6.5545°E; 4th November 2010; 2♀♀; leg. J. Lissner; coll. NHMD; Herning, railway wasteland; 56.1313° N, 8.9880°E; 21st June 2012; 4♀♀; leg. J. Lissner; coll. NHMD; Viborg, railway wasteland; 56.4494°N, 9.3937°E; 26th November 2012; 1♀; leg. J. Lissner; coll. NHMD; Skanderborg, railway wasteland; 56.0434°N, 9.9177°E; 7th June 2013; 1♂1♀; leg. J. Lissner; coll. NHMD; Glostrup, railway wasteland; 55.6620°N, 12.3959°E; 1st August 2013; 1♀; leg. J. Lissner; coll. NHMD; Nykøbing Falster, railway wasteland; 54.7708°N, 11.8810°E; 23rd May 2017; 1♀; leg. J. Lissner; coll. NHMD. Sweden: Ystad, railway wasteland; 55.4271°N, 13.8303°E; 25th October 2008; 8 juveniles; leg. L. Jonsson; coll. L. Jonsson; Ystad, railway wasteland; 55.4271°N, 13.8303°E; 7th August 2016; 2♀♀; leg. L. Jonsson; coll. L. Jonsson; Gohtenburg, Kruthusgatan, railway wasteland; 57.7136°N, 11.9870°E; 30th July 2012; 1♂; leg. J. Lissner; coll. NHMD; Ystad, railway wasteland; 55.4271° N, 13.8303°E; 3rd August 2017; 1 juvenile, 1♀; leg. Å. Hedman; coll. Å. Hedman; Halmstads hamn, railway wasteland; 56.6580°N, 12.8667°E; 30th September 2017; 2♀♀; leg. L. Jonsson; coll. L. Jonsson; Malmö, Neptunigatan, road construction site; 55.6082°N, 12.9908°E; 21st July 2020; 1♀; leg. L. Jonsson; coll. L. Jonsson.

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Who's the real false widow: an account of my MSc thesis

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Introduction

My main interest as a researcher has always been venom – it's an endlessly fascinating topic but quite a tough area to get into and establish yourself. I started a Biodiversity, Taxonomy and Evolution MSc at Imperial College London in October 2018 – coming off the back of my undergraduate degree where my thesis had been a heavy computational analysis into different spider venoms, I was excited to refine my skills and grab any opportunity to work with venomous animals. The main draw of the MSc for me was the final project – where, essentially you had 6 months (or more if you were prepared!) to carry out a research project. While there is a list of pre-prepared projects available, providing you can find an internal supervisor, there is the option to work with senior researchers to come up with your own project.

My motivation for scientific research stems from wanting to shed light on neglected species, to contribute to the scientific literature to improve our understanding, and to ensure I am the best science communicator I can be to get people excited about science. When you spend time wrapped up in academia and focusing exclusively on research, it can be easy to forget just how little people know (or worse, *care*) about science – a lesson learnt particularly throughout the pandemic.

With these motivations in mind and a recent flurry of tabloid newspaper articles in the beginning of 2019, it led me to researching the Noble False Widow spider (*Steatoda nobilis*) for my MSc thesis. Is there a spider as polarising as *Steatoda nobilis*? A striking looking spider with a reputation for delivering bites that have occasionally put people in hospital and leads to an enormous amount of conflict whenever it's discussed. It is deeply frustrating as an ex-arachnophobe and scientist to see the hard work put in by countless people to ensure there is a nuanced discussion about these animals undone with a tabloid article or an errant comment from another individual on how they are 'aggressive'.

The truth is even in 2022 we are lacking such vital data on these spiders; from their true native range to their genetics, making it difficult to convey the full picture of this species. The spiders do not pose a significant risk to humans. They are docile and almost all bite cases recorded have been a result of an unfortunate accident – of the 25 confirmed bite cases worldwide by *S. nobilis,* eight of them occurred during sleep and five from being trapped in clothing (Dunbar *et al.,* 2022). However, that's not to say they should be labelled as harmless – rather, the perceived risk of them has been overblown. Suffice to say, you could probably fill a whole

 ISSN 0959-2261