

However, that's not quite the end of the story. A single male turned up in a different part of the Moss during a visit in February this year (Fig. 5) and also, it appears, the spider was again found during a visit by the still esteemed (see last edition's article) editor of this Newsletter this September.

Look out for a further ripping yarn – The Perilous *Atypus* Expedition in the next issue (space and editor's forbearance permitting).

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Most Northerly Record of *Arctosa cinerea* (Araneae: Lycosidae) Found at Morrich More Site of Special Scientific Interest (VC106 East Ross & Cromarty, Scotland) in Atypical Habitat

by Chris Cathrine

Arctosa cinerea was recorded at Morrich More Site of Special Scientific Interest (SSSI) (VC106 East Ross & Cromarty) during site condition monitoring surveys completed by Caledonian Conservation Ltd, under contract to Scottish Natural Heritage (SNH). The site condition monitoring surveys at Morrich More SSSI targeted the notified invertebrate assemblage feature, which included Diptera, Lepidoptera and Cladocera, but not Araneae.

A single female was recorded by Chris Cathrine on 11 August 2015 in stabilised dune habitat with large areas of bare sand, which are periodically submerged (NH814841). The spider ran on to a sweep net resting on the sand while the surveyor was sorting specimens of flying insects, which were the target of the survey.

UK literature suggests that *A. cinerea* occupies stony habitats on the shores of watercourses, and so it is interesting to record a specimen on sandy substrates (Roberts, 1996; Bee *et al.*, 2017). However, in Sweden *A. cinerea* is known from sandy seashores, and is found in similar habitat in Georgia (Almquist, 2005; Mcheidze, 2014). Furthermore, Framenau *et al.* (1996) found that *A. cinerea* in Germany have two stages in their life cycle: the first vagrant, utilising shingle and rocky substrates; the second within a burrow in sand. The observation of *A. cinerea* at Morrich More SSSI suggests that this species also uses sandy substrates in Scotland. This appears to be the most northerly record of *A. cinerea* in the UK at time of writing.

Arctosa cinerea is Nationally Scarce but not assessed as qualifying for an IUCN threat category in the latest status review (Harvey *et al.*, 2017).

Note that all invertebrate records collected during site condition monitoring undertaken by Caledonian Conservation Ltd in Scotland are available at full resolution on the NBN Atlas as required under SNH contract (<https://registry.nbnatlas.org/public/show/dp4>).

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Testing an Electrifying Old Hypothesis “on the Aerial Spider”

by Erica Morley

To disperse, over often astonishing distances, spiders take to the air and balloon on strands of gossamer silk. Ballooning in spiders has fascinated scientists for hundreds of years, many pondering how these wingless arthropods can glide as far as 4 km up in the sky and 1,600 km out to sea. In the early 1800s, John Murray, an renowned scientist of the day, proposed that ‘the aerial spider’ was propelled upwards by electrostatic forces (Murray, 1828). This was the time of Michael Faraday, when electricity was a new, exciting discovery on the forefront of people's minds. However, his argument was won over by John Blackwall's intuitive hypothesis that it was wind and aerodynamic drag forces that propelled spiders to become airborne (Blackwall, 1827, 1830). Today we know that aerodynamic drag forces from very light wind (less than 3 m/s) can facilitate ballooning and get spiders performing pre-ballooning tiptoe behaviour in the lab (Fig. 1), but there are several questions that have not been explained by this mechanism. For example, how do the often many strands of ballooning silk splay out and not tangle? And, how do large spiders become airborne on very calm-windless days?

The involvement of electrostatic forces in ballooning was never tested experimentally and since John Murray proposed electrostatic ballooning, there have been leaps forward in our understanding of atmospheric electricity in the natural environment (Wilson, 1903). In 2013 a physicist decided to do the maths and work out whether it would be possible for this force to get spiders ballooning, with what is now known about atmospheric electricity (Gorham, 2013). His calculations show that spiders could become airborne using electrostatic forces alone, without aerodynamic drag, but called for an ‘enterprising biologist’ to collect data to test the theory. I saw this as a challenge! Conducting a series of behavioural experiments