

Social interactions in a megapopulation of the Bridge Spider *Larinioides sclopetarius* (Clerck, 1757) (Araneae, Araneidae) at Nafford Sluice, Birlingham, Worcestershire.

Paul F. Whitehead

Moor Leys, Little Comberton, Pershore, Worcestershire, WR10 3EH. Email: paulpww@outlook.com.



01. Nafford sluice, Birlingham, Worcestershire, 21:52 hrs, 3 August 2022. Paul Whitehead.

Discussion

The Bridge Spider *Larinioides sclopetarius* (Clerck, 1757) is a well-known inhabitant of humanly fabricated structures particularly in river valleys. They are active at night and have a predilection for chironomid midges and a known attraction to artificial light (e.g. Winnall, 2022). During July 2022 it was observed that the sluice at Nafford, Birlingham, Worcestershire (SO940418) was permanently floodlit at night which continued into August. I visited the sluice on the nights of August 3rd and 13th with the objective of recording night-flying insects. The weather was warm and settled; on August 13th the temperature at 2100 hrs was 25°C. Although large night-flying insects were few, the number of active *L. sclopetarius* on the structure was remarkable.

Introduction

The sluice forms part of a river-spanning steel framework within which three sets of actuators are positioned in gated compartments each floodlit from the top (01). The floodlights are linear high-

intensity halogen bulbs and each compartment occupies some 22m³ of space; these compartments were completely filled with webs constructed by *L. sclopetarius*. The disposition of the webs was such that they can only have been constructed by a socially interacting community of spiders working to a common objective and individual spiders were observed adding strands to these webs (03). These 'super-webs' were used by numerous actively perambulating spiders as if they were searching for food items. Near the floodlights some webs contained nucleated waste piles of dead chironomid midges (*Chironominae* spp. *indet.*) assembled apparently by more than one spider.

The super-webs took two forms, one was a vast extraordinary concentric hub of web-strands (03) with a flood light at its centre. A large female *Steatoda grossa* (C. L. Koch, 1838) (02) was positioned immediately beneath one light to rapidly intercept night-flying moths beyond the ability of *L. sclopetarius*.



02. Nafford sluice, Birlingham, Worcestershire, 21:59 hrs, 3 August 2022. Female *Steatoda grossa* (C. L. Koch) occupying prime position beneath a floodlight. Paul Whitehead.



03. Nafford sluice, Birlingham, Worcestershire, 2119 hrs, 13 August 2022. Extraordinary metre deep concentric web-strand hub created and occupied by *Larinioides sclopetarius*. Paul Whitehead.



04. Nafford sluice, Birlingham, Worcestershire, 2205 hrs, 13 August 2022. Part of a vertically disposed web-maze >2 m in height attended by many *Larinioides sclopetarius*. Paul Whitehead.

The other form of super-web was a more or less vertically-disposed web-sheet (04) tied to the side and top frames of each bay. Individual *L. sclopetarius* used these webs for routine movement usually without let or hindrance and each bay was estimated to accommodate 350 spiders in various stages of maturity. Occasional examples of other spiders tended to remain on the structure on the edges of the main activity areas; these included *Nuctenea umbratica* (Clerck, 1757). These observations imply that many spiders were

functioning communally in supporting the super-webs. It was also clear that a small number of spiders were acting individually by using these webs as support for their normal orb-webs. Female spiders constructing and using these webs demonstrated signalling systems (05) that notified wandering spiders of their right to a web and these included direct threat and defence signals to deter potential conspecific intruders.



05. Nafford sluice, Birlingham, Worcestershire, 2137 hrs, 13 August 2022. Female *Larinioides sclopetarius* adopting defensive threat stance when confronted by a conspecific female approaching from the left side of the web. Paul whitehead.

Although the basis for these observations is understood (e.g. Davidson, 2008; 2010) this sophisticated form of communal behaviour is seldom observed. These findings, in particular of the ability of an orb-web spider to construct webs to entirely different geometrical forms used by populations of many interacting spiders may well be novel (Heiling & Herberstein, 1998; Phangurha, 2018).

References

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Images

01. Nafford sluice, Birlingham, Worcestershire, 2152 hrs, 3 August 2022. Paul Whitehead.
02. Nafford sluice, Birlingham, Worcestershire, 2159 hrs, 3 August 2022. Female *Steatoda grossa* (C. L. Koch) occupying prime position beneath a floodlight. Paul Whitehead.
03. Nafford sluice, Birlingham, Worcestershire, 2119 hrs, 13 August 2022. Extraordinary metre deep concentric web-strand hub created and occupied by *Larinioides sclopetarius*. Paul Whitehead.
04. Nafford sluice, Birlingham, Worcestershire, 2205 hrs, 13 August 2022. Part of a vertically disposed web-maze >2 m in height attended by many *Larinioides sclopetarius*. Paul Whitehead.
05. Nafford sluice, Birlingham, Worcestershire, 2137 hrs, 13 August 2022. Female *Larinioides sclopetarius* adopting defensive threat stance when confronted by a conspecific female approaching from the left side of the web. Paul Whitehead.