Revalidation of *Wabasso replicatus* (Holm, 1950), and description from Britain (Araneae: Linyphiidae)

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Summary

Diplocentria replicata Holm, 1950 from Sweden was treated as a junior synonym of *Eulaira quaestio* Chamberlin, 1948 from Canada by Millidge (1984), who also redescribed the latter as the type species of the new genus *Wabasso*. This synonymy is here considered to be incorrect, and redescriptions and figures are provided of *Wabasso replicatus* (Holm, 1950) from British and Swedish material, and of *W. quaestio* (Chamberlin, 1948) from Canadian specimens. The epigyne of *Diplocentria bidentata* (Emerton, 1882) is also figured for comparative purposes. The occurrence and habitat of *W. replicatus* in Britain is discussed, and a distribution map for *W. replicatus* and *W. quaestio* is provided.

Introduction

Holm (1950) described *Diplocentria replicata* from both sexes from northern Sweden. He later (Holm, 1967) described as *replicata* a form from west Greenland which differed slightly in palp structure from the Swedish specimens. As part of his major work on North American linyphiids, Millidge (1984) erected the new genus *Wabasso* for two species, the type species being *Eulaira quaestio* Chamberlin, 1948, originally described from a single female from Manitoba, Canada. Millidge (1984) also examined other material from Canada, and in spite of recognising minor differences between North American and European specimens he concluded that *D. replicata* was a junior synonym of *Wabasso quaestio* (Chamberlin, 1948). *Note*: Millidge referred to the species as *questio*, but *quaestio* was the original spelling.

In July 1999 one of us (IKD) collected two males at Insh Marshes in the Spey valley, Scotland, which matched Holm's (1950) description of *replicata*. Their capture was reported briefly by Dawson (2000), and in the revised check list of British spiders (Merrett & Murphy, 2000) they were listed as *Wabasso quaestio replicatus* (Holm, 1950). At that time we decided to treat *replicatus* as a subspecies of *quaestio*, in recognition of the minor differences between them, but in the absence of females we were unsure of its taxonomic status. However, in July 2002 three females were found at Insh Marshes (Dawson & Dawson, 2003), and the British material was also compared with Swedish specimens of both sexes and samples of *quaestio* from three localities in Canada. This has shown that *W. quaestio* and *W. replicatus* should be considered as separate species. There is some variation within both species, but there are also consistent differences between them in both sexes. Marusik *et al*. (2000) had also expressed doubts about the conspecificity of *W. quaestio* and *W. replicatus*, based on zoogeographical considerations. The "*D. replicata*" described by Holm (1967) from west Greenland are *W. quaestio*. *Wabasso replicatus* has also been reported from two other localities in northern Sweden (Holm, 1983; Granström, 1978), northern and central Finland (Koponen, 1977; Koponen & Viramo, 1998; Koponen *et al*., 2001; Hoffmann, 2002), Norway (Aakra & Hauge, 2002), and several localities in northern and southern central Siberia (Eskov, 1994; Marusik *et al*., 2000), and probably from Iceland (Agnarsson, 1996).

Here we redescribe and figure *W. replicatus* from the British material and from Swedish specimens from the Holm collection, Museum of Evolution, Uppsala University (UZM), and *W. quaestio* from specimens from Quebec and Ontario from the Canadian National Collection, Ottawa (CNC). Comparative drawings are also provided of the epigyne of *Diplocentria bidentata* (Emerton). The habitats and distribution of both species of *Wabasso* are also discussed, and a distribution map is provided. All measurements are in mm, expressed to the nearest 0.05 mm.

Genus *Wabasso* Millidge, 1984

Wabasso Millidge, 1984: 149.

Type species: *Wabasso quaestio* (Chamberlin, 1948).

Other species included: *W. replicatus* (Holm, 1950), *W. cacuminatus* Millidge, 1984, *W. hilaroides* Eskov, 1988, *W. millidgei* Eskov, 1988, *W. tungusicus* Eskov, 1988.

Diagnosis: Small spiders of total length 1.3–1.9. Carapace unmodified, abdomen without scuta. Dorsal tibial spines 2221. Metatarsi I–III with a trichobothrium, TmIV absent. Position of TmI 0.3–0.5. Tarsus I longer than metatarsus I. In *W. quaestio*, *W. replicatus* and *W. cacuminatus*, metatarsus I of male with 2 stout curved prolateral spines (Fig. 6), absent in female. The male of *W. hilaroides* (from northern Siberia) has 7 spines on metatarsus I, and those of *W. millidgei* (N. Siberia) and *W. tungusicus* (Central Siberia) have none, but as the male palps and epigynes differ considerably from those of the first three species there may be some doubt as to whether these three Siberian species described by Eskov (1988) are correctly placed in *Wabasso*. Male palp: tibia with two dorsal trichobothria; paracymbium long and narrow; tegulum with translucent region anteriorly (in *W. quaestio*, *W. replicatus* and *W. cacuminatus*); embolic division with well-developed tailpiece, anteriorly divided into narrow curved embolus and shorter sclerotised ventral apophysis. Epigyne: a short broad scape, distal end forming an upturned rim; spermathecae and ducts simple.

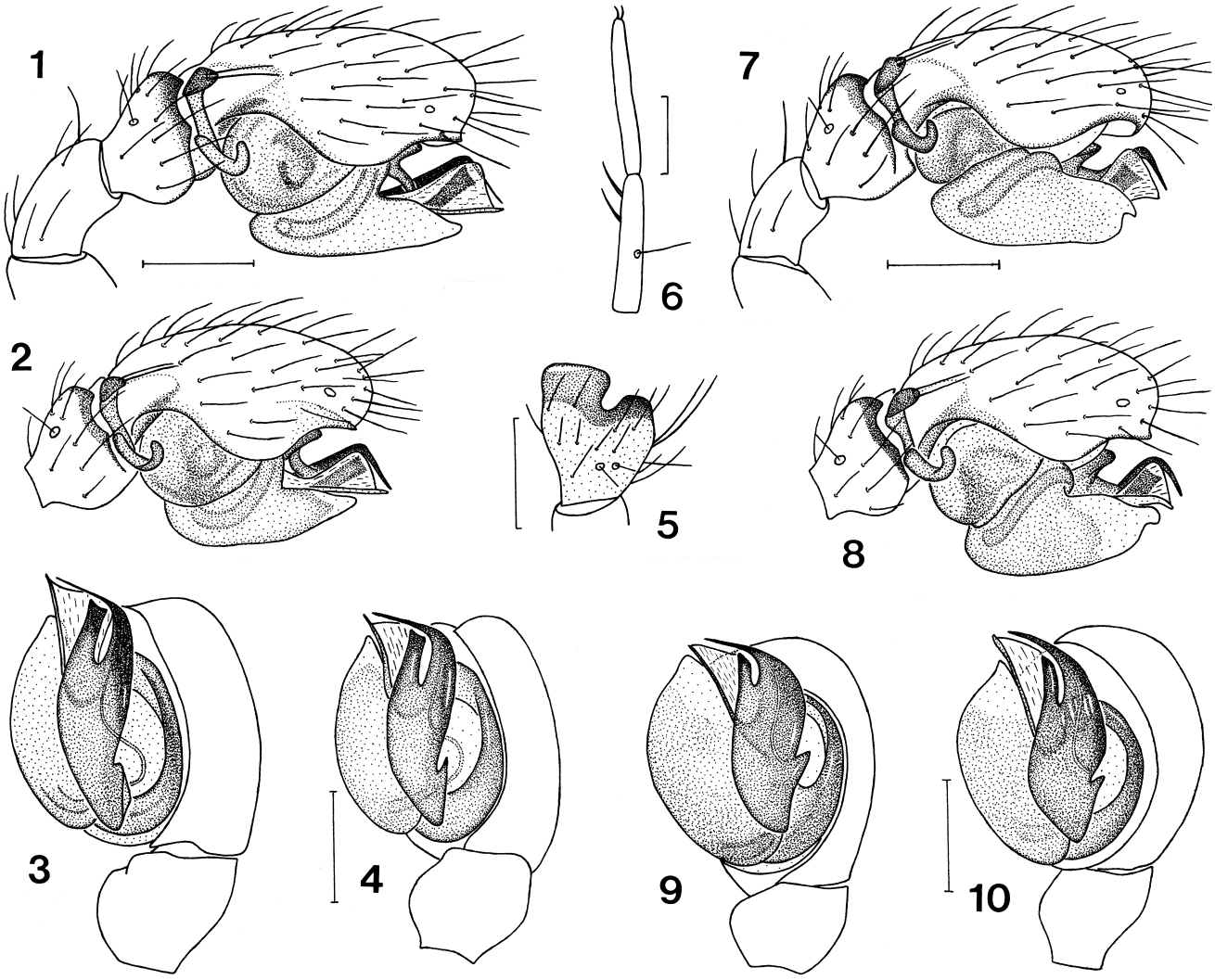
***Wabasso replicatus* (Holm, 1950)** (Figs. 1–6, 11–14, Map 1)

Diplocentria replicata Holm, 1950: 139, fig. 11a–e (descr. ♂♀); 1967: fig. 31 only (♂).
Wabasso questio: Agnarsson, 1996: 107, fig. 111a–d (♂♀).

Types: Holotype ♂, 3♀ paratypes, Sweden, Torne Lappmark, Kopparåsen, 8 June 1945, sieved from lichen-rich *Empetrum* heath in subalpine zone, leg. Å. Holm (UZM), not examined.

Material examined: SWEDEN: Pite Lappmark, Peljekaise national park, near Uppsala University field station, south end of Lake Tjallasjaure, sieving *Sphagnum* in *Betula nana* bog, 5♂ 8♀, 21 June 1981; same locality, mire by small lake, 6♂ 1♀, 12 June–7 July 1981, pitfall traps; all leg. Å. Holm (UZM), habitat described in Holm (1983). GREAT BRITAIN: Scotland, Inverness-shire, Insh Marshes, grid ref. NH 812025, alt. *c*. 220 m, sieved from flood litter, 2♂, 15 July 1999; same locality, 3♀, raking *Molinia* tussocks and sieving *Sphagnum*, 13 July 2002; all leg. I. K. & D. Dawson (Dawson coll.).

Diagnosis: Males can be distinguished from those of *W. quaestio* most easily by the shape of the palpal tegulum in lateral view; in *replicatus* the distal half is narrow and tapers smoothly to a point, whereas in *quaestio* it is broader and terminates in a small rounded dorsal projection (Figs. 1–2 cf. Figs. 7–8). This difference is clearly recognisable in the drawings of *replicatus* in Holm (1950: fig. 11a) and Agnarsson (1966: fig. 111c) and of *quaestio* by Holm (1967: fig. 28) and Millidge (1984: fig. 112). There are also differences in the proportions of the embolic division, the proximal part in *W. replicatus* being relatively narrower and the distal apophysis usually being larger than in *W. quaestio* (Figs. 3–4 cf. Figs. 9–10), but there is some variation and these differences are less clear-cut than the shape of the tegulum. Females are distinguished from those of *W. quaestio* most reliably by the form of the epigyne in postero-dorsal view; in *replicatus* the epigyne tapers to a point, and the ducts can be seen diverging towards the spermathecae, whereas in *quaestio* the epigyne is truncated posteriorly, and the ducts run almost parallel to each other (Fig. 12 cf. Fig. 17). The epigyne also appears more pointed in *replicatus* in ventral view (Fig. 11 cf. Fig. 16), but the appearance varies considerably according to the precise angle of view. The epigyne



Figs. 1–10: **1–6** *Wabasso replicatus* (Holm). **1** Right male palp, retrolateral (Insh); **2** Ditto (Sweden); **3** Right male palp, prolateral, hairs omitted (Insh); **4** Ditto (Sweden); **5** Male palpal tibia, dorsal (Insh); **6** Right male metatarsus and tarsus I, dorsal, fine hairs omitted (Insh). **7–10** *Wabasso quaestio* (Chamberlin). **7** Right male palp, retrolateral (L'Isle Verte, Quebec); **8** Ditto (James Bay, Ontario); **9** Right male palp, prolateral, hairs omitted (L'Isle Verte); **10** Ditto (James Bay). Scale lines=0.1 mm (1–5, 7–10), 0.2 mm (6).

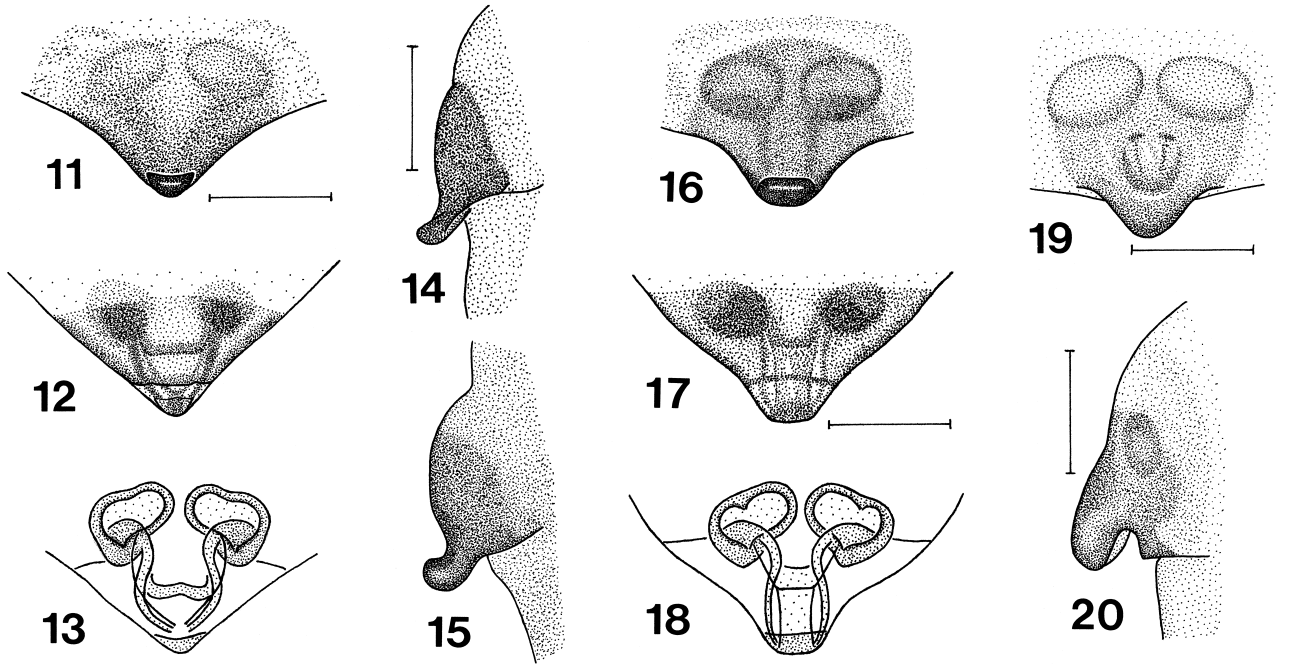
of *quaestio* also tends to end in a more obviously upturned knob in lateral view (Fig. 15 cf. Fig. 14), but this may not be reliable. The epigyne of *Diplocentria bidentata* looks rather similar in antero-ventral view (Fig. 19), but is clearly different in lateral view (Fig. 20).

On average *W. replicatus* tends to be slightly larger than *W. quaestio*, and the value of TmI may be slightly lower, but this is not significant.

Description: *Male* (n=13)/*female* (n=12): Total length 1.35–1.75/1.45–1.80. Carapace length 0.70–0.80/0.65–0.75, width 0.50–0.60/0.50–0.55. Carapace yellow-brown to dark yellow-brown, streaked with grey on striae and in foveal area, AME *c*. 0.5 diam. apart and *c*. 1 diam. from ALE, posterior eyes all *c*. 1 diam. apart. Abdomen grey to black. Legs yellow-brown to dark yellow-brown, suffused with grey. Dorsal tibial spines 2221. Metatarsus I in male with 2 stout, slightly curved prolateral spines towards distal end (Fig. 6). One of the Insh females also bears a single distal prolateral spine on right metatarsus I, but weaker than in male. Tarsus I longer than metatarsus I, especially in male (MtI/tI: ♂ 0.75–0.94, mean 0.84; ♀ 0.89–0.97, mean 0.92). Metatarsus IV longer than tarsus IV, slightly more so in male (MtIV/tIV: ♂ 1.17–1.34, mean 1.24; ♀ 1.14–1.26, mean 1.21). Position of TmI: ♂ 0.43–0.47, mean 0.45; ♀ 0.42–0.47, mean 0.44. TmIV absent. Male palp (Figs. 1–5): Tibia with short, broad, flattened dorsal apophysis and short, rounded dorso-lateral apophysis; with two trichobothria (Fig. 5). Paracymbium long, narrow, with hooked distal lobe and subtriangular proximal lobe bearing 2 long hairs. Tegulum extends distally into narrow lobe, tapering smoothly to a point in lateral view; distal area translucent (Figs. 1–2). Embolic division with rather narrow proximal part ending in posterior projection; embolus narrow distally, accompanied at base by sclerotised truncate apophysis (Figs. 3–4). A broad subtriangular membrane with a thickened ventral edge arises from between embolus and suprategulum. Epigyne (Figs. 11–14): With a broad subtriangular scape, terminating in a slightly upturned point (Figs. 11, 14). In postero-dorsal view the lines of the ducts diverge towards the spermathecae (Fig. 12).

Distribution and habitat: Widespread but uncommon in northern Fennoscandia (Map 1): Norway (Aakra & Hauge, 2002), Sweden (Holm, 1950, 1983; Granström, 1978) and Finland (Koponen, 1977; Koponen & Viramo, 1998; Koponen *et al*., 2001; Hoffmann, 2002). Specimens from Iceland have not been seen, but the drawing of the male palp in Agnarsson (1996: fig. 111c) from Icelandic material clearly corresponds to *replicatus* rather than *quaestio* in the shape of the tegulum. In Siberia it has been recorded from a narrow belt extending from the far north-west (South Yamal), through the central Podkamennaya Tunguska region to eastern Tuva in the south, near the Mongolian border (Map 1) (Eskov, 1994; Marusik *et al*., 2000). Records have come from a range of rather dry lichen-rich habitats and damper mossy habitats, but most frequently from bogs in association with *Sphagnum* and dwarf shrubs. It is reported by Koponen *et al*. (2001) as being a dominant species in some open peatbogs in central Finland, characterised by *Sphagnum*, *Eriophorum* and *Carex*, as well as various dwarf shrub species.

In Scotland, the first two males were sieved from flood litter on Insh Fen, part of the RSPB Insh Marshes Reserve in the Spey valley, on 15 July 1999. That year had been abnormally wet, and much of the fen was still under water. In 2000, when it was much drier, a visit on 14 July produced two subadult males, but no females. A third visit in 2002 was more successful. Three females



Figs. 11–20: **11–14** *Wabasso replicatus* (Holm). **11** Epigyne, ventral (Insh); **12** Epigyne, postero-dorsal (Sweden); **13** Vulva, dorsal (Sweden); **14** Epigyne, lateral (Insh). **15–18** *Wabasso quaestio* (Chamberlin), L'Isle Verte, Quebec. **15** Epigyne, lateral; **16** Epigyne, ventral; **17** Epigyne, postero-dorsal; **18** Vulva, dorsal. **19–20** *Diplocentria bidentata* (Emerton), Malham, Yorkshire. **19** Epigyne, antero-ventral; **20** Epigyne, lateral. Scale lines=0.1 mm.

were found on 13 July by raking *Molinia* tussocks and sieving *Sphagnum* at two sites *c*. 300 m apart, either side of the spot where the original males were found. Five subadult males and three subadult females were also collected on 9 July. Subadults were identified by a combination of their tibial spines, position of TmI, ratio of MtI/tI and, in males, by the presence of prolateral distal spines on metatarsus I. Pitfall traps were also used on the site at Insh Fen during June and July 2002, but no *Wabasso* were caught. The species would thus appear to be uncommon, but well established, on the site. Insh Fen is the most southerly record for *W. replicatus* in Europe, but it occurs at lower latitudes in Siberia. The situation of Insh Fen, well away from any human activity, makes it unlikely that *W. replicatus* is a recent introduction. Insh Marshes constitutes a largely intact and complex ecological and hydrological unit and, as such, is exceptional among wetland nature reserves in Britain. It is the most important floodplain mire in Britain, primarily owing to its unspoilt character. The size and habitat diversity of the marshes has given rise to a mosaic of plant communities, consisting essentially of northern poor fen. Flooding at Insh Marshes is a semi-natural process little influenced by current management techniques: water levels can fluctuate markedly and the marsh can flood at any time of the year, but typically between October and March (Beaumont *et al*., 1998). It is possible that the female of *W. replicatus* could have been confused with that of *Diplocentria bidentata* in the past, but the male is unlikely to be mistaken for any other species.

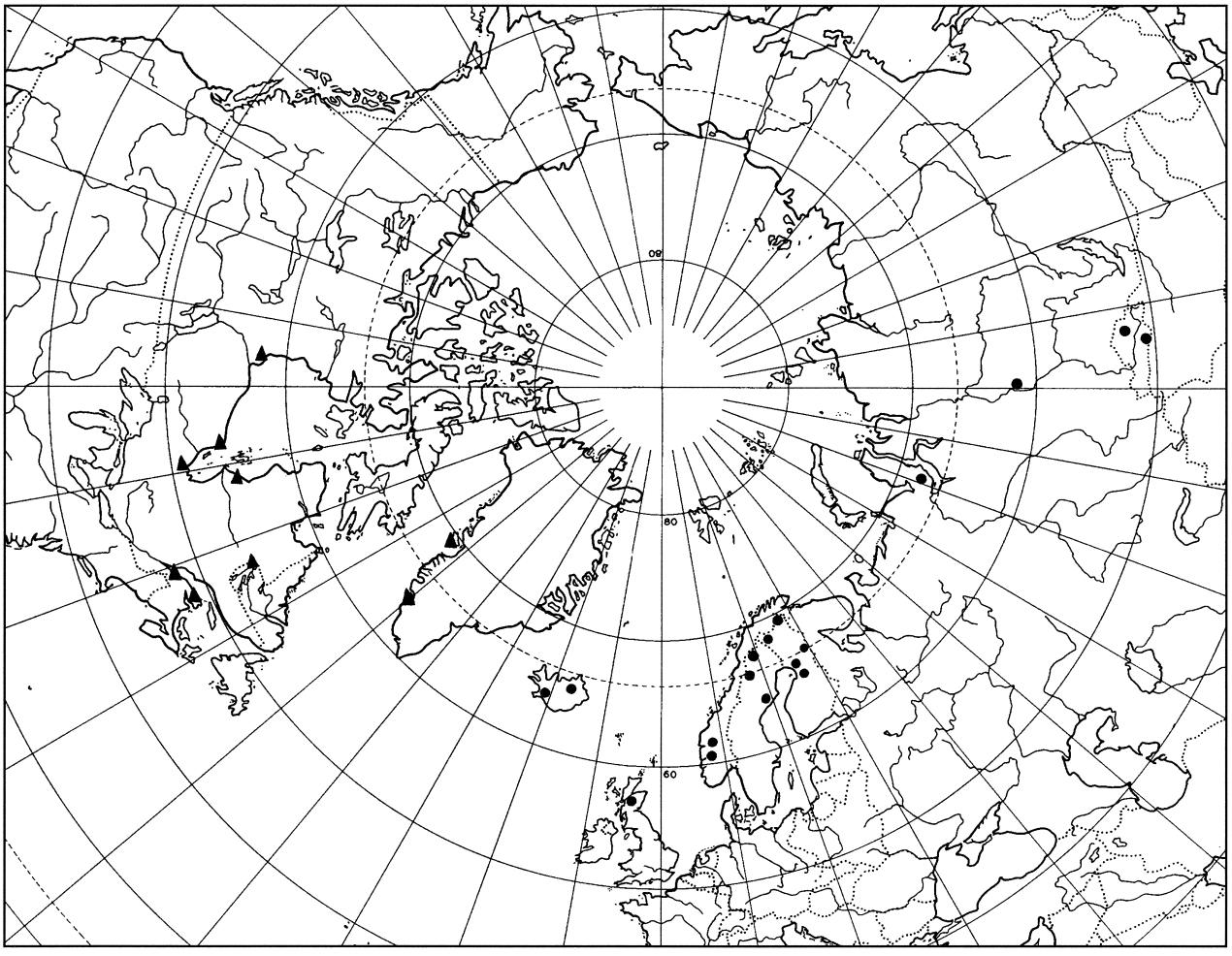
In Sweden adults of both sexes were collected in June. At Insh Fen, however, adults have not been found before the middle of July. Subadult males were collected on 9 and 14 July, suggesting that the main maturity period in Scotland is late July and possibly August.

***Wabasso quaestio* (Chamberlin, 1948)** (Figs. 7–10, 15–18, Map 1)

Eulaira quaestio Chamberlin, 1948: 531, figs. 57, 58 (descr. ♀).
Diplocentria replicata: Holm, 1967: 27, figs. 28–30 (descr. ♂).
Wabasso questio: Millidge, 1984: 150, figs. 112, 113, 116, 117, 119, 121, 122 (♂♀).

Type: Holotype ♀, Canada, Manitoba, Churchill, June–July 1936, leg. H. E. McClure (AMNH), not examined.

Material examined: CANADA: Ontario, James Bay, radar site, 54°45′N, 82°24′W, 6♂ 2♀, 31 July 1979, leg R. I. G. Morrison; Quebec, L'Isle Verte (Rivière-du-Loup), saltmarsh, 7♂ 2♀, 17 June 1986, leg. G. Bélanger; Quebec, Mount Albert, Gaspé Prov. Park, 3♂,



Map 1: Distribution of *Wabasso quaestio* (triangles) and *W. replicatus* (circles). One symbol may represent more than one close locality.

4 June–24 July 1980, leg. C. Dondale & J. Redner. All deposited in CNC.

Diagnosis: See diagnosis of *W. replicatus*.

Description: *Male* (*n*=14)/*female* (*n*=4): Total length 1.30–1.50/1.45–1.65. Carapace length 0.65–0.70/0.65–0.70, width 0.50–0.55/0.50–0.55. Coloration, general appearance, and leg spination as in *W. replicatus*. MtI/tI: ♂ 0.83–0.88, mean 0.86; ♀ 0.89–0.94, mean 0.91. MtIV/tIV: ♂ 1.16–1.33, mean 1.24; ♀ 1.19–1.29, mean 1.23. Position of TmI: ♂ 0.47–0.52, mean 0.49; ♀ 0.45. TmIV absent. Male palp (Figs. 7–10): Tibia and paracymbium similar to *W. replicatus*. Distal half of tegulum broad in lateral view, ending in small rounded protuberance on dorsal edge; distal area translucent (Figs. 7–8). Embolic division with broad proximal part ending in broad posterior projection; embolus slightly less narrow than in *W. replicatus*, accompanied at base by sclerotised apophysis, variable in size but usually smaller than in *W. replicatus* (Figs. 9–10). Broad subtriangular embolic membrane as in *W. replicatus*. Epigyne (Figs. 15–18): A broad scape, with slightly concave sides, ending in small, truncated upturned lobe (Figs. 15–16). In postero-dorsal view the lines of the ducts run almost parallel towards the spermathecae (Fig. 17).

Distribution and habitat: Known only from eastern Canada (southern edge of Hudson Bay, St Lawrence estuary, and western border of Labrador) and western Greenland (Map 1) (Millidge, 1984; Koponen, 1994). All except one of the records are from coastal localities, but not necessarily from maritime habitats. Found on saltmarsh at L'Isle Verte (St Lawrence estuary), but in Greenland recorded from litter in a dense *Salix* thicket and from moist heaths (Holm, 1967). Koponen (1994) recorded it from Schefferville on the western border of Labrador from open *Sphagnum*/*Carex*/*Andromeda* fen, wet *Sphagnum*/*Eriophorum*/*Carex* fen, and most commonly from *Trichophorum*/*Eriophorum*/*Carex* fen on lake shore. He also found a single individual in open wet *Sphagnum* bog at Kuujjuarapik on the east coast of Hudson Bay. All records of adult males and females in June and July.

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