

AN AID FOR IDENTIFYING ADULTS OF *LIMNEPHILUS PATI* O’CONNOR (TRICHOPTERA: LIMNEPHILIDAE)

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Abstract

Photographs and drawings are provided as an aid towards identifying adults of *Limnephilus pati* O’Connor. They also show intraspecific variability within the species.

Key words: *Limnephilus pati* O’Connor, Trichoptera, caddisfly, adults, identification aid, intraspecific variability, photographs, drawings.

Introduction

Limnephilus pati O’Connor was described in 1980 from England, Ireland and the Isle of Man (O’Connor, 1980). It is a rare European caddisfly known from only 20 sites in Denmark, France, Germany, Great Britain, Ireland, the Isle of Man and Poland (Fig. 1). It is mainly associated with raised bogs and calcareous fens. Slow-flowing, shallow, well-vegetated streams with a reasonable calcium carbonate content are its principal breeding habitat at Market Weston Fen, England (Sutton, Wallace and O’Connor, 2023). The streams arise within the fen from the coalescence of highly calcareous spring oozes. Such specialised habitats are not widespread and populations of *L. pati* were probably always isolated, made even more so nowadays by habitat destruction through drainage and water abstraction. As a result, the genitalia may differ from site to site especially in the degree and form of the prolongation of the ninth segment and the shape of the male lateral appendage. Records of adults date from the mid May to the end of July. The flight period therefore is short. Many *Limnephilus* species go into summer diapause during the warmest and driest part of the summer and re-appear afterwards to mate and deposit their eggs. This diapause does not seem to be present in *L. pati* (Lock, 2023) or at most it is of short duration (Wallace, 2023). Light trapping has been the easiest way to find this species. RDS discovered a population of *L. pati* in Scotland (Sutton, Wallace and O’Connor, 2021,

2023). Since he was able to take high resolution photographs of live specimens (male and female), it was thought useful to use these along with other photographs and drawings as an aid towards identifying the species and also to indicate intraspecific variability.



PLATE 1. Live adults of *Limnephilus pati*: (a) ♂, light-trap, Eochar, South Uist, 21 July 2020; (b) ♀, light-trap, Eochar, South Uist, 27 June 2023. Photographs: Robin D. Sutton.



PLATE 2. Right forewing of *Limnephilus pati* (showing the freckling in this species), peat bogs along the river Semois in the nature reserve Marais de Heinsch in Arlon, Belgium, 20 July 2020. Photograph: Koen Lock.

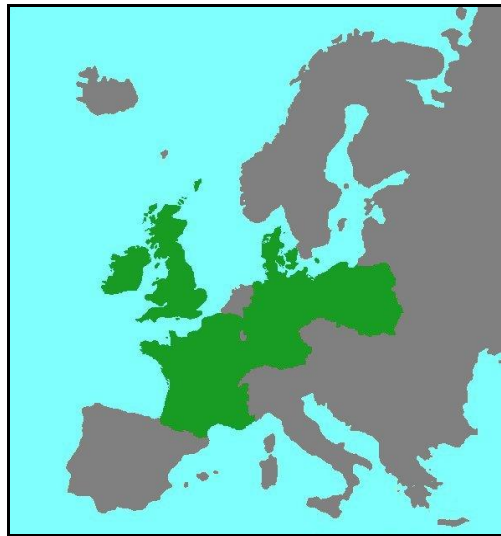


FIGURE 1. The European countries where *Limnephilus pati* has been recorded (marked in green).

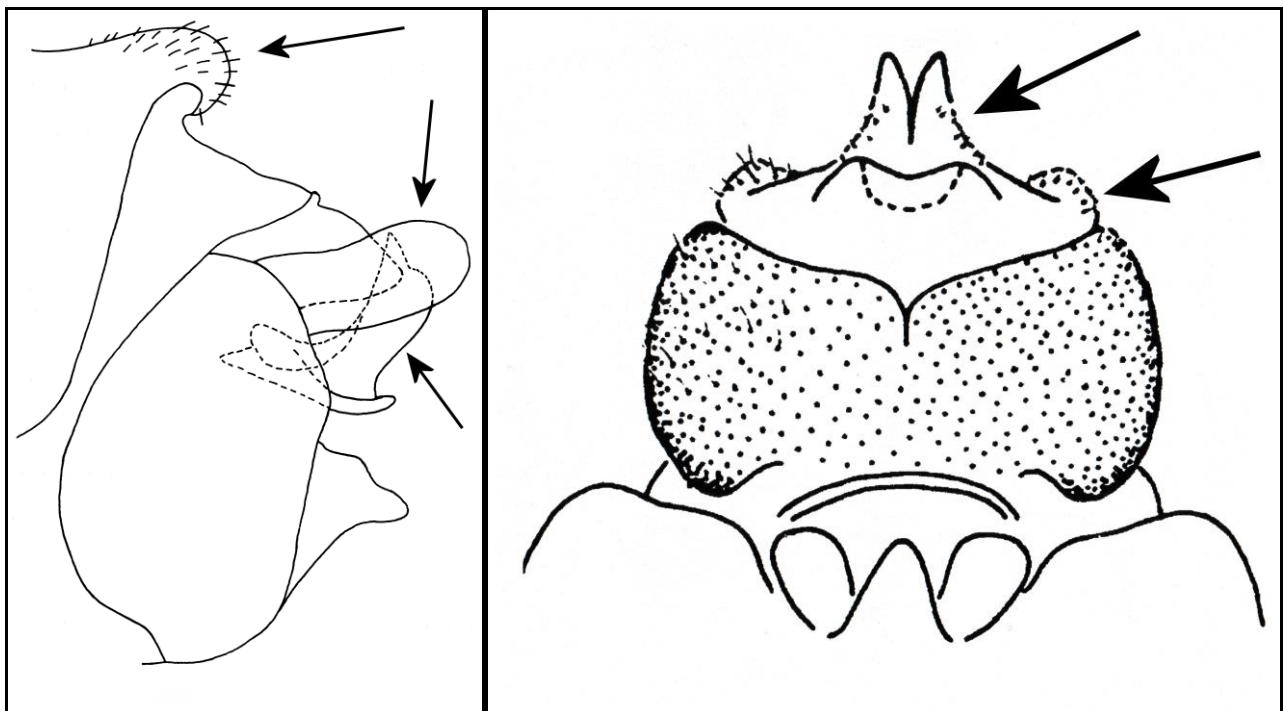


FIGURE 2. Left: ♂, lateral view, Coxtown, Donegal, July 1894, W. F. Johnson. Drawn by J. P. O'Connor with the assistance of Hans Malicky (see O'Connor, 1980). Right: ♀, ventral view, Curragh Ballaugh, Isle of Man, R. Cassal. Drawn by P. C. Barnard (see O'Connor and Barnard, 1981; Malicky, 2004). Diagnostic features are indicated by arrows.

Variation in males

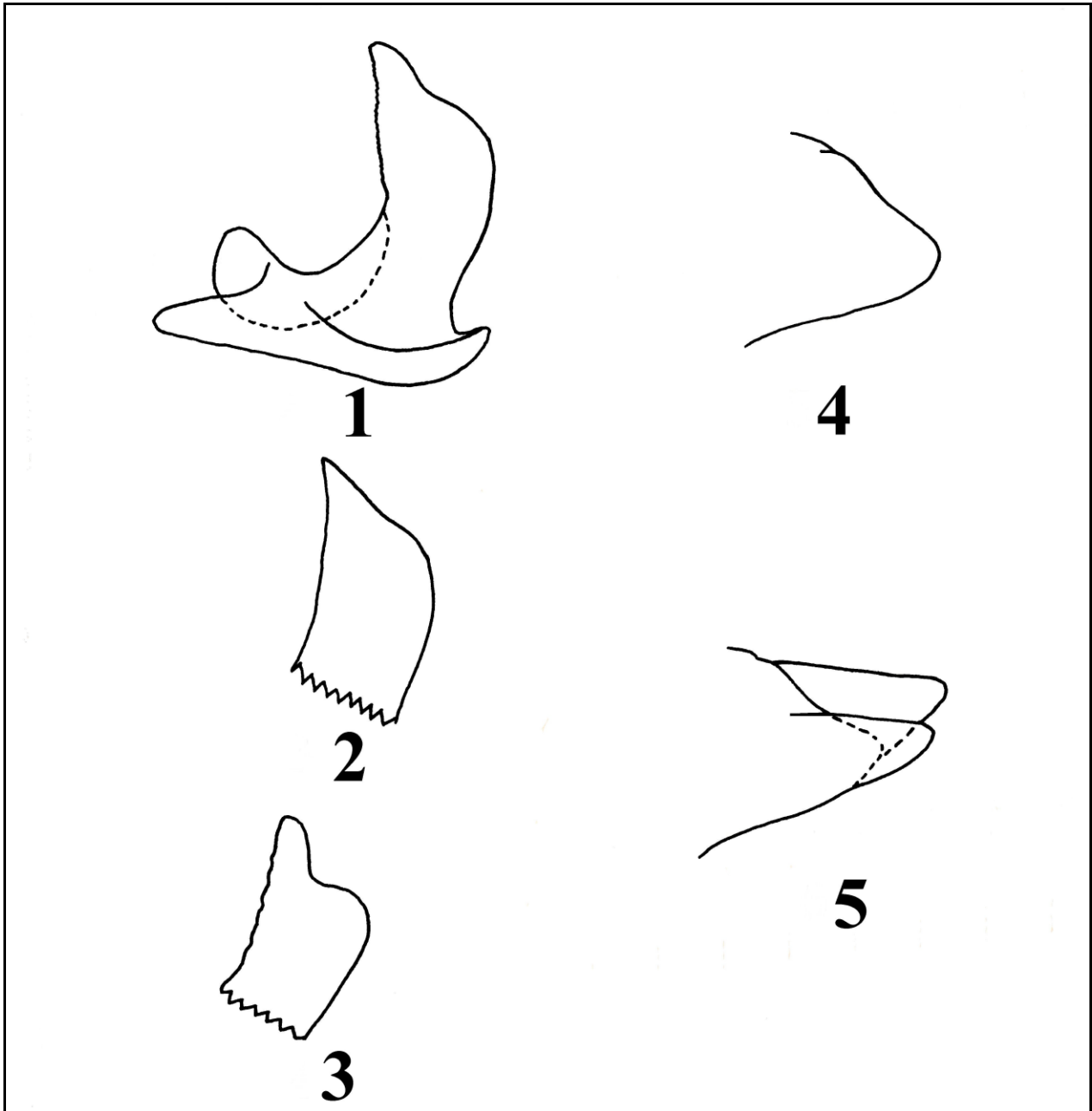


FIGURE 3. ♂♂ showing variation in the lateral (intermediate or mid) appendage (1-3) and the prolongation of the ninth segment under the tenth segment (dorsum), which is often bifid (4-5). This structure is missing in some individuals. Drawn by J. P. O'Connor with the assistance of Hans Malicky based on twelve individuals from England, Ireland and the Isle of Man (see O'Connor, 1980).

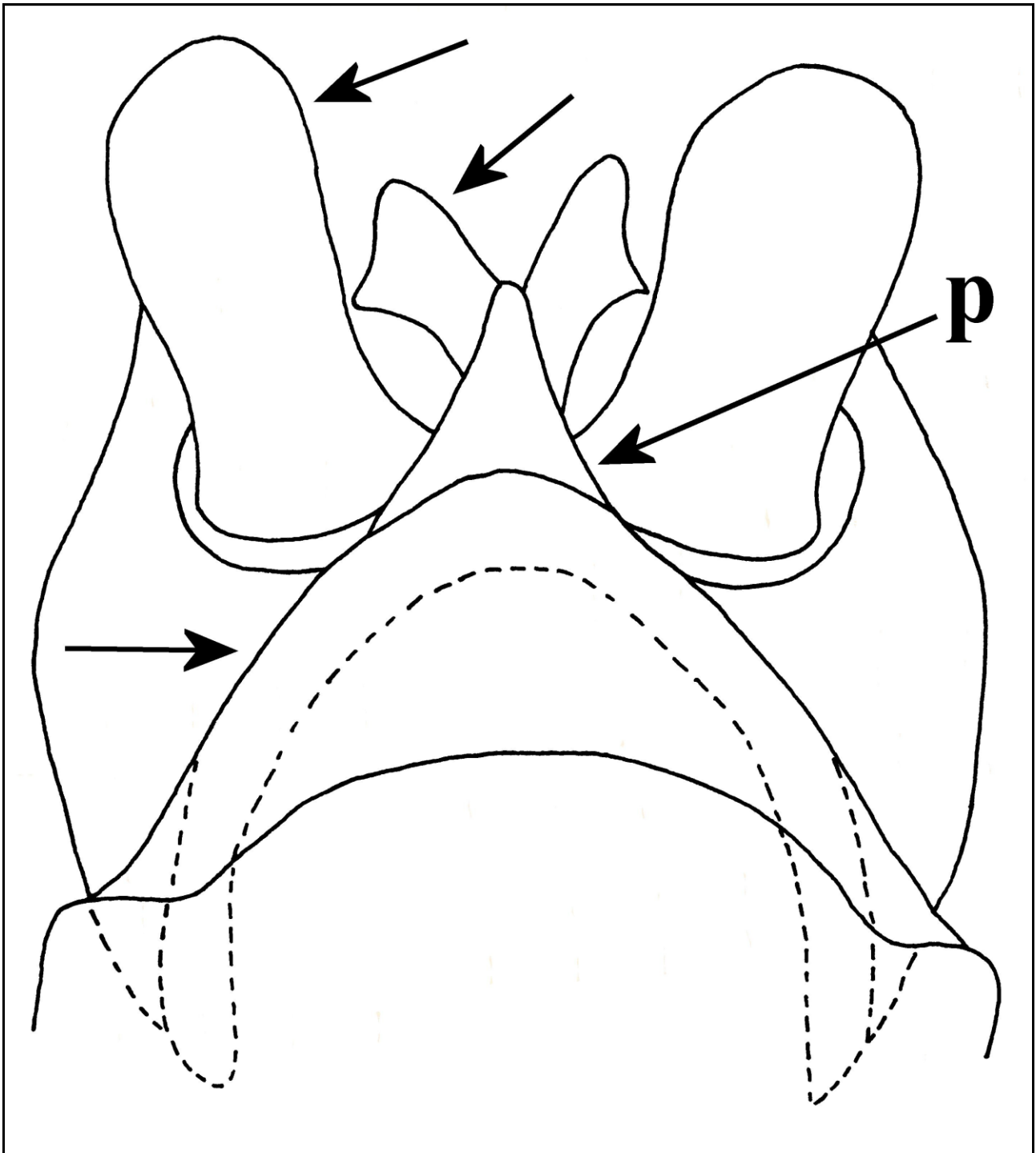


FIGURE 4. ♂, Coxtown, Donegal, July 1894, W. F. Johnson. Drawn by J. P. O'Connor with the assistance of Hans Malicky (see O'Connor, 1980). The prolongation of the ninth segment under the tenth segment (dorsum) is indicated (p). This structure is missing in some individuals. Diagnostic features are indicated by unlabelled arrows.

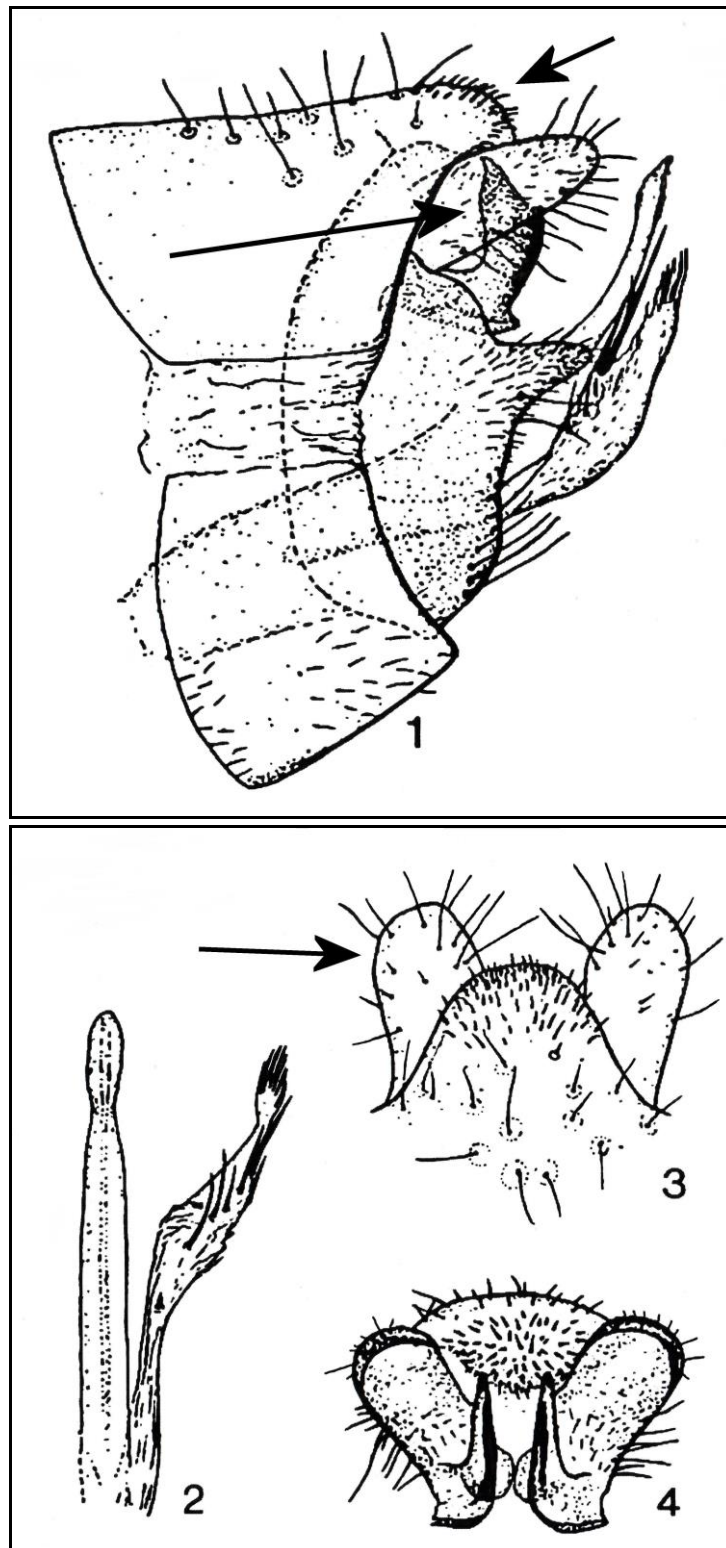


FIGURE 5. ♂, Mindelsee, Lake Constance area, Germany, 2 June 1966, W. Eidel. Figure adapted from Tobias (1981). Diagnostic features are indicated by arrows.

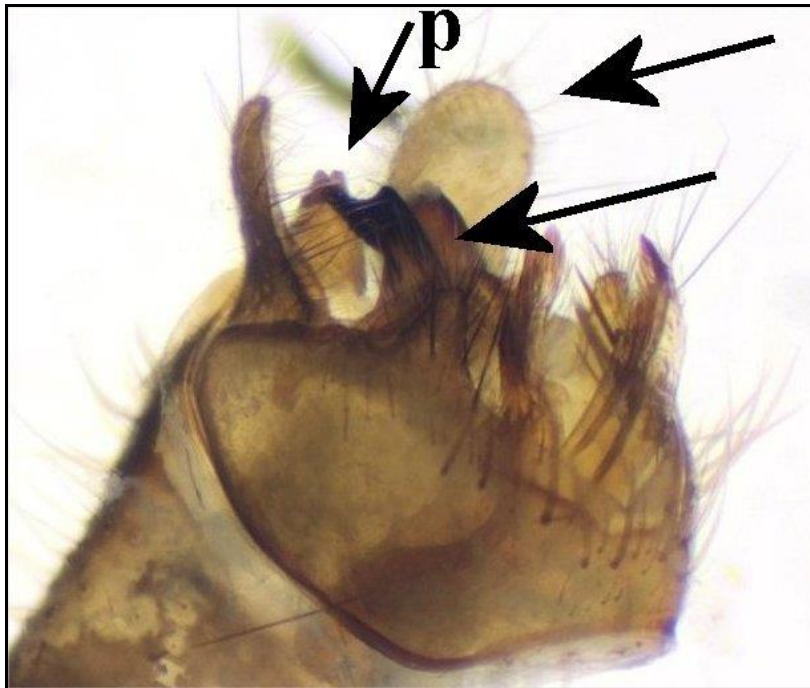


PLATE 3. ♂, light-trap, Eochar, South Uist, 21 July 2020. Photograph Robin D. Sutton. The ninth segment bifid prolongation (p) is evident. Diagnostic features are indicated by unlabelled arrows.



PLATE 4. ♂, Malaise trap, Doubs department, Franche-Comté (Eastern France), 27 June 2014. Photograph: Gennaro Coppa. A diagnostic feature is indicated by an arrow.

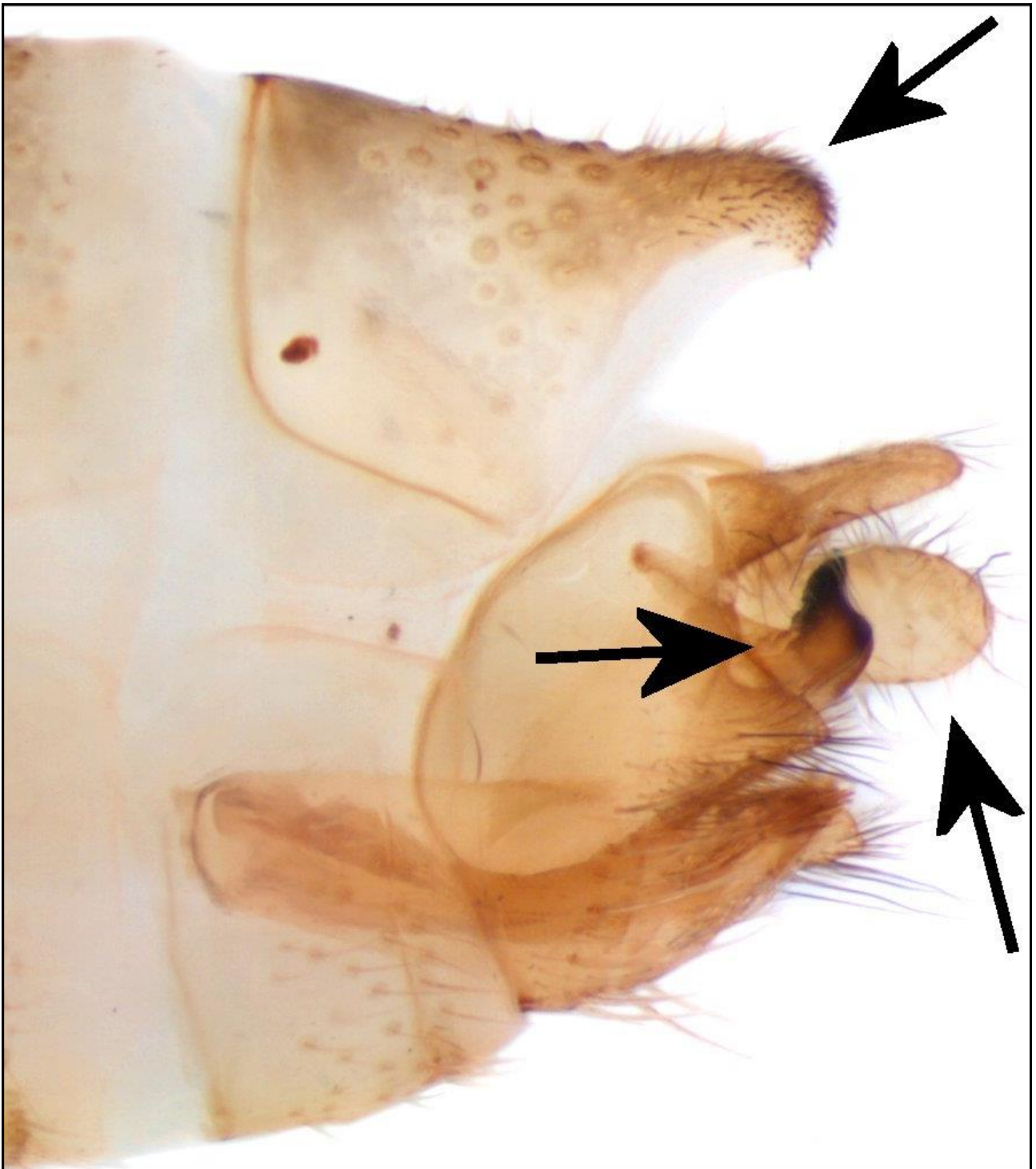


PLATE 5. ♂, Luboń in northwest Poland, 6 July 2011. Photograph: David Tempelman. Diagnostic features are indicated by arrows.

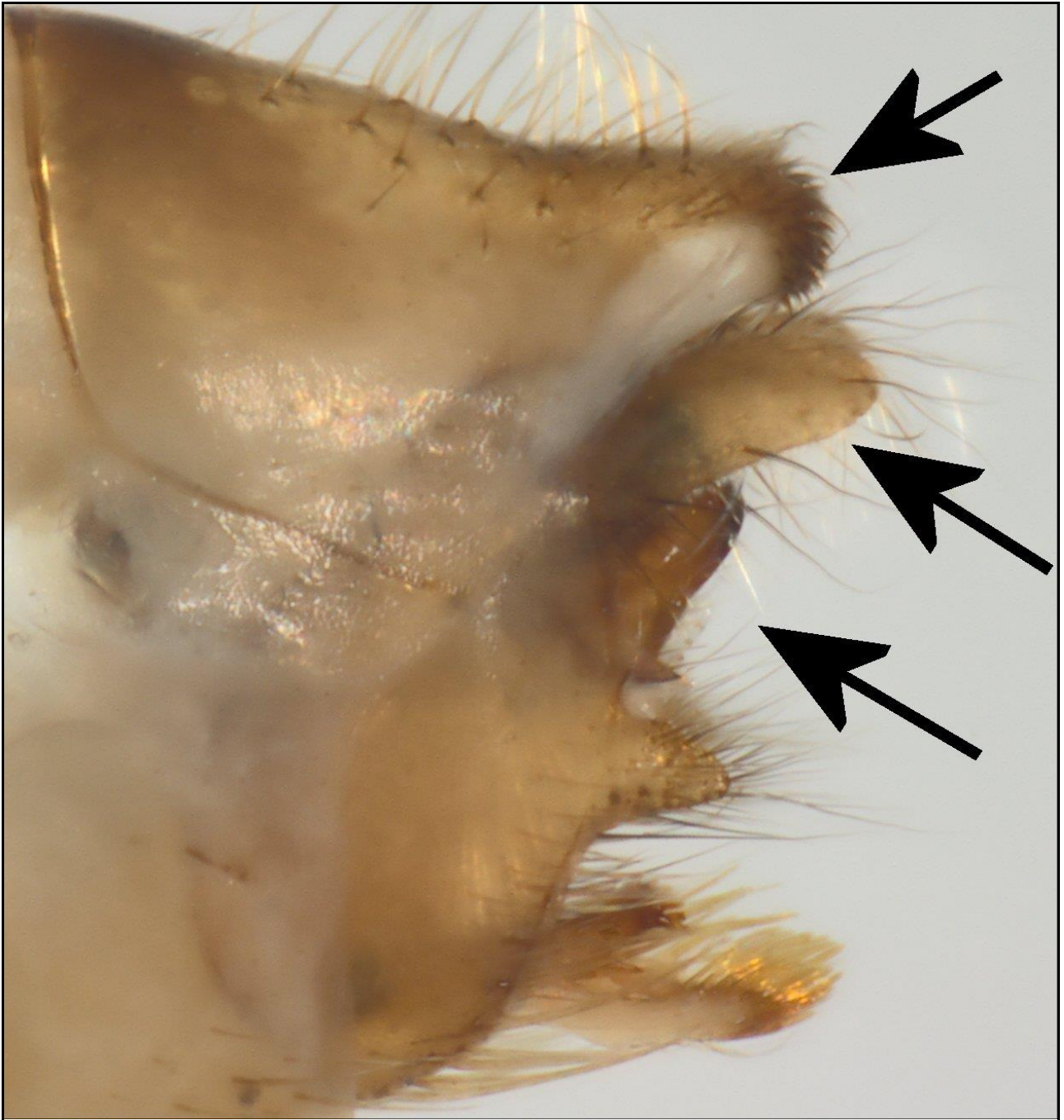


PLATE 6. ♂, peat bogs along the river Semois in the nature reserve Marais de Heinsch in Arlon, Belgium, 20 July 2020. Photograph: Koen Lock. Diagnostic features are indicated by arrows.

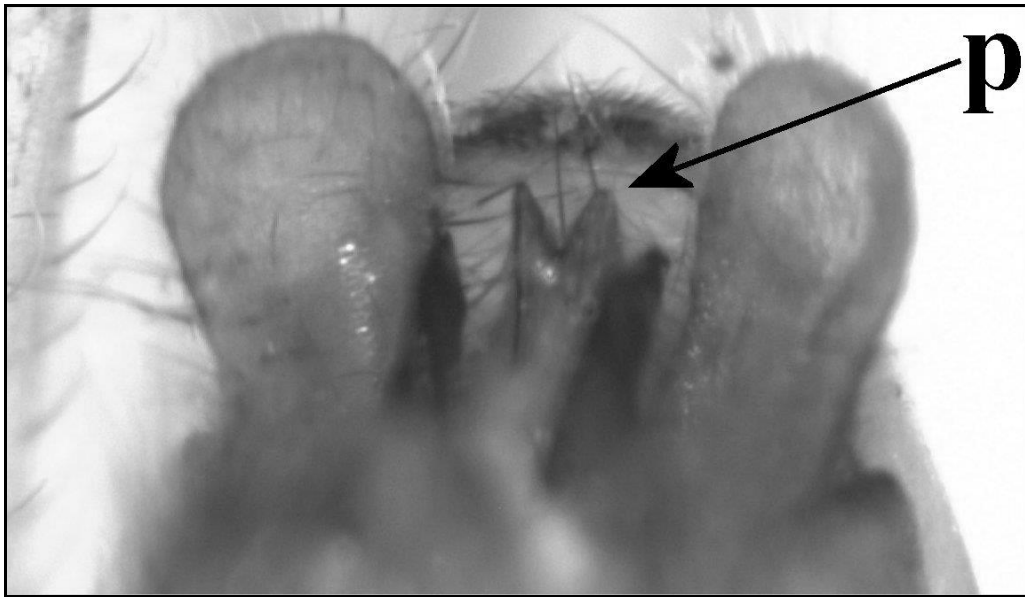


PLATE 7. ♂, Cabragh Bog, Tipperary, Ireland, 28 June 1994, K. G. M. Bond. Photograph: Tatyana S. Vshivkova. See O'Connor (2015). The prolongation of the ninth segment is indicated by an arrow (p).

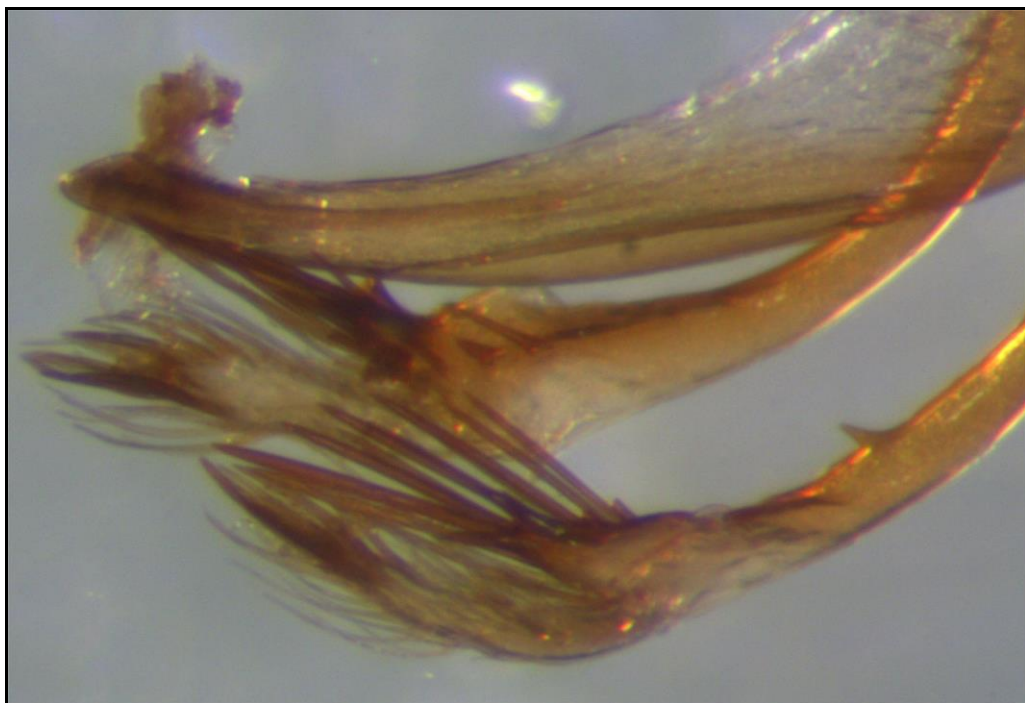


PLATE 8. ♂, aedeagus and parameres, Doubs department, Franche-Comté (Eastern France), 27 June 2014. Photograph: Gennaro Coppa.

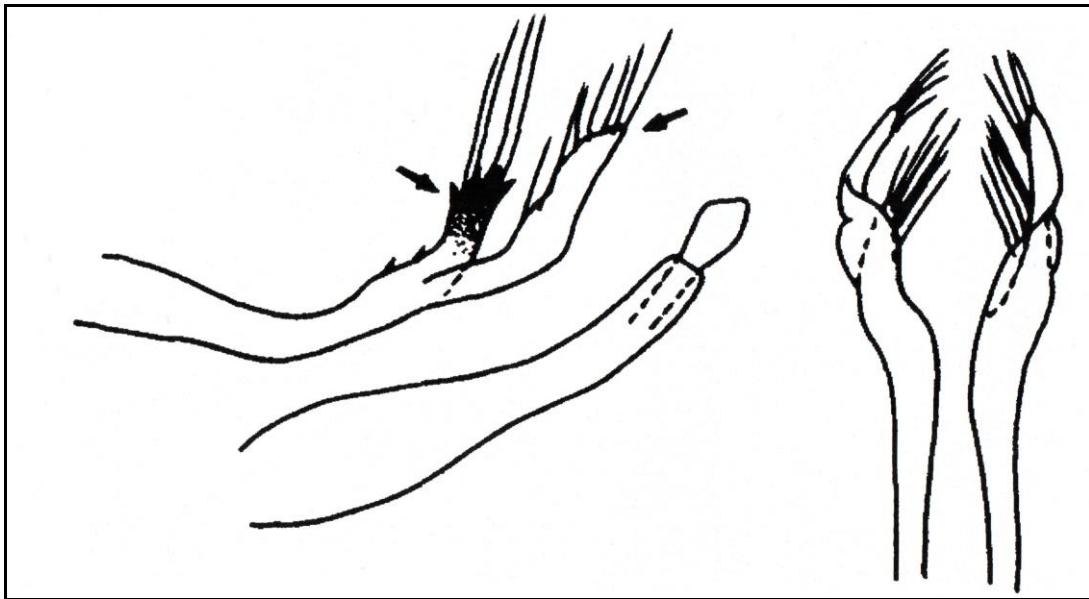


FIGURE 6. ♂, aedeagus and parameres from Malicky (2004). Diagnostic features are indicated by arrows.

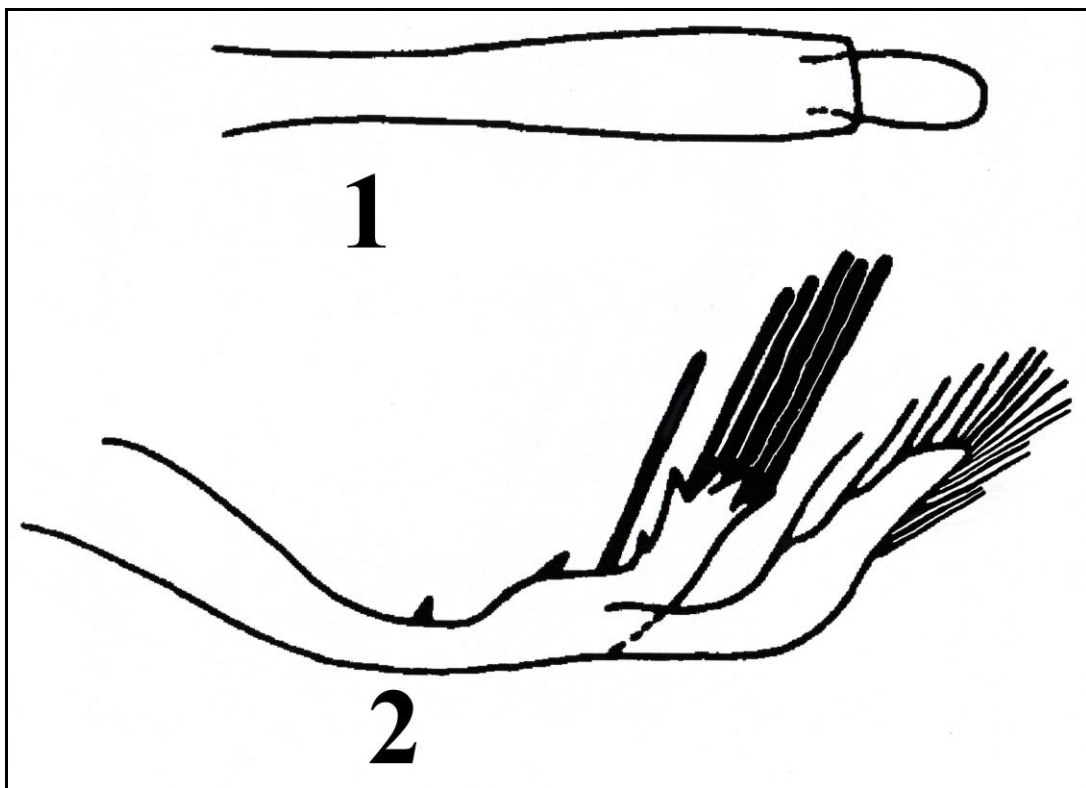


FIGURE 7. ♂, aedeagus and parameres based on O'Connor (1980).



PLATE 9. ♂, aedeagus and parameres, Luboń in northwest Poland, 6 July 2011. Photograph: David Tempelman. A diagnostic feature is indicated by the arrow.

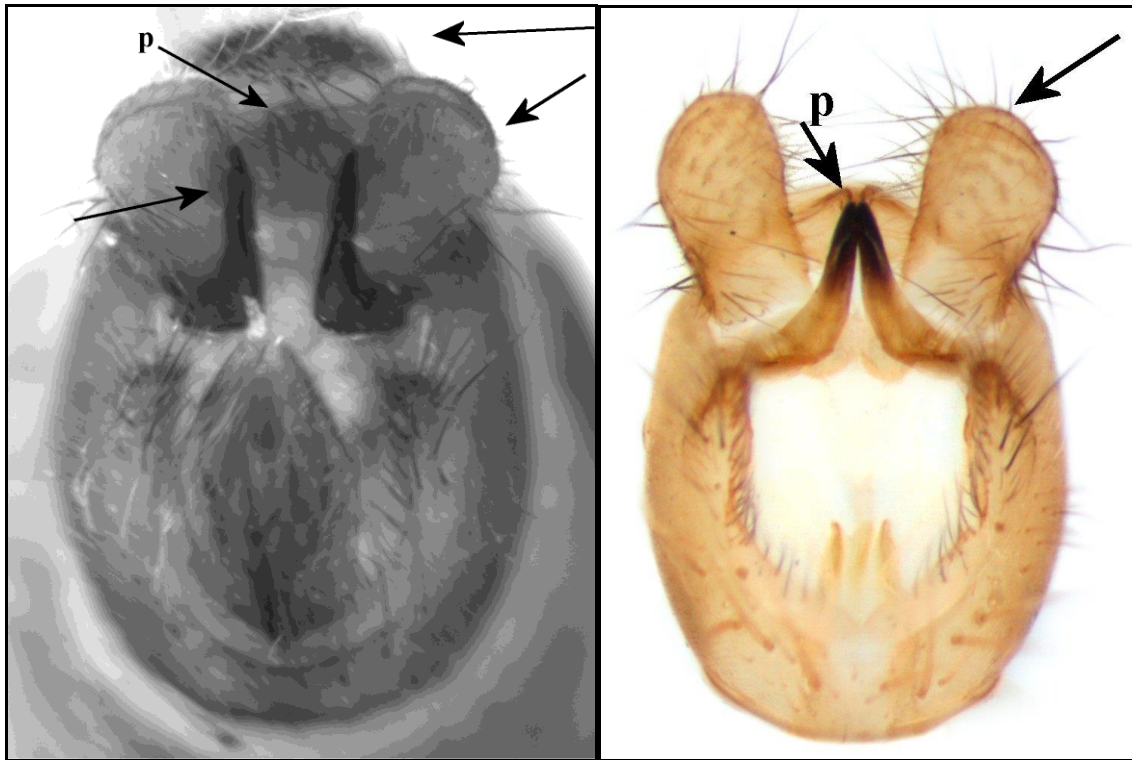


PLATE 10. Left: ♂, Cabragh Bog, Tipperary, Ireland, 28 June 1994, K. G. M. Bond. Photograph: Tatyana S. Vshivkova. See O'Connor (2015). Right: ♂, Luboń in northwest Poland, 6 July 2011. Photograph: David Tempelman. The prolongation of the ninth segment is indicated by an arrow (p) and diagnostic features by unlabelled arrows.



PLATE 11. ♂, Luboń in northwest Poland, 6 July 2011 showing the diagnostic lateral appendage. Photograph: David Tempelman.



PLATE 12. ♂, peat bogs along the river Semois in the nature reserve Marais de Heinsch in Arlon, Belgium, 20 July 2020. Photograph: Koen Lock.

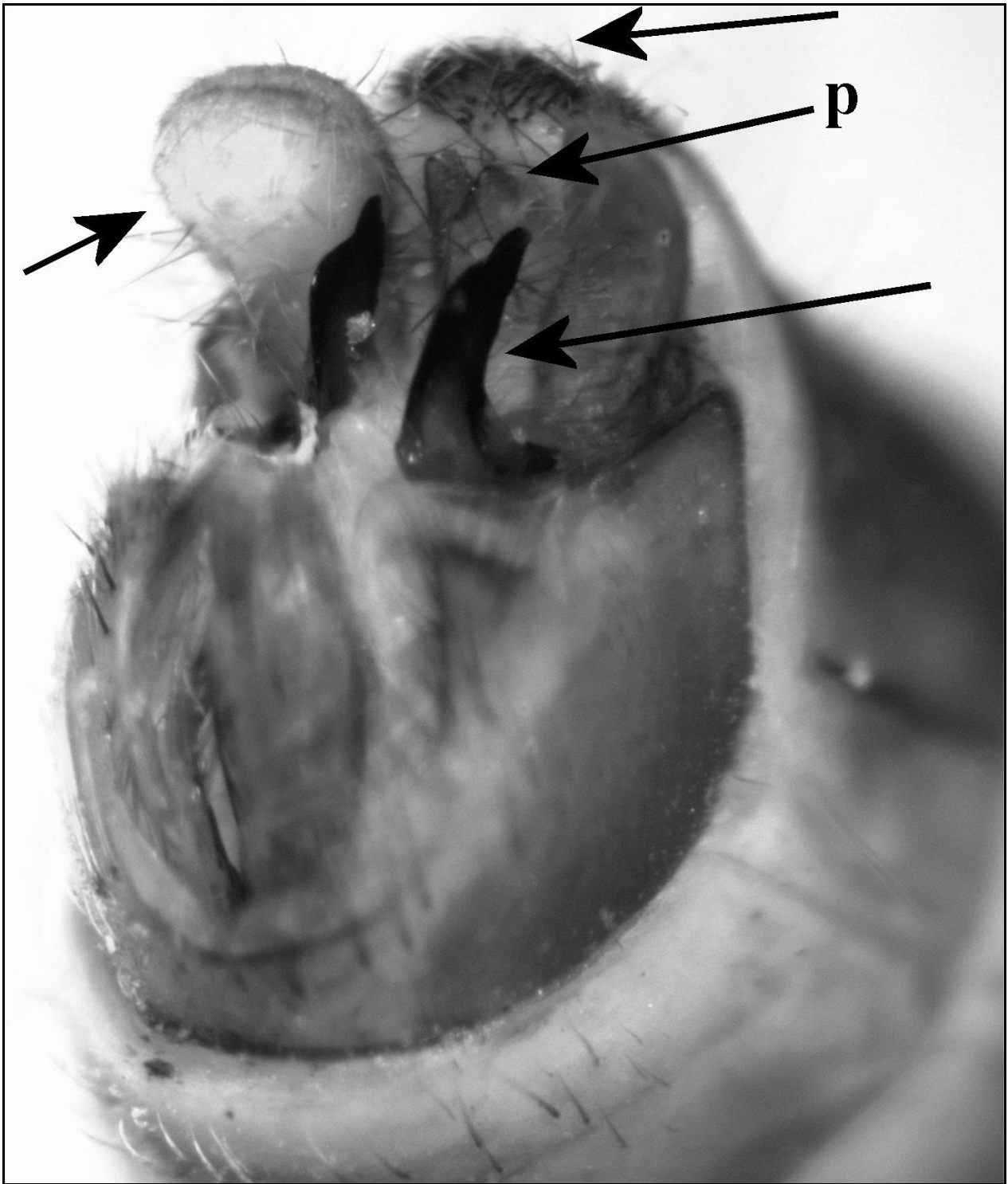


PLATE 13. ♂, Cabragh Bog, Tipperary, Ireland, 28 June 1994, K. G. M. Bond. Photograph: Tatyana S. Vshivkova. See O'Connor (2015). Prolongation of the ninth segment indicated by an arrow (p) and diagnostic features by unlabelled arrows.

Variation in females

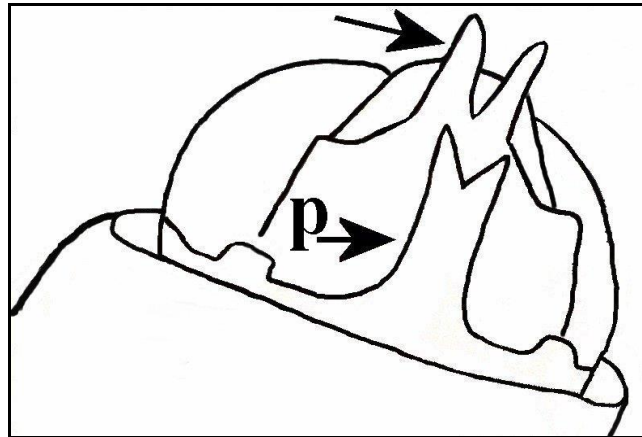


FIGURE 8. ♀, dorsal view, Eochar, South Uist, 27 June 2023. Based on the photograph by Robin Sutton (Plate 15). Drawn by J. P. O'Connor. A prolongation of the ninth segment over the tenth segment is indicated (p) and a diagnostic feature by the other arrow.

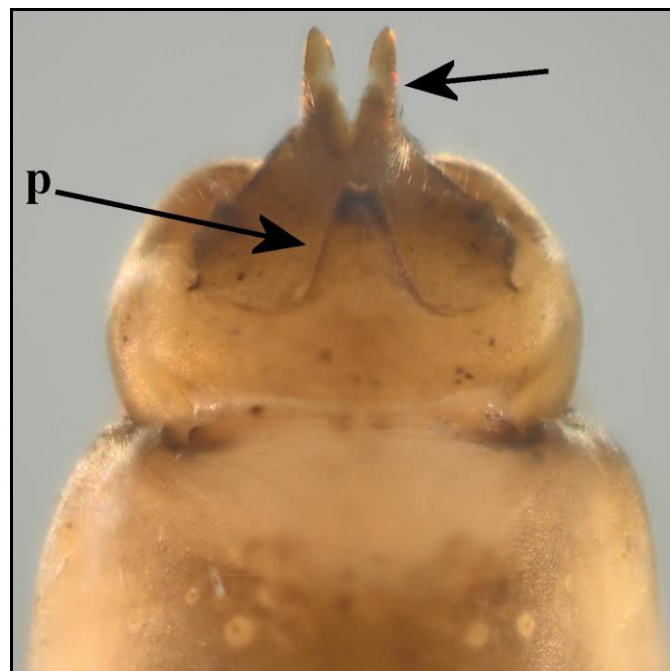


PLATE 14. ♀, dorsal view, peat bogs along the river Semois in the nature reserve Marais de Heinsch in Arlon, Belgium, 20 July 2020. Photograph: Koen Lock. A prolongation of the ninth segment over the tenth segment is indicated (p) and a diagnostic feature by the unlabelled arrow.

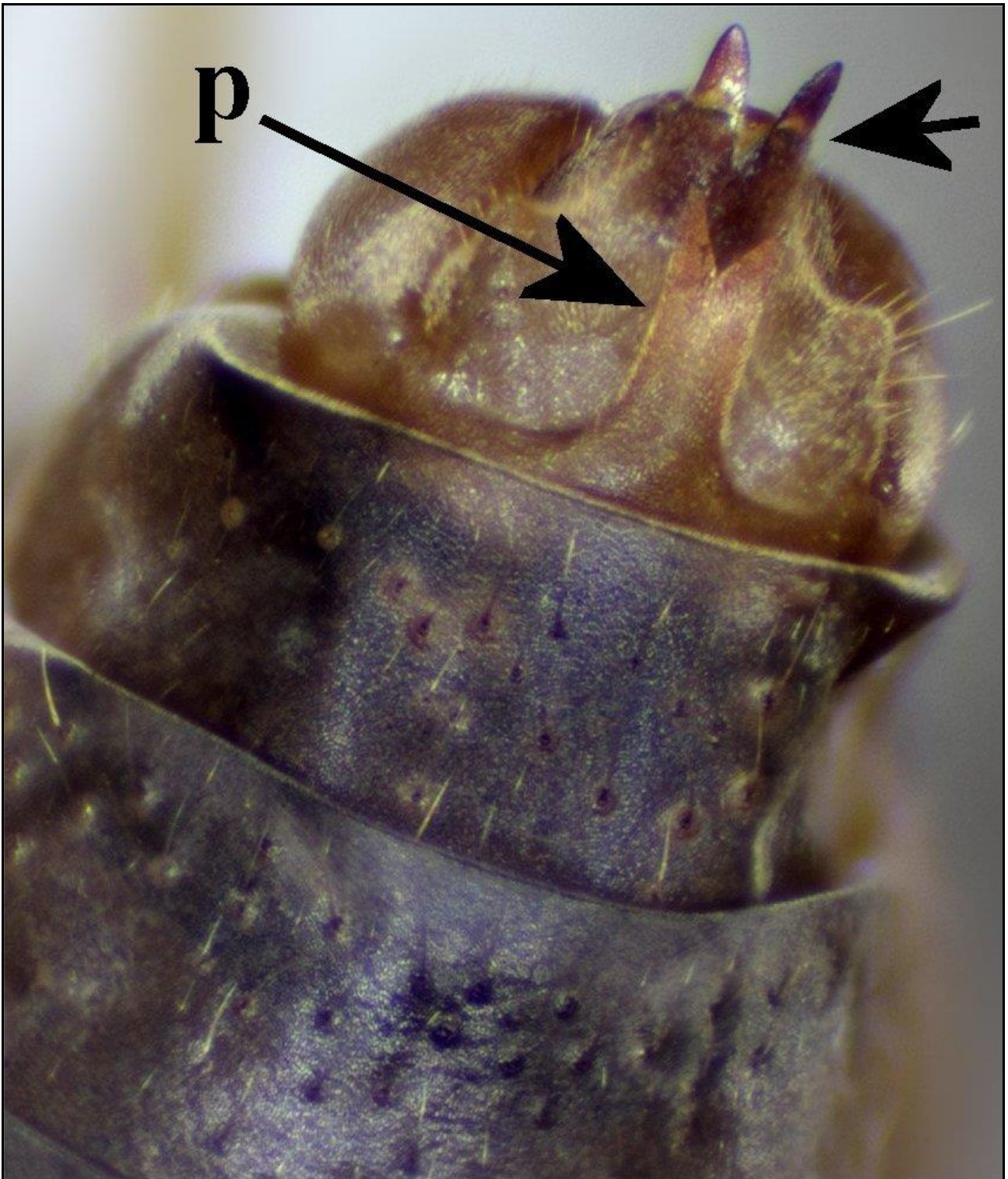


PLATE 15. ♀, dorsal view, Eochar, South Uist, 27 June 2023. Photograph: Robin D. Sutton. A prolongation of the ninth segment over the tenth segment is indicated (p) and a diagnostic feature by the unlabelled arrow.

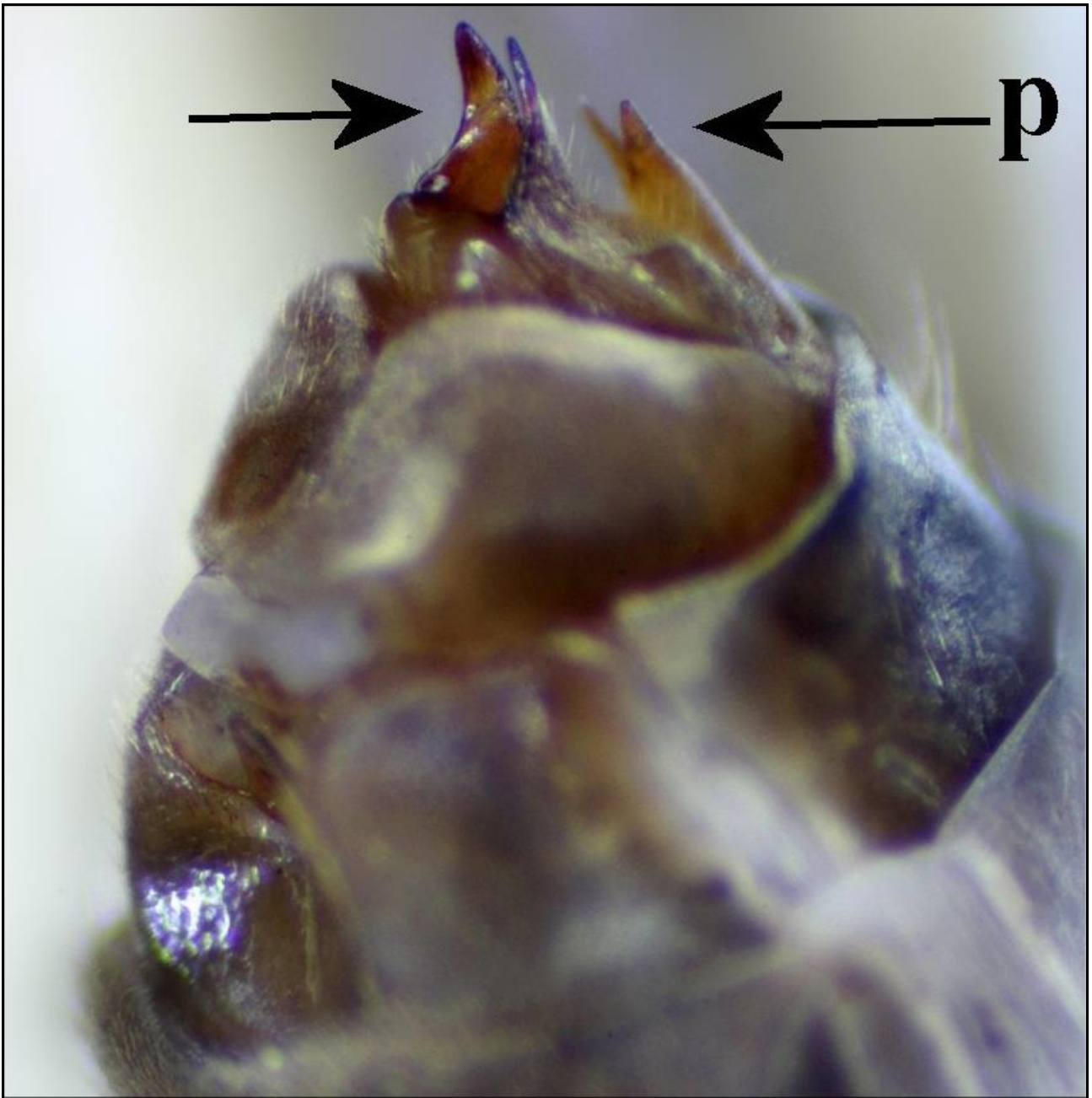


PLATE 16. ♀, lateral view, Eochar, South Uist, 27 June 2023. Photograph: Robin D. Sutton. A prolongation of the ninth segment over the tenth segment is indicated (p) and a diagnostic feature by the unlabelled arrow.

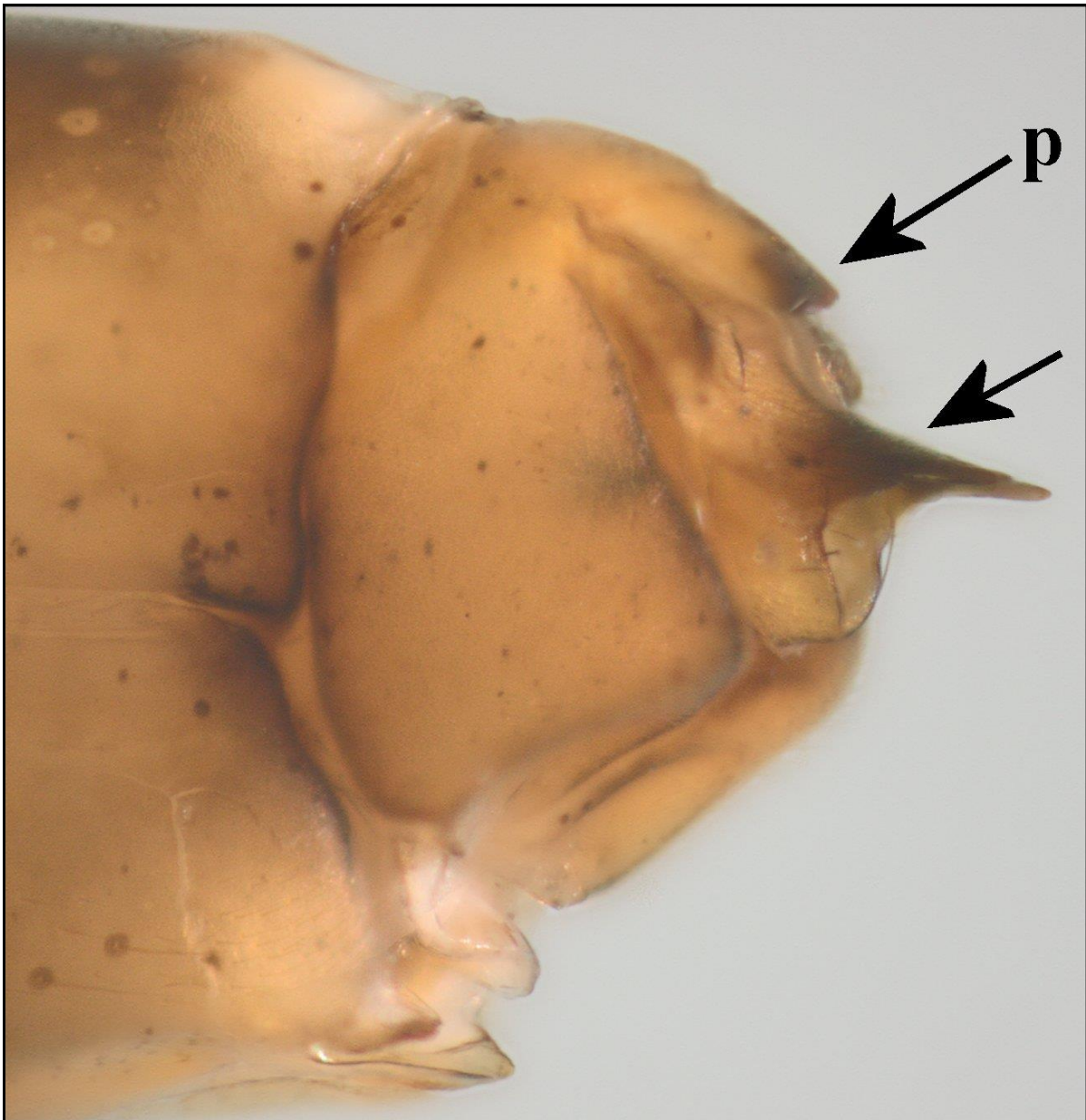


PLATE 17. ♀, lateral view, peat bogs along the river Semois in the nature reserve Marais de Heinsch in Arlon, Belgium, 20 July 2020. Photograph: Koen Lock. A prolongation of the ninth segment over the tenth segment is indicated (p) and a diagnostic feature by the unlabelled arrow.

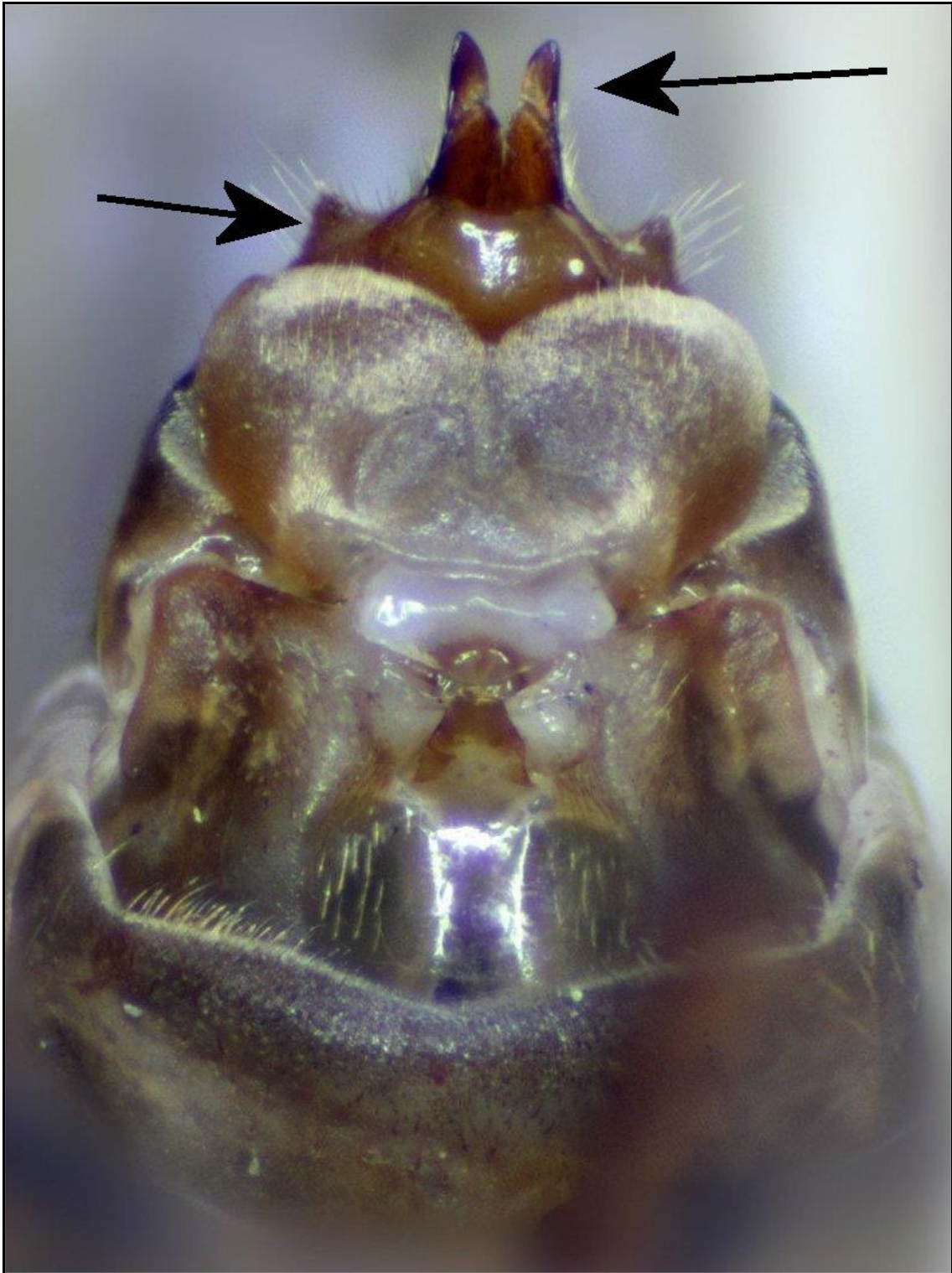


PLATE 18. ♀, ventral view, Eochar, South Uist, 27 June 2023. Photograph: Robin D. Sutton. Diagnostic features are indicated by arrows.

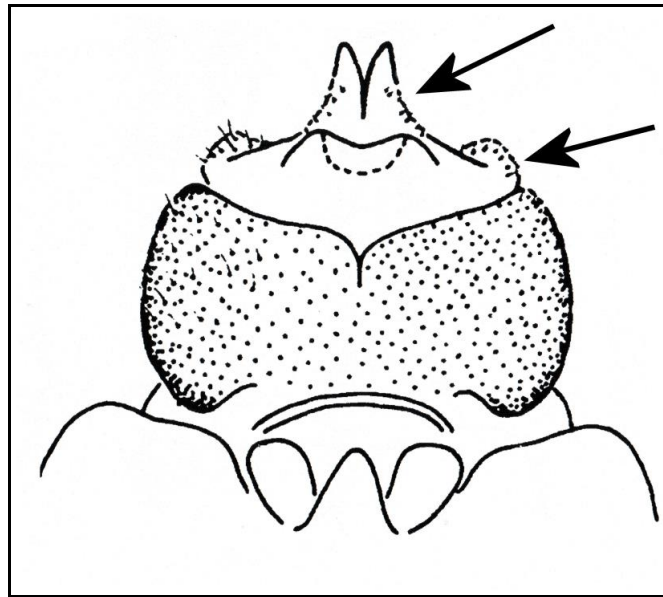


FIGURE 9. ♀, ventral view, Curragh Ballaugh, Isle of Man, R. Cassal. Drawn by P. C. Barnard (see O'Connor and Barnard, 1981; Malicky, 2004). The diagnostic features are indicated by arrows.

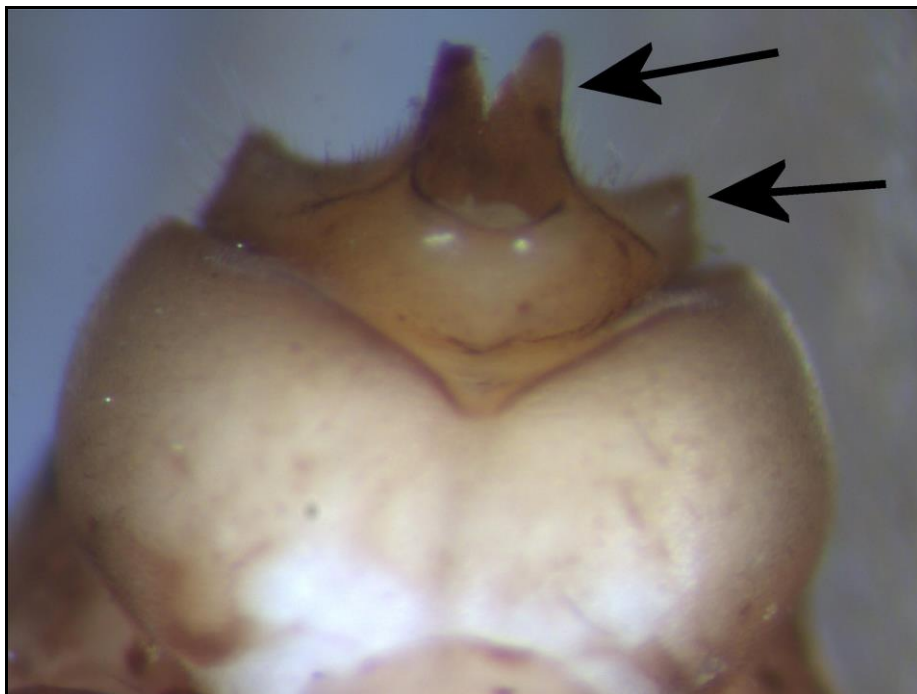


PLATE 19. ♀, ventral view, Doubs department, Franche-Comté (Eastern France), 27 June 2014. Photograph: Gennaro Coppa. Diagnostic features are indicated by arrows.

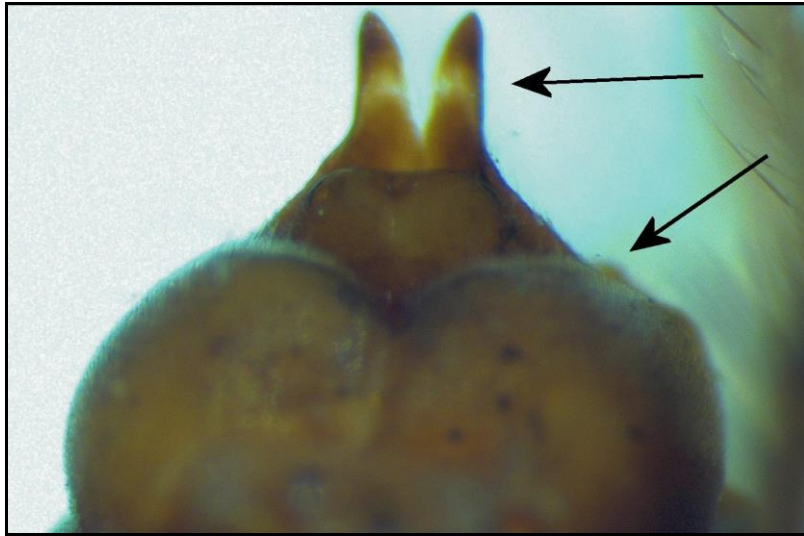


PLATE 20. ♀, ventral view, Cabragh Bog, Tipperary, Ireland, 28 June 1994, K. G. M. Bond. Photograph: Tatyana S. Vshivkova. See O'Connor (2015). Diagnostic features are indicated by arrows.



PLATE 21. ♀, ventral view, peat bogs along the river Semois in the nature reserve Marais de Heinsch in Arlon, Belgium, 20 July 2020. Photograph: Koen Lock. A diagnostic feature is indicated by the arrow.

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