

## On the breeding period of *Culex pipiens* and *C. torrentium* (Diptera, Culicidae) in Uppsala, Sweden

[Något om reproduktionsperiodens längd för stickmyggorna *Culex pipiens* och *C. torrentium* (Diptera, Culicidae) i Uppsala]

MICHEL RAYMOND

*Culex pipiens* and *C. torrentium* are two mosquito species with a similar ecology and morphology (Andersson & Jaenson 1987, Dahl 1988, Gillies & Gubbins 1982, Service 1968, see Fig 1). Both are of Palearctic origin, and are common in western and northern Europe. Only examination of male genitalia can be used to correctly separate them based on their morphology. Despite the similarities, they seem to represent two distinct gene pools, as males of each species swarm in distinct places (Service 1994) and diagnostic loci have been found in sympatric samples from Italy (Urbanelli et al. 1981) and Sweden (Dahl 1988). In Sweden, both species overwinter as females in sheltered places (Jaenson 1987).

For *C. pipiens*, there is latitudinal variation for the length of the overwintering period, and for the date of the subsequent egg-raft deposition corresponding to the first breeding generation. From the literature, the breeding season starts in the beginning of May in Norway (Natvig 1948, p. 448), and it seems that the only mention for Sweden is from Ishii & Sohn (1987) who reported late summer (mid-August) for the first egg-raft deposition. For Swedish *C. torrentium*, the first generation egg-raft was reported to be deposited in mid-August (Ishii & Sohn 1987, Natvig 1948).

The fact that males of both species have been captured as early as June 15 in Uppsala (Dahl 1988, Fig. 10.6) seems to indicate that the date for first egg deposition for both species is earlier than reported.

Inspection of the same breeding site studied by Ishii & Sohn (1987), the sludge deposits of the Uppsala sewage works, on May 7th, 1994, disclosed 2 unhatched *Culex* egg-rafts (either *C. torrentium* or *C. pipiens*). No larvae were detected. Five days later, more than 10 unhatched *Culex* egg-rafts were present on the same breeding site.

Mosquito samples were collected from the Uppsala botanical garden. Egg-rafts, all instar

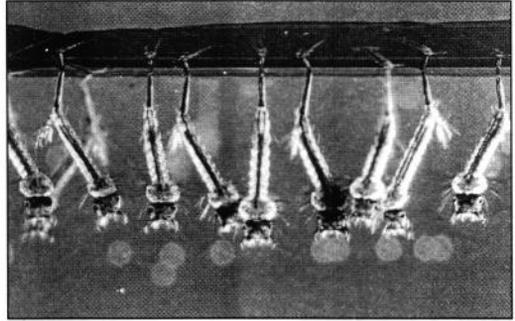


Fig. 1. *Culex pipiens* fourth instar larvae from southern France, morphologically indistinguishable from *C. torrentium*. In 1994, both species bred from May to September in Uppsala, which extends the beginning of the known breeding period of *C. torrentium* by almost two months. Photo: M. Raymond.

Larver av stickmyggan *Culex pipiens*, i fjärde larvstadiet, med sina andningsrör genom vattenytan. I samma vattenpölar hittas ofta larver av den snarlika *C. torrentium*, som nu konstaterats reproducera sig nära två månader tidigare än vad som förut varit känt.

larvae and pupae were present on May 31st 1994, but after a thorough search no pupal exuviae were located. This indicates that these mosquitoes represent the first generation of the year. Adults were raised and genitalia of six males were observed: two males were *C. pipiens* and four were *C. torrentium*. Four egg-rafts were sampled from the same breeding site on July 26th 1994, and mosquitoes from each raft were raised separately for analysis of the male genitalia. All four of them had been laid by a *C. torrentium* female. Finally, the same breeding site was inspected on September 9th 1994. No egg-raft was found, but a few larvae and pupae were present and were collected. These individuals represent probably the last generation of the breeding season. Nine males were

examined for their genitalia: six were *C. torrentium* and three *C. pipiens*.

In conclusion, immature *Culex* mosquitoes have been sampled at the beginning and the end of the 1994 breeding period, and both *C. pipiens* and *C. torrentium* were present. This particular year, the breeding season for both species occurred from May to September.

### Acknowledgements

I thank P. Pamilo for inviting me to spend a sabbatical year in his lab, and C. Dahl, P. Dias, S.-Å. Berglind and R. Paxton for helpful comments. This is contribution ISEM 95.025.

### References

- Andersson, I. H. & Jaenson, T. G. T. 1987. Nectar feeding by mosquitoes in Sweden, with special reference to *Culex pipiens* and *Cx. torrentium*. - *Med. Vet. Ent.* 1:59-64.
- Dahl, C. 1988. Taxonomic studies on *Culex pipiens* and *C. torrentium*. In: M. W. Service (Eds.): *Biosystematics of haematophagous insects* pp. 149-175. Oxford (Clarendon Press).
- Gillies, M. T. & Gubbins, S. J. 1982. *Culex* (*Culex*) *torrentium* Martini and *Cx.* (*Cx.*) *pipiens* L. in a southern English county; 1974-1975. - *Mosq. Syst.* 14:127-130.
- Ishii, T. & Sohn, S. R. 1987. Highly polluted larval habitats of the *Culex pipiens* complex in central Sweden. - *J. Am. Mosq. Cont. Assoc.* 3:276-281.
- Jaenson, T. G. T. 1987. Overwintering of *Culex* mosquitoes in Sweden and their potential as reservoirs of human pathogens. - *Med. Vet. Ent.* 1:151-156.
- Natvig, L. R. 1948. Culicini. Contribution to the knowledge of the Danish and Fennoscandian mosquitoes. Oslo (Brogers Boktrykkeri, A. W.).
- Service, M. W. 1968. The taxonomy and biology of two sympatric sibling species of *Culex*, *Culex pipiens* and *Culex torrentium* (Diptera, Culicidae). - *J. Zool., London* 156:313-323.
- Service, M. W. 1994. Male swarming of the mosquito *Culex* (*Culex*) *torrentium* in England. - *Med. Vet. Ent.* 8:95-98.
- Urbanelli, S., Sabatini, A. & Bullini, L. 1981. Tassonomia morfologica e biochimica di *Culex pipiens* e *Culex torrentium*. - *Parassitologia* 23:279-281.

### Sammanfattning

Litteraturuppgifter rörande fortplantningsperiodens längd för de snarlika stickmyggorna *Culex pipiens* och *Culex torrentium* i Sverige har varit bristfälliga. Jag samlade larver vid tre tillfällen från början till slutet av 1994 års fortplantningsperiod i Uppsala, och identifierade de kläckta exemplaren genom undersökning av hannarnas genitalier. Båda arterna reproducerade sig från maj till september.

*M. Raymond, Department of Genetics, Uppsala University, Box 7003, S-75007 Uppsala, Sweden, and Institut des Sciences de l'Evolution (URA CNRS 327), Laboratoire Génétique et Environnement, Université de Montpellier II (C.C. 065), F-34095 Montpellier cedex 05, France*

## Fjärilskalender av Ingvar Svensson finns ännu att köpa

Ingvar Svensson har skrivit en kalender som innehåller information om larv-, pupp- och flygtid för både små- och storfjärilar i Sverige med angränsande länder. Här finns också data om värdväxter mm. Boken finns i två versioner: En större med plats för egna anteckningar och en mindre fältversion.

Pris för den stora (224 sidor, 15,5x21 cm) 210 kr och för fältversionen (144 sidor, 10,5x15 cm) 110 kr. Beställes från Hans Hellberg, Lofotengatan 16, 164 33 Kista, pg 4199669-5.

