



The Gnetwork

Intended use of resource / data

Open access resources and data provided by The Gnetwork should be used for the intended purpose only, as specified below.

Title of resource

GN_07: Emergence Trapping

Authored by

When using this protocol, the following should be referenced:

Dr Jessica Stokes (Pirbright Institute, UK). Adapted from Stokes *et al.* (2022) Emergence dynamics of adult *Culicoides* biting midges at two farm in south-east England. *Parasites & Vectors* 15, 251. <https://doi.org/10.1186/s13071-022-05370-z>

DOI

N/A

Description

Emergence trap collections

Intended use

Scientific research use and training purposes.

Restrictions on use

Content is not to be redistributed in the public domain (e.g. presentation, lecture, online or in publications).

Resource history

N/A

GN 7 Emergence trapping

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Dr Jessica Stokes (Pirbright Institute, UK)

Adapted from Stokes *et al.*, (2022)

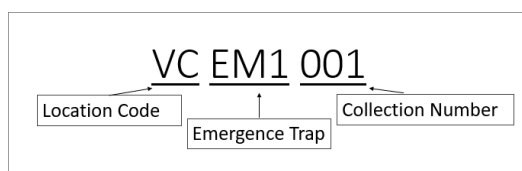
A. Introduction

The use of emergence traps is beneficial to determining the true emergence rates, abundance and diversity of the habitats utilised by *Culicoides*. In contrast to light-suction traps, true emergence rates can be observed using this trapping method, rather than the proxy of adult flight activity which is in turn biased again by the type of light used, the presence of any additional lures, and the trap placement, as well as air temperatures, humidity and the timing of trap collections.

Habitats utilised by *Culicoides* as larval development sites are known to be varied and diverse. Some species utilise niche breeding habitats, whereas others, such as *Culicoides obsoletus*, demonstrate a high plasticity in their breeding habitats.

Depending on the research question, the following should be considered good practice:

1. Map of sites enrolled in the study. Consider undertaking JNCC Phase 1 Habitat Surveys. Include locations of potential breeding habitats, potential host species, any animal housing and any information relevant to the research question.
2. Ensure you have a suitable numbering system in place to track samples, particularly if trapping across sites and with multiple traps on site. Consider allocating a unique identifier to each site/ trap. For example:



The trap location should be clearly indicated. This may be to identify traps between sites and/or location within the site. In this example 'VC' refers to a farm, 'EM1' is the trap on the farm and 001 is the collection number as multiple traps across multiple sites were deployed. Collection date is a suitable alternative to collection number.

3. The medium you collect into depends on the planned downstream use of samples. If collecting live or into ethanol check weather conditions and plan accordingly- for example when it is due to be hot it is appropriate to collect more frequently, earlier in the day and/or reduce the concentration of ethanol (i.e from 70% to 50% ethanol) to reduce evaporation.
4. Where placement of a trap is on or near a public access right of way it is best practice to create an information sign.
5. If collecting into ethanol include unique identifier in pencil on paper inside the collection pot as ethanol will remove permanent marker if spilt in transit.

B Materials

- Emergence traps
 - NHBS (product number #211898)
 - Information on home-made traps in Harrup *et al.*, 2013
- Tent pegs to secure trap (or can weigh down sides using bricks/wood/etc)
- Collection medium (i.e. 70% ethanol, water & washing-up liquid, RNAlater, etc)
- Collection pots
- Permanent marker to label collection pots
- Pencil & paper (to include in collection pot in case of spills)

C. Method

1. Prepare an excel spreadsheet including trap information, site information, unique identifiers and dates.
2. Prepare labels of unique identifiers (pencil on paper and permanent markers on collection pots).
3. Set up emergence traps;
 - 3a. If using NHBS traps or similar, set up emergence traps using connectors and fibreglass poles as per manufacturers instructions.
4. Secure trap – either using tent pegs or by weighing down sides. This both helps prevent the trap from falling over in winds and prevents insects crawling into the trap from outside of the emergence trap.
5. Set collection pot and any collection medium.
6. Collect any additional data in support of your research question (consider setting weather stations, or collecting information on breeding substrate such as soil moisture content, pH, etc).
7. Set any signage if near public access.
8. Collect collection at pre-specified time points (depending on your research question this could be daily, weekly, bi-weekly, etc).
9. Reset trap by refilling collection pot with any collection medium.
10. If continuing to trap at the same location, rotate the trap so that the emergence site is not smothered by the trap.
11. Return all samples to the lab for analysis. Consider following our protocols on *Culicoides* identification or non-destructive DNA extractions from our resource section– be aware that freshly emerged *Culicoides* can be paler than adults collected from light traps and male genitalia may still be hardening.

D. References

HARRUP, L. E., PURSE, B. V., GOLDING, N., MELLOR, P. S. & CARPENTER, S. 2013. Larval development and emergence sites of farm-associated Culicoides in the United Kingdom. *Med Vet Entomol*, 27, 441-9.

Protocol: Non-destructive DNA extraction from dipteran specimens <https://www.gnatwork.ac.uk/protocol-non-destructive-dna-extraction>

Protocol: *Culicoides* Identification <https://www.gnatwork.ac.uk/culicoides-identification>

E. Recommended Reading

GONZÁLEZ, M., LÓPEZ, S., MULLENS, B. A., BALDET, T. & GOLDARAZENA, A. 2013. A survey of Culicoides developmental sites on a farm in northern Spain, with a brief review of immature habitats of European species. *Veterinary Parasitology*, 191, 81-93.

HARRUP, L., GUBBINS, S., BARBER, J., DENISON, E., MELLOR, P., PURSE, B. & CARPENTER, S. 2014. Does covering of farm-associated Culicoides larval habitat reduce adult populations in the United Kingdom? *Veterinary parasitology*, 201, 137-145.

HARRUP, L. E., PURSE, B. V., GOLDING, N., MELLOR, P. S. & CARPENTER, S. 2013. Larval development and emergence sites of farm-associated Culicoides in the United Kingdom. *Med Vet Entomol*, 27, 441-9.

LÜHKEN, R., KIEL, E. & STEINKE, S. 2014. Culicoides biting midge density in relation to the position and substrate temperature in a cattle dung heap. *Parasitology research*, 113, 4659-4662.

THOMPSON, G. M., JESS, S. & MURCHIE, A. K. 2013. Differential emergence of Culicoides (Diptera: Ceratopogonidae) from on-farm breeding substrates in Northern Ireland. *Parasitology*, 140, 699-708.

WERNER, D., GROSCHUPP, S., BAUER, C. & KAMPEN, H. 2020. Breeding Habitat Preferences of Major Culicoides Species (Diptera: Ceratopogonidae) in Germany. *Int J Environ Res Public Health*, 17