IT Protocol

TIPULIDAE

Aim

To monitor changes in populations of selected species of Tipulidae larvae

Rationale

The larvae of craneflies (Tipulidae) are widespread, numerous and easily sampled in soil. They are rarely, if ever, found at depths below 10 cm and sampling does not involve the degree of soil disturbance which would be incurred, for instance, in sampling earthworms. These larvae are mainly plant feeders; they are important food for many other animals and play a key role in terrestrial food webs (Coulson 1962). Because several species might be present, estimates of changes of abundance will be possible on a comparative basis. To ensure that sampling covers the latter, larger larval stages, for which both retrieval and identification are easier, it is necessary to sample both in spring and in autumn because, although most species have an annual life cycle, they have different emergence seasons.

Method

Cores are taken from the soil and hand-sorted to remove the larvae. Sampling the larvae from soil cores in April covers the development time of the most common grassland species, *Tipula paludosa*, whilst samples in September will include other species found in woodland and moorland habitats as well as the late spring-emerging grassland species.

Equipment

A metal corer, 10 cm in diameter and with an operating depth of at least 10 cm, will be used.

Location

A sampling site of at least 50 m x 40 m should be selected outside, but preferably close to, the TSS. The sampling is destructive and its long-term effects are mitigated by using as large an area as possible. If both woodland and grassland sites are available, it is desirable to sample each separately as different species will be present. On upland sites it is desirable to select both a relatively well-drained and a wet peat site, as well as a grassland with mineral soil.

Sampling

The sampling area should be gridded into 20 subplots as an aid to taking a stratified random sample which is geographically dispersed across the area. A corer 10 cm in diameter will be used to obtain cores 10 cm deep. Twenty cores should be taken, using pairs of random co-ordinates, one from each of the subplots, in April and again in September. The cores should be placed in separate, labelled polythene bags and should be hand-sorted within 24 hours. The extracted larvae should be dropped into near-boiling water and then preserved in 70% alcohol, keeping separate those from each core. It should be borne in mind that zero counts may be important for comparison with future counts.

Identification of Tipulidae to species level should be possible by Site Managers, using token specimens provided. Subsequent periodic checking of identifications will also be needed. Adult craneflies collected from the pitfall traps (see IG Protocol) may provide useful confirmation of the presence of some species at a site.

Time

Sampling and sorting	4 days/year
Identification	1 day/year

Author

J. C. Coulson

Reference

Coulson, J.C. 1962. The biology of *Tipula subnodicornis* with comparative observations on *Tipula paludosa*. *Journal of Animal Ecology*, **31**, 1-21.

Specification of results and recording conventions

The measurement variables listed below are those required for each IT sampling location at an ECN Site. Sites submitting data to the ECNCCU should refer to the accompanying Data Transfer documentation for the specification of ECN dataset formats, available on the restricted access Site Managers' extranet. Contact ecnccu@ceh.ac.uk if you need access to this documentation.

The first 4 key parameters uniquely identify a sample or recording occasion in space and time, and must be included within all datasets:

• Site Identification Code (e.g. T05)	Unique code for each ECN Site
• Core Measurement Code (e.g. PC)	Unique code for each ECN 'core measurement'
• Location Code (e.g. 01)	Each ECN Site allocates its own code to replicate sampling locations for each core measurement (e.g. for different surface water collection points)
• Sampling Date (/time)	Date on which sample was collected or data recorded. This will include a time element where sampling is more frequent than daily

ECNCCU 2001

Core measurement: invertebrates – tipulids (IT Protocol)

The following variables are recorded twice yearly, in April and September.

Variable	Units	Precision of recording
Site Identification Code		
Core Measurement Code		
Location Code		
Sampling date		
Core ID	numeric code (Cn)[1]	
Species code	BRC code[2]	
Species name	genus species	
Number found	count	1

Recording forms
Three forms are available from the CCU for up to three tipulid sampling sites within each ECN site.

Notes
1. Core/subplot IDs should be unique within each ECN site. For example, if there are three tipulid sampling locations, each taking 20 cores, the cores should be labelled from 1 to 60 (C1-C20 for Location 01, C21-C40 for Location 02, C41-C60 for Location 03).
2. The coding system should follow the standard currently used by the Biological Records Centre, ITE Monks Wood, Abbots Ripton, Huntingdon, Cambs PE17 2LS, UK.