A DATABASE OF GENERIC INFORMATION TO AID THE INTERPRETATION OF NTA FIELD STUDIES

Alan Lawrence
Cambridge Environmental Assessments, Battlegate Road, Boxworth, Cambridge, CB3 8NN, UK

Non-target arthropod (NTA) effects field studies are conducted to investigate adverse effects observed at lower-tier testing. Studies may be designed to investigate effects both 'in-field' and 'off-field', using full field rates and relevant drift rates, respectively. Study sampling design may vary to include specific 'beneficial' insects, or wider arthropod diversity. An objective of these studies is to investigate potential for recovery of arthropod populations - ideally within season. Depleted 'in-field' populations may be replenished by reproduction and recolonisation by arthropods from 'off-field' areas. The interpretation of these studies is complex and may prove problematic for specialists and non-specialists alike. Generic information regarding the number and timing of generations per year, fecundity, dispersal potential and general life history of arthropods may be used to aid interpretation of these results, by providing a background context. The aim of this ongoing project is to provide a searchable database of information for both 'beneficial' arthropods, and those species which may be found in 'full-fauna' studies.

Introduction

The interpretation of field-scale arthropod effects studies is complex and may prove problematic to specialists and non-specialists alike. Generic information on the life history of arthropods may prove useful. The following parameters may be considered:

- Timing of reproductive events
- Number of generations per year (voltinism)
- Development rate (egg – adult)
- Dispersal ability, including rate and mode
- Sensitivity to a range of plant protection products

This information may allow risk assessors to relate study results to a 'typical' situation involving those species for which information was available.

Observed effects maybe related to number of generations per year, for example – more generations may indicate greater potential for recovery. More information exists for traditional 'beneficial' arthropods, often the focus of Integrated Pest Management studies, than for more general arthropods which may also occur in study samples. Information on both groups is disparate and there is a need to collate relevant information on NTA's into a database. Such information / databases have previously been collected for Birds and Mammals (e.g., PSD project PN0919, 1998) and the data have been summarised in 'Bibles' and Microsoft Access databases. A similar database for NTA's would enable a risk assessor to better contextualise observed results in individual field studies. A NTA database and 'Bible' would include summaries of relevant published literature and life history data for selected arthropod groups.

Methods

Data

Data would be gathered on selected arthropod life history parameters from a range of sources. These may include:

- Peer reviewed papers
- Books
- Unpublished research reports (eg Government research)
- 'Grey literature' (eg grower information sheets)
- Enthusiast websites
- Theses

Gathered information would be assessed for credibility and representativeness.

Database

The data would be entered into a searchable database to enable end-users to search available information by keyword, such as species name, taxonomic group or life history parameter. For instance:

- Oedothorax – returns all records on this genus

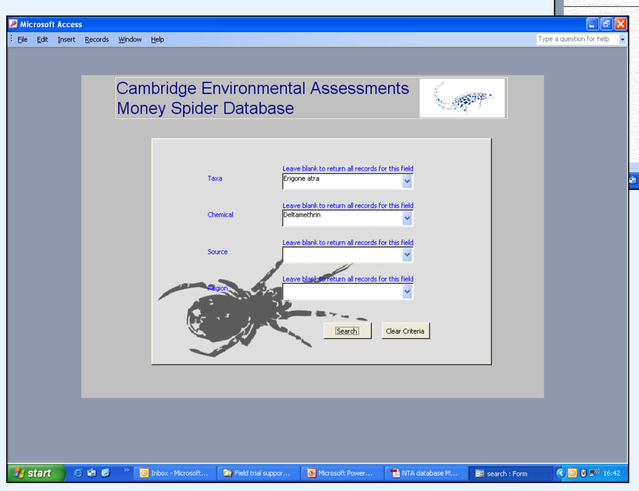
Or,

- Linyphiidae + voltinism – returns all records on this group and parameter

Data presentation

Full reference details and keywords would be returned by searches. Text summaries would also be provided, covering all relevant information.

Current version: front end (below), and search report (right)



Database developed by Simon Ford at CEA

Data may also be presented in hard-copy format, as per currently available 'Bird bible'.

Results

Progress

This project is on-going within CEA. An illustrative prototype database has been developed, containing information on money spiders (Linyphiidae). This will be extended to other arthropod groups when resources allow. These may include:

- Carabidae
- Hymenoptera, eg Braconidae
- Foliar dwelling predators, eg Coccinellidae, Neuroptera
- Wider arthropods, for instance Anthocoridae, Chrysomelidae, other Parasitica, Homoptera

Once complete therefore, this tool would provide a comprehensive source of information for risk assessors faced with interpretation of complex multi-species studies. Both familiar beneficial arthropod and wider arthropod groups would be included, aiding interpretation of studies with different sampling designs.

Discussion

Risk assessors faced with complex study results may benefit from provision of generic life history data, particularly in relation to factors which may influence recovery of arthropod communities following application of plant protection products.

For instance, non-recovery of an arthropod group within-season may lead to concern. Investigation of available information, including voltinism, dispersal/mobility and response to exposure to pesticides with similar modes of action may provide sufficient background information to show that recovery may be expected under alternative conditions, or that the present study is anomalous. Alternatively, this information may help to illustrate worst-case scenarios in terms of time to recovery and magnitude of effect.