Cambridge Environmental Assessments

NTA Recovery PS2355
NTA Representivity PS2356
ESCORT 3 meeting report

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Outline

- Non-target arthropod (NTA) risk assessment background
- Report progress on 2 CRD funded NTA projects
  - Use of recovery in risk assessments
  - Representivity of standard test species
- ESCORT 3 meeting
- Further research

NTA risk assessments

- Pre-market approvals, environmental safety
- Remit: Soil surface & above ground arthropods
  - Different scheme for soil organisms (worms, soil arthropods)
- Tiered testing scheme
  - Lab studies with standard test species
  - Field studies with naturally occurring fauna – typically conducted in-field, e.g. 1 ha plots
- Risk assessment addresses in-field & off-field
- Compare lab toxicity to exposure estimate
- Field tests, potential for recovery/recolonisation within 1 year

…under ESCORT 2

PS2355 NTA Recovery Background

"*If higher tier testing … indicates an **acceptable potential** for re-colonisation/recovery…low risk to the habitat of concern can be concluded*".

ESCORT 2 – current NTA guidance

Objective

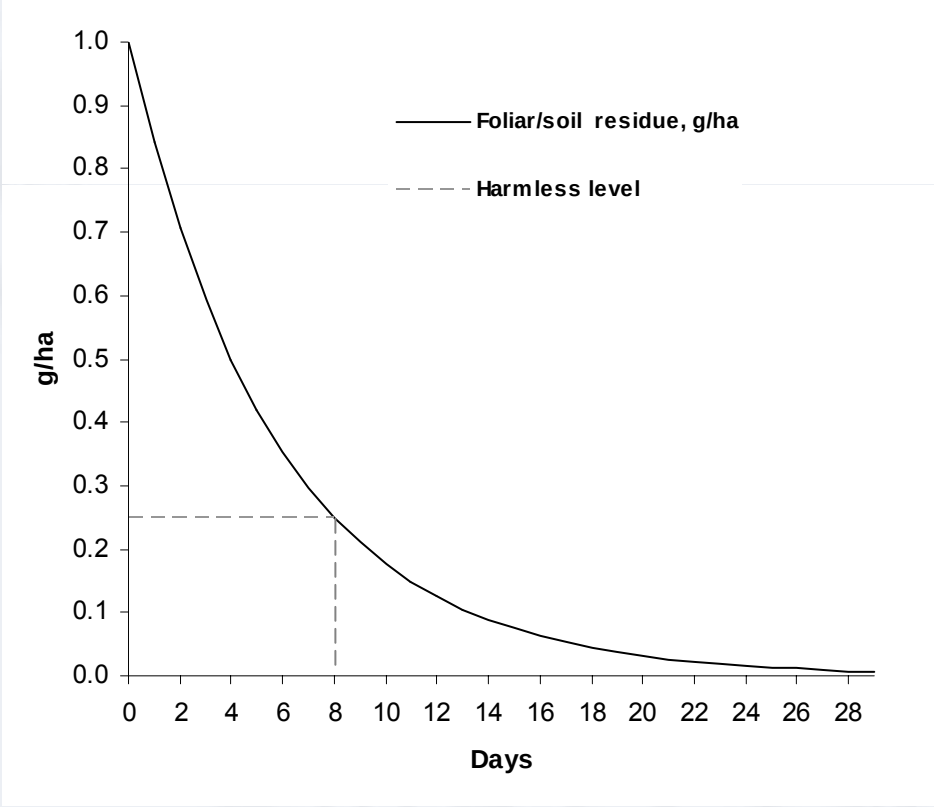
To resolve.. the uncertainty surrounding the demonstration and interpretation of recovery of non-target arthropod populations..:

- To conduct a critical review of recovery processes and signs..

..What may affect demonstration and interpretation of recovery, how does it happen and what does it look like?

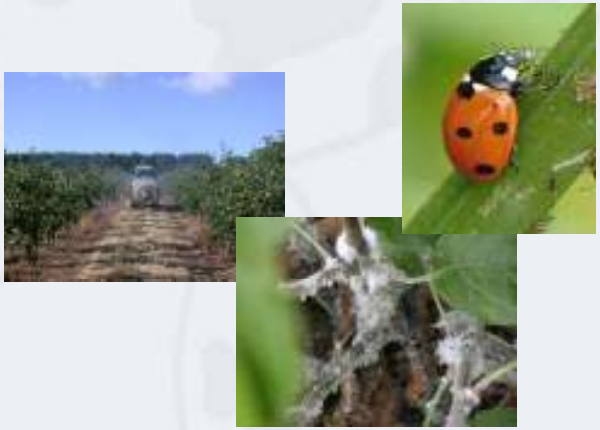
***NOT** – "What is acceptable?"*

What is recovery?

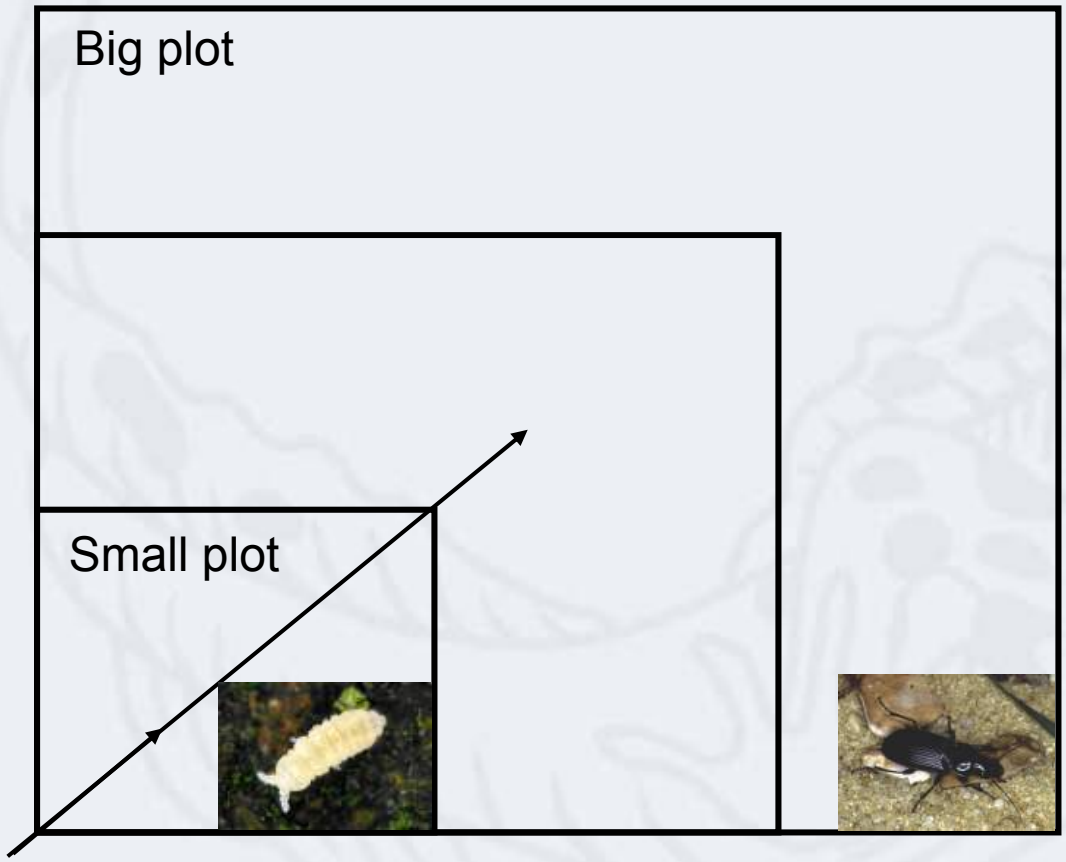


Two elements:

1. Decline of harmfulness
2. Presence of recolonising individuals



Plot scale vs. mobility vs. study duration



For walking arthropods, time to recovery related to plot size

Some animals may range beyond the field scale; flying insects particularly hard to study

Taxonomic resolution

Family	Insecticide 1 Drift rate	Insecticide 1 Field rate	Insecticide 2 Field rate
Carabidae Coleoptera	Reduction 3% Recovery 1 week	Reduction 20% Recovery 8 weeks	Reduction 33% Recovery 8 weeks
Staphylinidae Coleoptera	Reduction 1% Recovery 1 week	Reduction 77% Recovery 8 weeks	Reduction 82% Recovery 8 weeks
Linyphiidae Araneae	Reduction 18% Recovery 6 weeks	Reduction 90% Recovery 1 year	Reduction 90% Recovery 1 year

Family level ground beetle data, UK cereal study

Brown & Miles, 2006

Taxonomic resolution

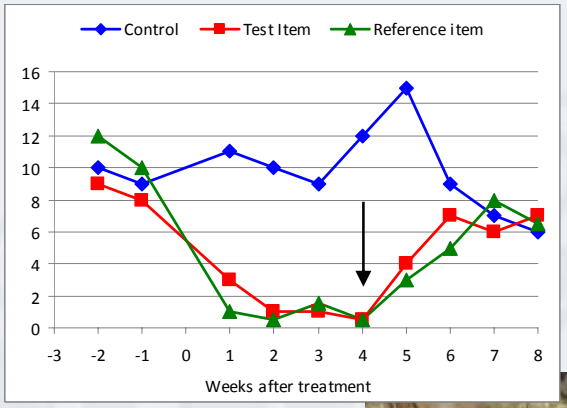
Example species	Insecticide 1 Drift rate	Insecticide 1 Field rate	Insecticide 2 Field rate
Asaphidion curtum Col; Carabidae	No reduction	No reduction	Reduction 90% Recovery not seen
Bembidion lampros Col: Carabidae	No reduction	Reduction 96% Recovery 6 weeks	Reduction 99% Recovery 6 weeks
Nebria brevicollis Col: Carabidae	No reduction	No reduction	No reduction
Stenus clavicornis Col: Staphylinidae	No reduction	Reduction 100% Recovery 8 weeks	Reduction 100% Recovery 8 weeks
Erigone dentipalpis. Male Araneae: Linyphiidae	No reduction	Reduction 100% Recovery 1 year	Reduction 100% Recovery 1 year

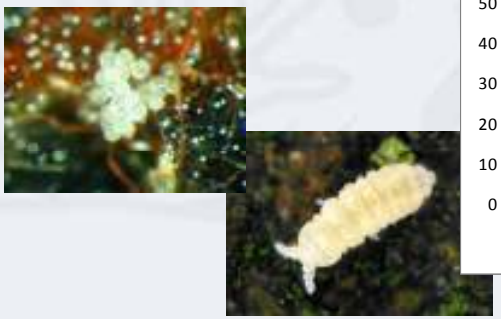
Species level data

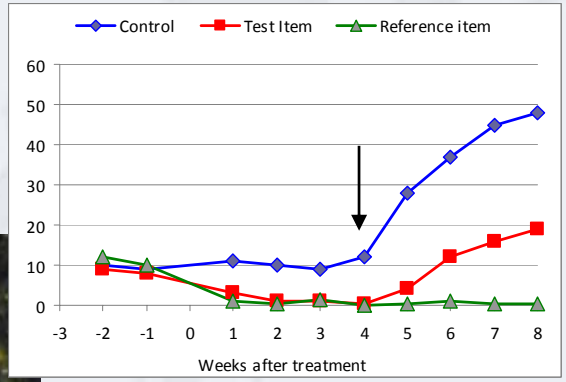
Taxonomy ≠ ecology – effects may vary within Family

Types of recovery

- Redistribution
  - Once harmfulness declines in treatment plots, animals move in from outside
  - Scale & mobility dependent
  - “Statistical recovery” Harmonisation of control & treatment plots
- Regeneration
  - From protected life stage, reproduction of survivors







Recovery conclusion

- Recovery is valid & can be meaningful
- Interpretation
  - Lab & field data offer an approximation of full-field processes
  - Some animals operate at landscape scale
  - Is an approximation of potential for recovery (vs. demonstration of actual recovery) enough?
- Off-field issues
  - Connectivity? Plot study vs. linear habitat?
- Trade-off – practicalities vs. precision
- Project status – draft comments received

PS2356 NTA representivity Background

- 20,000+ UK insect species (+ other arthropods – mites, spiders etc)
- 24 taxonomic Orders (UK insects)
- Test species:
  - Tier 1 screen - 1x insect; 1x mite
  - Higher tiers – 4 to choose from

Objectives

- Identify and **compare the life histories and feeding strategies of the wider NTA fauna to the sentinel species** tested under 91/414/EEC

- Identify **which species** (or other appropriate taxonomic group or ecological guild) **are/are not represented by the current sentinel species**

Approaches

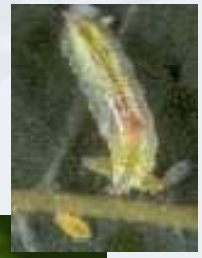
- Life history assessment
  - Tabulated characteristics (PN0937)
  - Gaps exist! Esp. herbivores, detritivores, fungivores
  - Test species: predators, parasitoids, short generation times
- Open literature for effects data
  - Specifically oral dosing (herbivores). Ongoing
- Regulatory studies
  - In-field & off-field; N & S Europe; field & permanent crops
  - Full fauna designs, multiple sampling techniques
  - Allowed comparison of test species/relatives to wider fauna

Results from regulatory studies

- NTA responses divided crop & off-crop systems into
  - 2-d (e.g. cereals; meadows)
  - 3-d (woody crops e.g. orchards; hedges?)
- 2-d habitats – Collembola had highest sensitivity
- 3-d habitats – small herbivores very sensitive
  - But test species flower bug and ladybird similar
- Available species appeared to represent the response of the community...caveats:
  - Limited dataset
  - Very mobile or scarce species..?
- Results discussed at ESCORT 3

ESCORT 3 Background

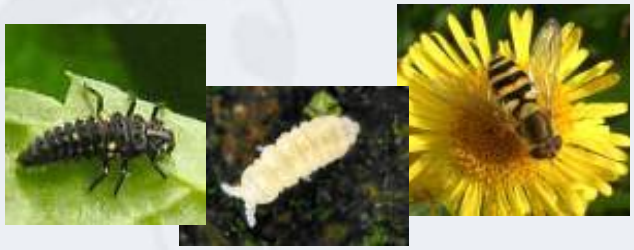
- European Standard Characteristics of Non-Target Arthropod Regulatory Testing
- 8-11 March 2010. 60 attendees; tripartite
  - Academia, Reg. Authorities, Industry.
- Previous meetings (1994, 2000) had led to guidance documents
- Remit: provide recommendations to European Food Safety Authority (EFSA) – revision of broader risk assessment guidance documents
- Current projects presented in plenary session



ESCORT 3
Key recommendations

- Protection goals: different in-field & off-field
  - Off-field: aim for no effect, hence recovery not applicable
  - In-field: recovery acceptable (caveats)
- Definition of in/off-field
  - For RA: In-crop, off-crop. In-crop = area where PPP applied.
  - For mitigation: In-field, off-crop buffers, some MS.
- Off-field exposure – currently use deposition data
  - Use of 3-d data for vegetated areas
  - Entrapment of drift by vegetation
- Representivity
  - Uncertainty remains; scarce species
- Status – meeting document/recommendations in preparation prior to submission to EFSA

Research suggestions

- How to deal with difficult species?
  - Large, scarce, mobile. Recovery?
  - May be biochemically sensitive, or infrequent breeders, low fecundity. Pre-selected?
- Modelling approaches for recovery?
- Web building spiders
- Off-field fauna. Regional?

- **Thanks for your attention**