The use of hoverflies (Diptera, Syrphidae) as indicators of wetland habitat quality: a case study from Pollardstown Fen, Co. Kildare, Ireland

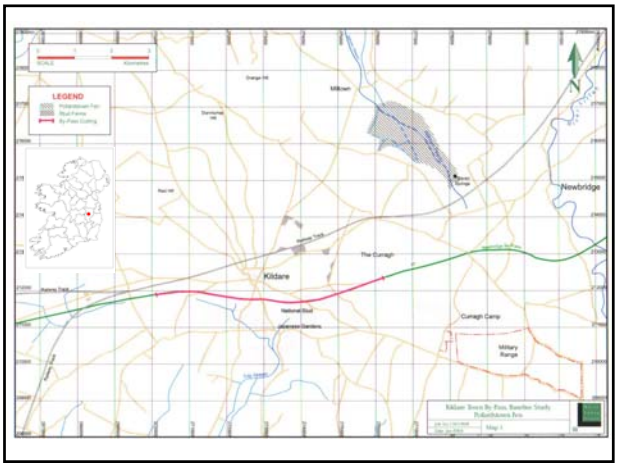
Tom Gittings[1], Jervis Good[2] and Martin Speight[3]
[1] 3 Coastguard Cottages, Roches Point, Whitegate, Co. Cork
[2] Terrascope, Glinny, Riverstick, Co. Cork
[3] National Parks and Wildlife Service, 7 Ely Place, Dublin 2

Pollardstown Fen

- 130 ha fen fed by calcium-rich ground water
- Candidate Special Area of Conservation:
  - Calcareous fen with *Cladium mariscus*
  - Petrifying springs with tufa formation
  - Alkaline fens
  - *Vertigo geyeri*, *Vertigo moulinsiana*, *Vertigo angustior*
- Many other rare plants and invertebrates

Kildare Town Bypass

- 3.5 km cutting constructed below the permanent water table of the aquifer
- 'Tanked' with a reinforced bituminous geomembrane overlain by a compacted clay layer
- Dewatering predicted to occur during construction of cutting
- Ministerial order required a monitoring programme to:
  "evaluate the existing groundwater conditions and dependent flora and fauna in the area that may be affected…and to implement any remedial measures that may be necessary"
- Monitoring programme includes: hydrology; vegetation; molluscs; and tufa spring invertebrates (inc. hoverflies)



Objectives

To evaluate and communicate the success of remedial management by identifying indicator assemblages that:

- are characteristic of the vulnerable habitat; and
- respond to the potential impact from road construction.

Indicator assemblages

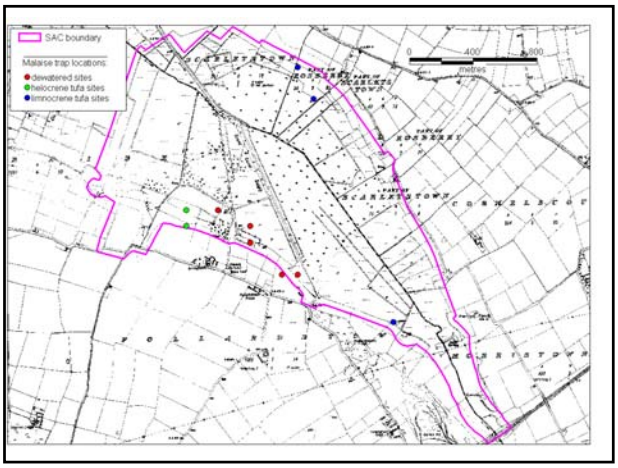
Includes tufa-associated organisms and biota associated with springs and spring-fed ecotone:

- Moth flies (Psychodidae, Diptera)
- Hoverflies (Syrphidae, Diptera)
- Rove beetles (Staphylinidae, Coleoptera)

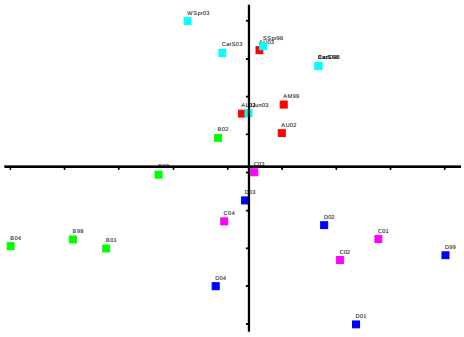
Presentation given at the 3rd Syrphidae Symposium, Leiden, The Netherlands, 2nd to 5th September, 2005

Methods

- 10 sites sampled:
  - 3 with extensive limnocrene tufa habitat
  - 2 with helocrene tufa habitat
  - 5 with historically dewatered habitat
- 23 site-year samples during the period 1999-2004
- surveyed using Malaise traps:
  - 2 traps per site
  - mainly mid-May- end July



PCA ordination of alkaline fen syrphid assemblage



Indicator species analysis

- Site A/dewatered sites: *Sphaerophoria interrupta*
- Site B: *Chrysotoxum bicinctum*, *Eristalinus sepulchralis*, *Eristalis interrupta*, *Neoascia podagrica*, *Platycheirus scambus*, *Syritta pipiens*
- Sites C and D: *Lejogaster tarsata*, *Neoascia tenur*, *Orthonevra geniculata*, *Trichopsomyia flavitarsis*

Limnocrene species

- *Helophilus hybridus*
- *Lejogaster metallina*
- *Lejogaster tarsata*
- *Neoascia tenur*
- *Orthonevra geniculata*
- *Platycheirus scambus*

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Numbers of limnocrene species

Site	mean	SD	min	max	n
Dewatered sites	1.4	0.7	0	2	8
Site A	3	1.4	2	4	2
Site B	4	1.0	3	5	5
Site C	4	0.8	4	5	4
Site D	3.6	0.5	3	4	5

Frequency of limnocrene syrphid indicator species

	Site A	Site B	Site C	Site D	Dewatered sites
Neoascia tenur	0.75	0.8	1	1	0.17
Lejogaster metallina	0.75	1	0.75	0.6	0
Orthonevra geniculata	0.25	0.6	0.75	1	0
Lejogaster tarsata	0.25	0.2	1	1	0
Platycheirus scambus	0	1	0	0	0.33
Helophilus hybridus	0.5	0	0.5	0	0.5
n	4	4	4	5	6

Discussion

- Ordination of overall assemblage, and use of limnocrene indicator species, show similar patterns
- Limnocrenre species varied in their associations with crenal habitats:
  - *Orthonevra geniculata*, *Lejogaster tarsata* - "thin surface film"
  - *Platycheirus scambus* - deep pools
  - *Helophilus hybridus* - no association
- Drying of Site C in 2003 did not produce detectable response in 2004

Conclusions

- Hoverfly assemblages are sensitive to variations in wetland habitat quality
- Malaise trap surveys can detect differences between sites located a few hundred metres apart in a permeable habitat matrix
- Potentially useful tool for monitoring wetland habitats

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