



## Effects of afforestation on hoverfly (Diptera, Syrphidae) biodiversity

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## Afforestation in Ireland

- T...
- 70...
- L...
- E...



## BIOFOREST Project

Multidisciplinary research into of biodiversity of commercial plantation forests in Ireland

3 sub-projects:

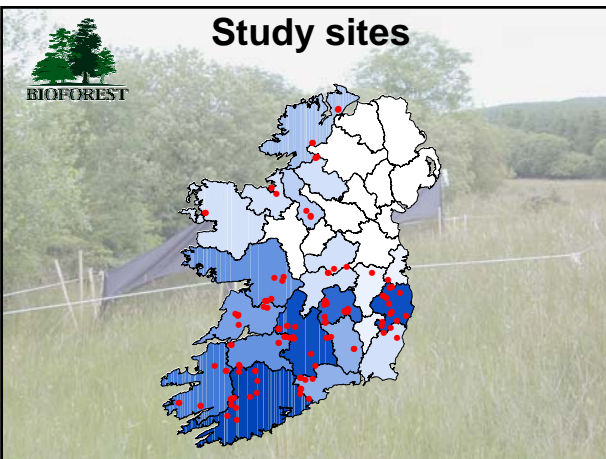
- Biodiversity assessment of afforestation sites
- Biodiversity across the forest cycle
- Biodiversity of open spaces in mature forests

## Hoverfly surveys

- Paired surveys of unplanted and 5 year old plantations (24 pairs of sites)
- Surveys of 3 forest types and 5 age-classes (38 sites)
- Surveys of open spaces in 12 forests



## Study sites



## Survey methods

- Malaise trapping
- 2-4 traps per site
- Sampling from mid-June - late August, early May - mid July, early May - late August
- Macrohabitats recorded using the Syrph The Net habitat classification
- Selected microhabitat parameters recorded



### Scope of this talk

- Biodiversity value of afforestation sites
- Biodiversity value of spruce plantations:
  - closed canopy
  - open spaces
- Net effect on biodiversity

### Hoverfly fauna recorded

- 112 species recorded (63% of total Irish fauna)
- 1 species new to Ireland: *Lapposyrphus lapponicus*
- 4 threatened species: *Parasyrphus nigritarsis*, *Platycheirus amplus*, *Xanthandrus comtus*, *Xylota florum*
- 7 vulnerable species: *Chalcosyrphus nemorum*, *Chrysogaster virescens*, *Meligramma guttata*, *Orhonevra geniculata*, *Orhonevra nobilis*, *Platycheirus immarginatus*

### Biodiversity in afforestation sites – humid grassland

Mean:

- 23.5 species/site (SD 5.3)
- 34% of Irish humid grassland fauna

Max:

- 32 species
- 46% of Irish humid grassland fauna

### Biodiversity in afforestation sites – moor and blanket/cutover bog

Mean:

- 15.6 species/site (SD 4.1)
- 33% of Irish moor and blanket/cutover bog fauna

Max:

- 20 species
- 43% of Irish moor and blanket/cutover bog fauna

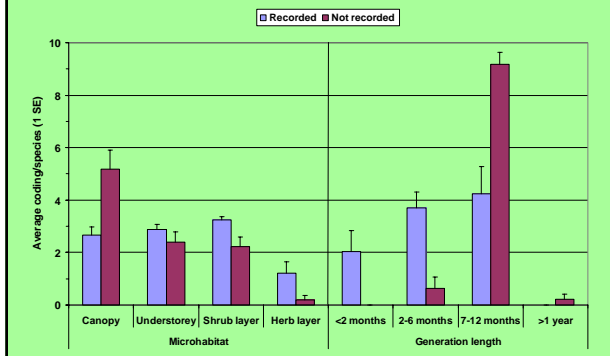
### Biodiversity in afforestation sites – threatened species

- *Chrysogaster virescens*, *Epistrophe nitidicollis*, *Meligramma guttata*, *Parasyrphus nigritarsis*
- *Platycheirus amplus*, *Platycheirus immarginatus*, *Orhonevra geniculata*, *Orhonevra nobilis*

### Biodiversity of closed canopy spruce plantations

- 15 of 27 Irish spruce plantation species recorded
- One species new to Ireland (*Lapposyrphus lapponicus*)
- Most aphid-feeding conifer specialist species not recorded
- Species not recorded mainly scarce or rare:
  - Not recorded, mean 2.7 50 km squares (SE 2.6)
  - Recorded, mean 34 50 km squares (SE 6.4)

### Characteristics of aphid-feeding conifer-associated hoverflies

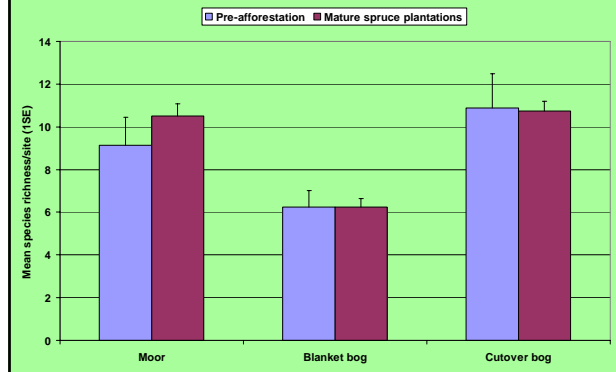


### Forest specialists in mature spruce plantations

- Ubiquitous: *Sphegina clunipes*, *Xylota jakutorum* (wet sites)
- Widespread: *Didea fasciata*, *Parasyrphus punctulatus*, *Scaeva selenitica*
- Rare: *Lapposyrphus lapponicus* (plus others?)



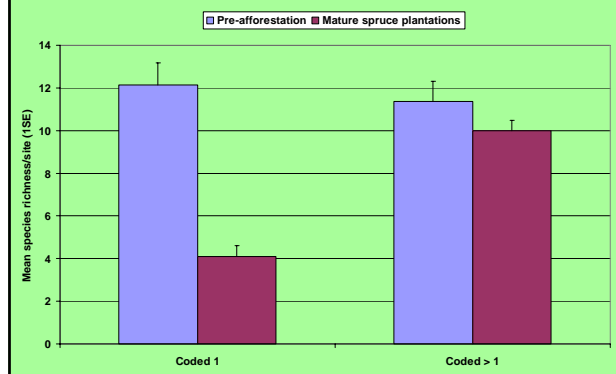
### Moor and blanket/cutover bog fauna: pre-afforestation bog/moor sites compared to open spaces in mature spruce



### Improved grassland fauna: pre-afforestation improved grassland sites compared to open spaces in mature spruce



### Humid grassland fauna: pre-afforestation humid grassland sites compared to open spaces in mature spruce



### Indicator species: pre-afforestation

|                                  | Bog/moor | Improved grassland | Humid grassland |
|----------------------------------|----------|--------------------|-----------------|
| <i>Cheilosia albipennis</i>      |          | √                  | √               |
| <i>Cheilosia bergenstammi</i>    |          | √                  | √               |
| <i>Cheilosia pagana</i>          |          |                    |                 |
| <i>Eristalis lineata</i>         |          |                    | √               |
| <i>Eumerus strigatus</i>         |          | √                  |                 |
| <i>Eupeodes corollae</i>         |          | √                  |                 |
| <i>Eupeodes latifasciatus</i>    |          | √                  | √               |
| <i>Lejogaster metallina</i>      |          | √                  |                 |
| <i>Neoscia podagrica</i>         |          | √                  |                 |
| <i>Platycheirus angustatus</i>   |          |                    | √               |
| <i>Platycheirus peltatus</i>     |          |                    | √               |
| <i>Platycheirus rosarum</i>      |          |                    | √               |
| <i>Platycheirus scambus</i>      | √        |                    | √               |
| <i>Sphaerophoria interrupta</i>  |          |                    | √               |
| <i>Syrirta pipiens</i>           |          |                    | √               |
| <i>Trichopsomyia flavitarsis</i> | √        |                    | √               |
| <i>Volucella bombylans</i>       |          |                    | √               |

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| <i>Platycheirus scambus</i>      | √        |                    | √               |
| <i>Sphaerophoria interrupta</i>  |          |                    | √               |
| <i>Syrirta pipiens</i>           |          |                    | √               |
| <i>Trichopsomyia flavitarsis</i> | √        |                    | √               |
| <i>Volucella bombylans</i>       |          |                    | √               |

### Indicator species: open spaces in mature spruce

|                              | Bog/moor | Improved grassland | Humid grassland |
|------------------------------|----------|--------------------|-----------------|
| <i>Chrysotoxum fasciatum</i> | (√)      |                    | √               |
| <i>Episyrphus balteatus</i>  |          | √                  | √               |
| <i>Eristalis interrupta</i>  | √        | √                  |                 |
| <i>Sericomyia lappona</i>    | (√)      |                    | √               |
| <i>Syrphus ribesii</i>       |          | √                  |                 |

### Conclusions

- Afforestation sites
  - Typical sites do not have high hoverfly biodiversity
  - But may be important for maintaining local biodiversity
  - But rare species can occur
- Mature plantations support few forest specialists
- Open spaces in mature plantations:
  - Important role in maintaining hoverfly biodiversity
  - But do not support full range of pre-afforestation fauna

### Project Funding



National Council for Forest Research and Development



Environmental Protection Agency



National Development Plan

### Acknowledgements

BIOFOREST colleagues, BIOFOREST steering group, Coillte and other landowners, Forest Service, Martin Speight



Project Website

<http://bioforest.ucc.ie>