



Dipterological research by the National Centre for the Study and Conservation of Forest Biodiversity (CNBF) Verona – Bosco della Fontana (Italy)

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The CNBF

The National Centre for the Study and Conservation of Forest Biodiversity (CNBF) (Italy) is a research centre affiliated to the Corpo Forestale dello Stato (Italian State Forestry Service). The CNBF has its offices in Verona and in the Biogenetic Nature Reserve ‘Bosco della Fontana’ (Fig. 1), a small, isolated lowland forest in the industrial and agricultural landscape of the Po Valley. The invertebrate fauna of the Reserve had only been sporadically explored before the end of the 1980s, when a few amateur entomologists began collecting there. The CNBF became officially established by decree in 2001, but invertebrate monitoring in the Reserve had started in 1998. In 1999, the CNBF received funds for a LIFE-Nature project at Bosco della Fontana; this allowed the Centre to gain more visibility, both nationally and internationally, and to become involved in various Italian and Community projects. The CNBF has now developed a solid network of collaborations, both with Italian and foreign institutions and taxonomic specialists. The Centre is currently involved in two LIFE projects, the ICP Forests programme and Forest Biota, with scientific activities focussing on the monitoring of forest invertebrates. The Centre also supports M.Sc. and Ph.D. projects and provides taxonomic expertise for families of Coleoptera, Diptera (Asilidae, Sarcophagidae, Stratiomyidae, Syrphidae, Tachinidae), Lepidoptera, Odonata and Orthoptera. With an agreement protocol recently stipulated between the Nature Protection Department of the Italian Ministry for the Environment and the State Forestry Service, the CNBF has been put in charge of monitoring the state of Natura 2000 and CONECOFOR (Controllo Ecosistemi Forestali) sites in Italy: a network of entomological labs called ‘Rete Nazionale Invertebrati’ (RIN) is being established for this purpose.

Dipterological research

Diptera are seldom among the best-known insect orders in natural environments, as dipterological research often focuses on flies of economic importance, such as crop pests (e.g. many Agromyzidae, Cecidomyiidae, Tephritidae), species of medical and veterinary importance (e.g. Culicidae, Simuliidae, Oestridae) or species of forensic importance (e.g. Calliphoridae, some Sarcophagidae). Furthermore, the contribution of amateur dipterists to the field has always been traditionally poorer than that of coleopterists or lepidopterists to their respective fields. Despite a relatively good knowledge, thanks also to the huge contribution of earlier authors such as Rondani and Bezzi, the Italian Diptera fauna is still incompletely known, especially as far as some families are concerned. One result of the recent faunistic and ecological surveys carried out – mainly in forest ecosystems – by the CNBF has been its contribution to the knowledge of the Italian dipteran fauna. This poster provides an overview of the results of faunistic, ecological and monitoring activities carried out between 1999 and 2006, with regard strictly to the Diptera.

Main study sites

NATURE RESERVE ‘BOSCO DELLA FONTANA’ (LIFE project 1999-2003) (Fig. 1). A small, remnant oak-hornbeam forest of 233 ha, situated in the province of Mantua (Lombardy, NE Italy), in the heart of the Po Valley. The Reserve consists mainly of forest habitat (dominant tree species Pedunculate oak and Hornbeam), with 2 ha of open grassland and a wetland.

NATURE RESERVE ‘VINCHETO DI CELARDA’ (LIFE project 2005 - ongoing) (Fig. 2). A small (92 ha), riparian forest (dominant tree species Black poplar) situated alongside the Piave river, province of Belluno (Veneto, NE Italy).

ABETONE (Apennine beech wood project 1999-2001). The state-owned demesne of Abetone (1310 ha) is located in the province of Pistoia (Tuscany), and contains the two Nature Reserves ‘Pian degli Ontani’ and ‘Campolino’. The area is mountainous, and altitudes of around 1800 m are reached



FIG. 5. *Pseudogonia metallaria* (Diptera, Tachinidae), from Marganai.

in both Reserves. ‘Piano degli Ontani’ is almost entirely covered by beech forest, whereas at ‘Campolino’ the beech is mixed with Norway spruce, possibly a glacial relict in this location.

GUADINE PRADACCIO NATURE RESERVE (Apennine beech wood project 2000-2001). A small (289 ha) Reserve located, between 1200 m and 1796 m, within a wide belt of forest on the northern slopes of the Tusco-Emilian Apennines, in the province of Parma (Emilia-Romagna). The vegetation is typical of the northern Apennines, with a dominance of beech up to the highest altitudes.

ORECCHIELLA NATURE RESERVE (Apennine beech wood project 2000-2001). Situated in north-west Tuscany in the province of Lucca (Tuscany), the Orecchiella reserve occupies an area of 52 km² between the Apuane Alps and the Apennines. The area is covered mainly by beech forest, with a mixture of other deciduous and coniferous trees, scattered clearings and wetlands.

BOSCO DELLA FICUZZA (CONECOFOR 2003-2005) (Fig. 3). ‘Bosco della Ficuzza’ is a 7,000 ha forest situated between 700 and 1000 m a.s.l. on the slopes of Rocca Busambra (1600 m), in the province of Palermo (Sicily). The main tree species characterising this forest are the Holm oak, the Cork oak, the Turkey oak and the endemic oak *Quercus gussonei*.

MARGANAI (CONECOFOR 2003-2005; Marganai project 2006 - ongoing) (Fig. 4). Marganai is part of a 12,000 ha forest located in the Sulcis-Iglesiente region, in southwest Sardinia (province of Cagliari). The dominant tree species in this forest are the Holm oak and the Strawberry tree (*Arbutus unedo*). The landscape of this area is characterized by a network of abandoned mineral mines.



FIG. 6. *Sarcophaga* (Heteronychia) sp. (Diptera, Sarcophagidae), from Marganai.

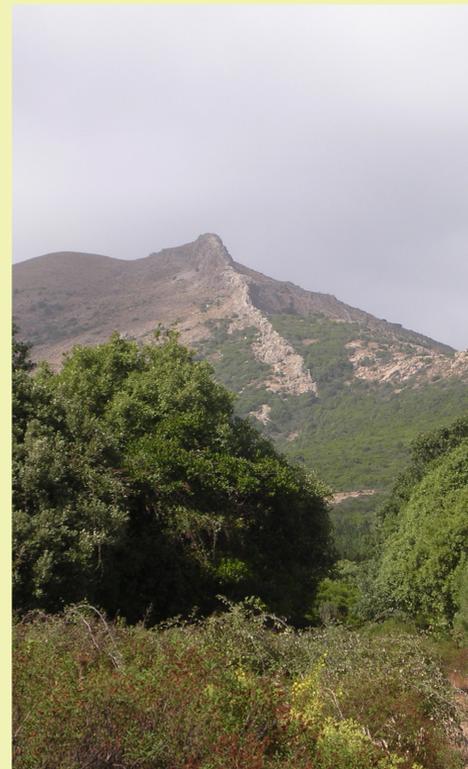


FIG. 3. The quartz massif of Muru Mannu, in the Marganai mountain range (Sardinia).

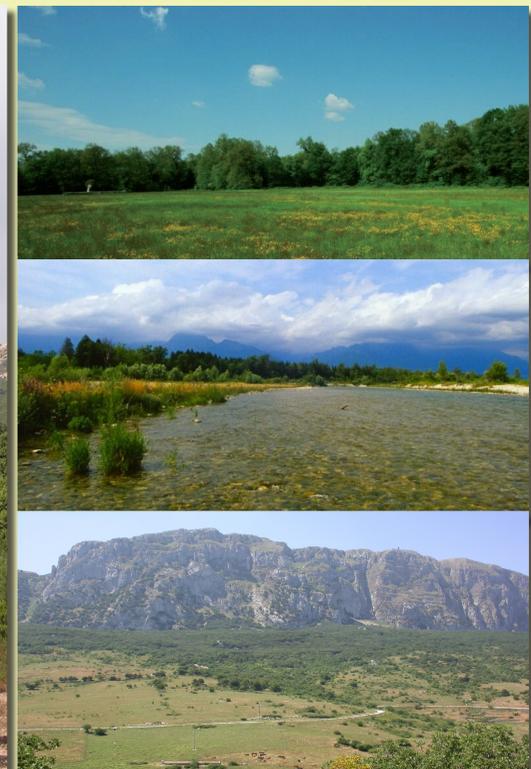


FIG. 1. ‘Bosco della Fontana’ Nature Reserve (Lombardy).
FIG. 2. ‘Vincheto di Celarda’ Nature Reserve, Veneto.
FIG. 4. A view of the forest of Ficuzza (Sicily).

Main collecting methods

The main methods used for collecting Diptera have been the Malaise trap and direct collecting with hand nets. Lower numbers of species were collected with pitfall traps and window flight traps. Methods used in each project are specified hereunder

LIFE project ‘Bosco della Fontana’ (1999-2003) (Mason et al. 2002): 5 Malaise traps in different habitat types for two years; sample collecting every fortnight; direct collecting with nets.

M.Sc. thesis project on canopy Tachinidae (Bosco della Fontana) (Cerretti et al. 2004b). During this study, an interesting sampling technique was used to survey the spatio-temporal distribution of tachinid flies in the Bosco della Fontana reserve: 2 pairs of Malaise traps (one on the ground and one suspended in the canopy) were placed in 2 different habitat types; duration of sampling 8 months; weekly collecting of samples.

Apennine beech wood project (1999-2001) (Cerretti et al. 2003): several Malaise traps in 4 nature reserves of the central-northern Apennines for 5 months each year; sampling every fortnight in 1999-2000, monthly sampling in 2001; direct collecting with nets.

CONECOFOR – InvertebrateBiodiv pilot project (2003-2005) (cf. Mason et al. 2006): 1 Malaise trap, 4 pitfall traps and 1 window flight trap in 12 ICP Forests level II permanent plots for 12 months; samples collected every fortnight; direct collecting with nets.

LIFE project ‘Vincheto di Celarda’ (2005 - ongoing): 1 Malaise trap on the ground and 1 Malaise trap suspended within the canopy for 7 months during 3 consecutive years; samples collected every fortnight.

Marganai project (2006 - ongoing): 3 Malaise traps placed in 3 different habitat types from March to November 2006; samples collected every fortnight; direct collecting with nets; additional collecting with Malaise traps for short periods in particular habitats (e.g. near humid areas).



FIG. 7. *Chorisops tunisiae* (Becker, 1915) (Diptera, Stratiomyidae), from Marganai.



FIG. 8. *Euthycera vockerothi* Rozkošný, 1988, (Diptera, Sciomyzidae), from Ficuzza.

Results and discussion

Faunistic studies at Bosco della Fontana and in Apennine beech woods have resulted in the publication of 3 monographs by the CNBF (Cerretti et al. 2003, 2004a; Mason et al. 2002), and a fourth monograph on the fauna of the Marganai mountain range (southwest Sardinia) is in preparation. Preliminary results concerning 4 of the 12 CONECOFOR sites surveyed in 2003-2005 have been recently presented and discussed in Mason et al. (2006). Altogether so far, 16 Diptera species new to science and 277 Diptera species new to the Italian fauna have been found. These results are summed up in Table 1.

One of the most striking results has been the finding of many new Italian records and 3 new species for science in such a small and isolated forest as ‘Bosco della Fontana’, which shows how important the conservation of these small and heavily altered European forests is. Among the approximately 850 Diptera species recorded in Apennine beech woods, the large number of Mycetophilidae and allies firstly recorded for Italy shows how poorly the fungus gnat fauna of this country is known. The same can be said for the Phoridae, the Hybotidae and the Empididae. Intense collecting in the Marganai mountain range in Sardinia has revealed the existence of a very interesting fauna, with several newly discovered endemics. So far, only a few families have been studied from this area, and equally interesting results are expected for other groups, some of which (e.g. the Ephydriidae and the Mycetophilidae) have been virtually unstudied in this region. Preliminary results on the dipteran canopy assemblages at ‘Vincheto di Celarda’ Nature Reserve (Veneto) have shown differences in species’ distribution between the canopy and the understorey, as well as different sex ratios within single species in these two layers.

Most of the Diptera material collected in the past 4 years in different parts of Italy (including Sardinia and Sicily) has been sorted to family. However, many of these have not yet been studied and identified to species level. Specialists wishing to study this material are welcome to collaborate in the CNBF’s projects.

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| PROJECT AND STUDY AREA | NEW SPECIES FOR ITALY | NEW SPECIES FOR SCIENCE | REFERENCES |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| LIFE NAT/IT/99/006245 (1999-2003) ‘Bosco della Fontana’ Nature Reserve | 62 Asteiidae (1), Bibionidae (1), Chironomidae (1), Drosophilidae (2), Empididae (13), Ephydriidae (5), Hybotidae (6), Keroplatidae (3), Lauxaniidae (3), Limoniidae (1), Lonchaeidae (1), Mycetophilidae (6), Phoridae (3), Pipunculidae (2), Sphaeroceridae (2), Stenomoceridae (1), Syrphidae (1), Tabanidae (1), Tachinidae (8), Tephritidae (1) | 4 Leia fontana Chandler, 2004 (Mycetophilidae) Leia padana Chandler, 2004 (id.) Megaselia mantuana Govi, 2005 (Phoridae) | Mason et al. 2002 Cerretti et al. 2004a |
| Apennine beech woods (1999-2001) Abetone, Guadine Pradaccio and Orecchiella Nature Reserves | 187 Calliphoridae (1), Chloropidae (4), Diadoxidae (1), Dolichopodidae (1), Empididae (15), Ephydriidae (1), Hybotidae (25), Keroplatidae (8), Lauxaniidae (2), Lonchaeidae (1), Micropezidae (1), Mycetophilidae (1), Mycetophilidae (76), Phoridae (32), Scathophagidae (1), Sciariidae (1), Sciarioidea (1), Sciomyzidae (1), Sphaeroceridae (1), Syrphidae (2), Tachinidae (9), Tephritidae (1), Trisosceldidae (1) | 1 Rhagionidae (Merz, unpublished) 5 Platypalpus pseudodalteri Ruffone, 2003 (Hybotidae) P. pseudostrobili Ruffone, 2003 (id.) P. submaculatus Ruffone, 2003 (id.) P. subpectorialis Ruffone, 2003 (id.) Tachypiza subumbilata Ruffone, 2003 (id.) | Cerretti et al. 2003 |
| CONECOFOR (2003-2005) Circeo (Italy), Ficuzza (Sicily), Marganai (Sardinia), Piano Limina (Calabria), Rosello (Abruzzo) | 18 Asilidae (1), Asteiidae (1), Campicoetidae (1), Chloropidae (3), Drosophilidae (1), Periscleridae (1), Pipunculidae (2), Sarcophagidae (6), unpublished, Sciomyzidae (1) (Fig. 7), Stratiomyidae (1) (Fig. 8), Syrphidae (3), Tachinidae (5, 2 unpublished) | 5 Pales albata Cerretti, 2005 (Tachinidae) P. marae Cerretti, 2005 (id.) Pseudogonia metallaria Cerretti, 2004 (id.) (Fig. 5) Esheria sp. (Cerretti, unpublished) (id.) Sarcophaga (Thysocnema) sp. (Whitmore, unpublished) (Sarcophagidae) | Birtele 2004 Mason et al. 2006 Merz 2005 Munari & Cerretti (accepted for publication) |
| LIFE NAT/04/000190 (2005 - ongoing) Vincheto di Celarda Nature Reserve | 1 Tachinidae (unpublished) | | |
| Marganai project (2006 - ongoing) Marganai mountain range (Sardinia) | 1 Tachinidae (unpublished) | 2 Siphona nuragica Cerretti & Tschornig, in press Sarcophaga (Heteronychia) sp. (Whitmore, unpublished) (Fig. 6) | |
| TOTALS | 277 | 16 | |