

Records of skippers and butterflies from the Marganai mountains and surroundings (SW Sardinia) (Lepidoptera)*

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ABSTRACT

The authors briefly report on 26 species of skippers and butterflies (Lepidoptera) collected by Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana" of Verona during an entomological survey carried out in the Marganai mountains and surrounding areas (SW Sardinia).

Key words: Lepidoptera, butterflies, skippers, Sardinia, Marganai mountains, faunistics.

RIASSUNTO

Dati sulle farfalle diurne dei Monti Marganai e dintorni nella Sardegna sud-occidentale (Lepidoptera)

Nel contributo si fornisce il rendiconto delle 26 specie di Esperidi e Ropaloceri (Lepidoptera) individuate dal Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana" di Verona nel corso di rilievi sull'entomofauna del comprensorio dei Monti Marganai e dintorni (Sardegna meridionale).

INTRODUCTION

The study of the butterfly faunas of the larger Mediterranean islands is of great theoretical interest in biogeography, conservation biology and evolutionary research (Balletto 1995; Grill et al. 2002; Dapporto 2010). In this respect, ever since the first contributions dating back to the 19th century (see Leigheb et al. 2005, 2006, for a review), above all the historical works by Gené (1839), Ghiliani (1852) and Costa (1882, 1883, 1884, 1886a, 1886b), the work of several students has been dedicated wholly or in part to assessing the butterfly and skipper fauna of Sardinia. Accordingly, the list of Sardinian Papilionoidea has been repeatedly updated until very recently, by both amateurs and professionals reporting on their findings (e.g. Cobolli et al. 1996; Leo 2011). These also included noteworthy discoveries such as *Polyommatus*

(*Lysandra*) *gennargenti* (Leigheb, 1987) (Lycaenidae), an island endemic which, though still ranked as a subspecies by Karsholt & van Nieukerken (2011), had first been collected and recognised by Silvia and Pietro Provera, respectively, who were not given enough credit for their outstanding discovery.

In order to improve the knowledge on the fine distribution of butterflies and skippers in southwest Sardinia, the authors were asked by the Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana" of Verona (hereafter CNBFVR) to identify the specimens collected during an entomological survey of the Marganai mountains and surroundings within the framework of the "CONECOFOR-ICP Forests Project" for the monitoring of forest ecosystems in Sardinia. In fact, five butterfly species sampled in the study area were already recorded by Mason et al. (2006), and the

present account extends to the totality of the samples.

MATERIAL AND METHODS

Study area

For an outline of the study area and features of the sampling sites the reader is addressed to the contributions by Angius et al. (2011) and Bardiani (2011).

Sampling techniques

The records were obtained through an array of methods in addition to the butterfly net, as listed hereafter in the abbreviations.

Identification, layout of results and depositories

All material was identified following the guidelines of major recent books on the European butterfly fauna (e.g. Higgins 1975; Lafranchis 2004; Tolman & Lewington 2009). Species names are listed after the systematic order of Balletto et al. (2005) and follow the nomenclature of "Fauna Europaea" (Karsholt & van Nieukerken 2011). All material examined is deposited at CNBFVR (Marmirolo, Mantua).

ABBREVIATIONS

SAMPLING SITES. **A17** = Carbonia-Iglesias prov., Fluminimagiore, Portixeddu, 6 m, 32S 449437 4365741; **C01** = Carbonia-Iglesias prov., Iglesias, Case Marganai, 725 m, 32S 463890 4355925; **C07** = Carbonia-Iglesias prov., Domusnovas, dint. Planargia-Scoveri, 625 m, 32S 465523 4362921; **C10** = Medio Campidano prov., Villacidro, dint. P.ta Piscina Argiolas, Serbatoio, 282 m, 32S 472049 4360081; **C14** = Carbonia-Iglesias prov., Domusnovas, Sedda Pranu Cardu, 549 m, 32S 470926 4358924; **C18** = Medio Campidano prov., Villacidro, Rio Cannisoni, 390 m, 32S 469095 4362383; **C22** = Medio Campidano prov., Villacidro, Rio Cannisoni, sorg. s'acqua Frischetta, 372 m, 32S 468391 4362826; **C23** = Medio Campidano prov., Villacidro, Rio Cannisoni, radura sponda sinistra, 401 m, 32S 468459 4362806; **C31** = Carbonia-Iglesias prov., Domusnovas, Lago Siuru, 322 m, 32S 467069 4357916; **C35** = Carbonia-Iglesias prov., Iglesias, "Mamenga", 610 m, 32S 462170 4356618; **C44** = Carbonia-Iglesias prov., Iglesias, Conca Margani, radura lungo strada, 700 m, 32S 462635 4356866; **C50** = Medio Campidano prov., Villacidro, C. Sarais, 251 m, 32S 474215 4361145; **C55** = Medio Campidano prov., Gonnosfanàdiga, M. Linas, Genna Mirratta, sorg., 793 m, 32S 465136 4366226; **C79** = Carbonia-Iglesias prov., Iglesias, M.ti Marganai, dint. Reigraxius, 700 m, 32S 463104 4356759; **C85** = Carbonia-Iglesias prov., Iglesias, M.ti Marganai, 540 m, 32S 463010 4355249; **S1** = Carbonia-Iglesias prov., Iglesias, dint. colonia Beneck, 636 m,

32S 462391 4355441; **S2** = Carbonia-Iglesias prov., Domusnovas, sa Duchessa, 371 m, 32S 464990 4358384; **S3** = Carbonia-Iglesias prov., Domusnovas, Valle Oridda, 592 m, 32S 466973 4362228; **SAR1** = Carbonia-Iglesias prov., Iglesias, Marganai, plot CONECOFOR SAR1, 700 m, 32S 462853 4355582.

COLLECTORS. DA = D. Avesani; DB = D. Birtele; DW = D. Whitmore; EM = E. Minari; FC = F. Chessa; GC = G. Chessa; GN = G. Nardi; MB = M. Bardiani; MM = M. Mei; MT = M. Tisato; PCe = P. Cerretti; PCo = P. Cornacchia.

COLLECTING ATTRACTANTS AND METHODS. bz = plastic glass loaded with beer and sugar fixed on tree trunk; mt = Malaise trap; nc = coca-cola and sugar bait sprayed on vegetation; nt = butterfly net; pt = pitfall trap.

FAUNISTIC LIST

HESPERIIDAE

1. *Pyrgus armoricanus* (Oberthür, 1910)

RECORDS. **C82**: 13.VI.2004, GN, nt, 1 ex. **S3**: 11–25.VII.2006, GC, mt, 1 ex.

2. *Carcharodus alceae* (Esper, 1780)

RECORDS. **S1**: 27.VI–11.VII.2006, GC, mt, 1 ex. **S3**: 8–22.VIII.2006, GC, mt, 1 ex.

PAPILIONIDAE

3. *Papilio hospiton* Gené, 1839

RECORDS. **C31**: 23.V.2006, MB, nt, 1 ex. **S3**: 18.IV–2.V.2006, GC, mt, 1 ex.

PIERIDAE

4. *Pieris cf. mannii* (Mayer, 1851)

RECORDS. **S3**: 16–30.V.2006, GC, mt, 1 ♀.

5. *Pieris rapae* (Linnaeus, 1758)

RECORDS. **A17**: 14.VI.2004, GN, nt, 1 ex. **C01**: 6.VI.2004, GN, nt, 1 ex; 11.VI.2004, GN, nt, 3 ex. **C07**: 20–24.V.2006, mt, MB DB PCo DW, 1 ex. **C31**: 20–23.V.2006, MB DB PCo DW, mt, 2 ♀♀. **S1**: 2–16.V.2006, GC, mt, 1 ♀; 16–30.V.2006, GC, mt, 5 ex; 13–27.VI.2006, GC, mt, 1 ex. **S2**: 2–16.V.2006, GC, mt, 2 ex; 16–30.V.2006, GC, mt, 1 ex; 20.V–13.VI.2006, GC, mt, 1 ex. **S3**: 12.VI.2004, GN, nt, 2 ex.

6. *Colias croceus* (Fourcroy, 1785)

RECORDS. **C02:** 7.VI.2004, GN, nt, 1 ex. **S1:** 16–30.V.2006, GC, mt, 1 ♀. **S2:** 16–30.V.2006, GC, mt, 1 ♀; 13–27.VI.2006, GC, mt, 1 ♂. **S3:** 6.VI.2004, DW, nt, 1 ex; 8.VI.2004, DW, nt, 1 ex; 12.VI.2004, GN, nt, 1 ex.

7. *Gonepteryx cleopatra* (Linnaeus, 1767)

RECORDS. **C01:** 8.IX.2006, GN, nt, 1 ♀. **C18:** 24.III.2006, DB, nt, 1 ♀. **C22:** 24.III.2006, DB, nt, 1 ♂. **C23:** 19–24.V.2006, MB DB PCo DW, nt + bz, sampled on *Quercus suber* (L.), 1 ♀. **S1:** 30.V–13.VI.2006, GC, mt, 2 ♀♀. **S2:** 23.III.2006, DB DW MB PCo, nt, 1 ♂; 16–30.V.2006, GC, mt, 1 ♀; 20.V–13.VI.2006, GC, mt, 3 ♂♂; 13–27.VI.2006, GC, mt, 6 ♂♂. **S3:** 19.IX–3.X.2006, GC, mt, 1 ex; 12.XI.2006, DA GN, nt, 1 ♀.

LYCAENIDAE

8. *Lycaena phlaeas* (Linnaeus, 1761)

RECORDS. **C07:** 20–24.V.2006, MB DB PCo DW, mt, 3 ex. **C23:** 19–24.V.2006, MB DB PCo DW, mt, 2 ex. **C31:** 12–17.VII.2006, DA MB DB PCe MM DW, mt, 1 ex. **C82:** 9.VI.2004, GN, nt, 1 ♂. **S1:** 16–30.V.2006, GC, mt, 2 ex; 13–27.VI.2006, GC, mt, 1 ex; 22.VIII–5.IX.2006, mt, FC, 1 ex. **S3:** 21.III–4.IV.2006, GC, mt, 1 ex; 2–16.V.2006, GC, mt, 1 ex; 16–30.V.2006, GC, mt, 6 ex; 13–27.VI.2006, GC, mt, 2 ex; 11–25.VII.2006, GC, mt, 7 ex; 25.VII–8.VIII.2006, GC, mt, 3 ex; 8–22.VIII.2006, GC, mt, 1 ex; 22.VIII–5.IX.2006, GC, mt, 3 ex; 19.IX–3.X.2006, GC, mt, 1 ex.

9. *Favonius quercus* (Linnaeus, 1758)

RECORDS. **C44:** 13.VII.2006, DB DA MB PCe DW, nt on *Euphorbia pythusa cupanii* (Guss. ex Bertol.) Radcl.-Sm., 1 ♂. **C55:** 12.IX.2006, GN, nt, 1 ♂. **C79:** 17.VII.2006, DB, nt on *Viburnum* sp., 1 ♂ 1 ♀. **SAR1:** 14.VII–5.VIII.2005, GC, mt, 1 ex.

10. *Celastrina argiolus* (Linnaeus, 1758)

RECORDS. **C31:** 12–17.VII.2006, DA MB DB PCe MM DW, mt, 1 ex; 20–23.V.2008, MB DB PCo DW, mt, 1 ♀. **S2:** 13–27.VI.2006, GC, nt, 1 ex.

11. *Aricia cramera* (Eschscholtz, 1821)

RECORDS. **C07:** 20–24.V.2006, MB DB PCo DW, mt, 2 ex. **C23:** 19–24.V.2006, MB DB PCo DW, mt, 2 ex. **C35:** 18.VII.2006, DA, nt, 1 ♂. **S2:** 20.V–13.VI.2006, GC, mt, 1 ex. **S3:** 11.VII–25.VII.2006, GC, mt, 1 ex; 12.XI.2006, DA GN, nt, 1 ♀.

12. *Polyommatus icarus* (Rottemburg, 1775)

RECORDS. **C01:** 11.VI.2004, GN, nt, 1 ♂. **C07:** 20–24.V.2006, MB DB PCo DW, mt, 2 ex. **C35:** 18.VII.2006, DA, nt, 1 ♂. **S1:** 2–16.V.2006, GC, mt, 1 ♀. **S2:** 2–16.V.2006, GC, mt, 2 ex. **SAR1:** 16.VII–1.VIII.2004, GC, mt, 1 ex.

NYMPHALIDAE

13. *Nymphalis polychloros* (Linnaeus, 1758)

RECORDS. **S2:** 23.III.2006, DB DW MB PCo, nt, 2 ex; 25.III.2006, DB DW MB PCo, nt, 1 ex. **S3:** 12.VI.2004, GN, nt, 1 ex. **SAR1:** 1–3.IX.2003, DB PCe EM MT DW, nt, 1 ex; 1–5.IX.2003, DB PCe EM MT DW, bz, 2 ex; 30.VI–16.VII.2004, GC, pt, 1 ex; 16.VII–1.VIII.2004, GC, pt, 1 ex.

14. *Vanessa atalanta* (Linnaeus, 1758)

RECORDS. **S3:** 19.IX–3.X.2006, GC, mt, 1 ex.

15. *Vanessa cardui* (Linnaeus, 1758)

RECORDS. **C02:** 7.VI.2004, DW, nt, 1 ex. **C31:** 12–17.VII.2006, DA MB DB PCe MM DW, mt, 1 ex. **S1:** 16–30.V.2006, GC, mt, 1 ex. **S3:** 2–16.V.2006, GC, mt, 1 ex; 16–30.V.2006, GC, mt, 1 ex.

16. *Polygonia c-album* (Linnaeus, 1758)

RECORDS. **C23:** 19–24.V.2006, MB DB PCo DW, mt, 1 ex.

17. *Charaxes jasius* (Linnaeus, 1767)

RECORDS. **C85:** 3–4.IX.2003, DB PCe EM MT DW, mt near *Foeniculum vulgare* Mill., 4 ex. **S1:** 16–30.V.2006, GC, mt, 1 ex. **S2:** 5–19.IX.2006, GC, mt, 1 ex. **SAR1:** 1–3.IX.2003, DB PCe EM MT DW, nt, 4 ex.

18. *Limenitis reducta* Staudinger, 1901

RECORDS. **C01:** 23.V.2006, PCo, nt, 1 ♂. **C07:** 20.V.2006, MB, nt, 1 ♂. **C10:** 20–24.V.2006, MB DB PCo DW, mt, 7 ex; 20.V.2006, PCo, nt, 1 ♂. **C23:** 19.V.2006, DB, nt + bz, 1 ♂. **S3:** 7.VI.2004, GN MT, nt, 2 ♂♂.

19. *Libythea celtis* (Laicharting, 1782)

RECORDS. **C01:** 8.IX.2006, DB, nt, 1 ♀. **S2:** 25.III.2006, DB, DW, MB PCo, nt, 4 ex; 22.VIII–5.IX.2006, GC, mt, 1 ex.

20. *Hipparchia aristaeus* (Bonelli, 1826)

RECORDS. **SAR1:** 1–3.IX.2003, DB PCe EM MT DW, nt, 1 ex (S. Hardersen det.).

21. *Maniola jurtina* (Linnaeus, 1758)

RECORDS. **C01:** 6.VI.2004, PCe, nt, 2 ♂♂. **C07:** 20–24.V.2006, MB DB PCo DW, mt, 6 ex. **C14:** 20–24.V.2006, MB DB PCo DW, mt, 1 ex. **C23:** 19.V.2006, DB, nt + nc, 1 ♀; 19–24.V.2006, MB DB PCo DW, mt, 1 ex. **C31:** 20–23.V.2006, MB DB PCo DW, mt, 7 ♂♂ 3 ♀♀. **C85:** 3–4.IX.2003, DB PCe EM MT DW, mt near *Foeniculum vulgare* Mill., 1 ex. **S1:** 16–30.V.2006, GC, mt, 2 ♂♂ 1 ♀ 6 ex; 30.V–13.VI.2006, GC, mt, 2 ex; 13–27.VI.2006, GC, mt, 1 ex; 27.VI–11.VII.2006, GC, mt, 2 ex. **S2:** 16–30.V.2006, GC, mt, 2 ex; 20.V–13.VI.2006, GC, mt, 5 ex; 13–27.VI.2006, GC, mt, 2 ♂♂; 11–25.VII.2006, FC, mt, 1 ex; 19.IX–16.X.2006, GC, mt, 1 ex. **S3:** 10.VI.2004, GN, nt, 1 ♂; 12.VI.2004, GN, nt, 1 ♂ 2 ♀♀; 13–27.VI.2006, GC, mt, 1 ex.

22. *Pyronia (Idata) cecilia* (Vallantin, 1894)

RECORDS. **S1:** 27.VI–11.VII.2006, GC, mt, 2 ♂♂ 1 ♀ 2 ex. **S2:** 27.VI–11.VII.2006, FC, mt, 1 ♀. **S3:** 13–27.VI.2006, GC, mt, 1 ♂; 27.VI–11.VII.2006, GC, mt, 3 ♂♂; 11.VII–25.VII.2006, GC, mt, 2 ♂♂.

23. *Coenonympha pamphilus* (Linnaeus, 1758)

RECORDS. **S2:** 27.VI–11.VII.2006, FC, mt, 1 ex.

24. *Coenonympha corinna* (Hübner, 1804)

RECORDS. **S1:** 27.VI–11.VII.2006, GC, mt, 3 ex; 11–25.VII.2006, FC, mt, 1 ex. **S2:** 13–27.VI.2006, GC, mt, 36 ex; 27.VI–11.VII.2006, FC, mt, 3 ex. **S3:** 13–27.VI.2006, GC, mt, 1 ex; 27.VI–11.VII.2006, GC, mt, 1 ex.

25. *Pararge aegeria* (Linnaeus, 1758)

RECORDS. **C02:** 7.VI.2004, GN, nt, 1 ♂. **C07:** 20–24.V.2006, MB DB PCo DW, mt, 1 ex. **C10:** 20.V.2006, PCo, nt, 1 ♂. **C23:** 19.V.2006, DB, nt + nc, 1 ♀. **C31:** 20–23.V.2006, MB DB PCo DW, mt, 2 ♂♂ 6 ♀♀; 12–17.VII.2006, DA MB DB PCe MM DW, mt, 2 ex. **C82:** 9.VI.2004, GN, nt, 2 ♂♂. **S1:** 18.IV–2.V.2006, GC, mt, 1 ♀; 2–16.V.2006, GC, mt, 1 ex. **S3:** 12.VI.2004, GN, nt, 1 ♂. **SAR1:** 16.VIII–1.IX.2004, GC, pt, 1 ex; 1–3.IX.2003, DB PCe EM MT DW, nt, 1 ex.

26. *Lasiommata paramegaera* (Hübner, 1824)

RECORDS. **C07:** 20–24.V.2006, MB DB PCo DW, mt, 2 ex. **C14:** 20–24.V.2006, MB DB PCo DW, mt, 1 ex. **C31:** 20–23.V.2006, MB DB PCo DW, mt, 2 ♀♀; 20–23.V.2006, MB DB PCo DW,

mt, 1 ♂. **C50:** 9.IX.2006, DB, nt, 1 ♀. **S1:** 16–30.V.2006, GC, mt, 2 ex; 30.V–13.VI.2006, GC, mt, 1 ex; 13.VI–27.VI.2006, GC, mt, 1 ex; 27.VI–11.VII.2006, GC, mt, 2 ex. **S2:** 4–18.IV.2006, GC, mt, 1 ♂; 18.IV–2.V.2006, GC, mt, 1 ex; 20.V–13.VI.2006, GC, mt, 3 ex. **S3:** 30.V–13.VI.2006, GC, mt, 2 ex; 13–27.VI.2006, GC, mt, 1 ex.

DISCUSSION

Despite the fact that no particular novelties were found (with the partial exception of *Pieris mannii* mentioned below), 50% of the Papilioidea so far known from Sardinia – i.e. 52 species according to Leigheb et al. (2005, 2006) – are here recorded from the Marganai Mts and surrounding areas. It is worth noting that our identification of *P. mannii* is tentative. This would represent an important confirmation of that species for Sardinia after the record of another doubtful specimen by Parenzan & Porcelli (2006) from Burcei (Cagliari prov., SE Sardinia) on 24.VI.1989. The specimen examined by us is quite worn, having been collected in alcohol with a Malaise trap, and its identification is therefore partially ambiguous. Nevertheless, characteristics of the black outer scaling on the forewing, which spans from the apex to vein 4, fully correspond to features of *P. mannii*. The species has recently been recorded from Sardinia also by Karsholt & van Niekerken (2011). Our findings are suggestive of high habitat quality in the study area and call for further research to be carried out there.

A number of endemics or subendemics restricted to the W-Mediterranean islands occur in the area, namely *Papilio hospiton*, *Hipparchia aristaeus*, *Coenonympha corinna* and *Lasiommata paramegaera*. Among these, *P. hospiton* is listed in CITES (Appendix A), the IUCN Red Data list, the Bern Convention (Appendix 2) and in the Habitats Directive (Annexes 2 and 4). Restricted to Corsica and Sardinia, in the latter island it has locally declined and is mainly centred on the main focal spots of Mt Limbara in the north, the massifs of Mt Albo, Ogliastra and Gennargentu in central Sardinia, and Sarrabus, Mt Linas and the Capoterra hills in the south (Leigheb et al. 2005–2006). The species is univoltine and on the wing from mid-April until the end of May, and is generally more common at elevations above 700 m. It is worth noting, however, that in a thorough assessment of threats on Sardinian butterflies after the IUCN categories, Grill et al. (2002) regard *P. hospiton* and the other three species mentioned above as of least concern.

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REFERENCES

- Angius R., Bacchetta G. & Pontecorvo C., 2011. Floristic and vegetational features of Monte Marganai (SW Sardinia), pp. 57–132 + 1 map. In: Nardi G., Whitmore D., Bardiani M., Birtele D., Mason F., Spada L. & Cerretti P. (eds), *Biodiversity of Marganai and Montimannu (Sardinia). Research in the framework of the ICP Forests network. Conservazione Habitat Invertebrati*, 5. Cierre Edizioni, Sommacampagna, Verona.
- Balletto E., 1995. Endemism, areas of endemism, biodiversity and butterfly conservation in the Euro–Mediterranean area. *Bollettino del Museo regionale di Scienze Naturali*, Torino, 13: 445–491.
- Balletto E., Bonelli S. & Cassulo L., 2005. *Insecta Lepidoptera Papilionoidea (Rhopalocera)*, pp. 259–263 + CD-ROM. In: Ruffo S. & F. Stoch (eds), *Checklist e distribuzione della fauna italiana. Memorie del Museo civico di Storia naturale di Verona, 2.Serie, Sezione Scienze della Vita*, 16.
- Bardiani M., 2011. Introduction, pp. 15–56. In: Nardi G., Whitmore D., Bardiani M., Birtele D., Mason F., Spada L. & Cerretti P. (eds), *Biodiversity of Marganai and Montimannu (Sardinia). Research in the framework of the ICP Forests network. Conservazione Habitat Invertebrati*, 5. Cierre Edizioni, Sommacampagna, Verona.
- Costa A., 1882. Notizie ed osservazioni sulla Geo-Fauna sarda Memoria Prima. Risultamento di ricerche fatte in Sardegna nel Settembre 1881. *Atti della reale Accademia delle scienze fisiche e matematiche di Napoli* [1882], 9 [(11)]: 1–41.
- Costa A., 1883. Notizie ed Osservazioni sulla Geo-Fauna Sarda. Memoria Seconda. Risultamento delle ricerche fatte in Sardegna nella primavera del 1882. *Atti della reale Accademia delle Scienze fisiche e matematiche di Napoli*, Serie 2^a [1888], 1 (2): 1–109 + [1].
- Costa A., 1884. Notizie ed osservazioni sulla Geo-Fauna sarda. Memoria Terza. Risultamento delle ricerche fatte in Sardegna nell'estate del 1883. *Atti della reale Accademia delle Scienze fisiche e matematiche di Napoli*, Serie 2^a, [1888] 1 (9): 1–64.
- Costa A., 1886a. Notizie ed osservazioni sulla Geo-Fauna Sarda. Memoria Quinta. Risultamento di ricerche fatte in Sardegna in maggio 1885. presentata nell'adunanza del di 5 dicembre 1885. *Atti della reale Accademia delle Scienze fisiche e matematiche di Napoli*, 2, Serie 2^a [1888], 2 (7): 1–24.
- Costa A., 1886b. Notizie ed osservazioni sulla Geo-Fauna Sarda. Memoria Sesta. Risultamento delle ricerche fatte in Sardegna nella State del 1885. *Atti della reale Accademia delle Scienze fisiche e matematiche*, Serie 2^a [1888], 2 (8): 1–40.
- Cobolli M., Lucarelli M. & Sbordoni V., 1996. Le farfalle diurne delle piccole isole circumsarde. *Biogeographia, Lavori della Società italiana di Biogeografia*, 18: 569–582.
- Dapporto L., 2010. Satyrinae butterflies from Sardinia and Corsica show a kaleidoscopic intraspecific biogeography (Lepidoptera, Nymphalidae). *Biological Journal of the Linnean Society*, 100 (1): 195–212.
- Gené J., 1839. De quibusdam insectis Sardiniae novis aut minus cogniti. *Memorie della regia Accademia delle Scienze di Torino*, (2) 1 (2): 43–84 + 2 pls.
- Ghiliani V., 1852. Materiali per servire alla compilazione della Fauna Entomologica italiana, ossia elenco delle specie di Lepidotteri riconosciute esistenti negli Stati Sardi. *Memorie della reale Accademia delle Scienze di Torino*, (2) 14: 131–247.
- Grill A., Crnjar R., Casula P. & Menken S., 2002. Applying the IUCN threat categories to island endemics: Sardinian butterflies (Italy). *Journal for Nature Conservation*, 10: 51–60.
- Higgins L.G., 1975. The classification of European butterflies. Collins, London, 320 pp.
- Karsholt O. & van Niekerken E.J. (eds), 2011. *Lepidoptera, Butterflies. Fauna Europaea version 2.4*, available at <http://www.faunaeur.org> [accessed 10 July 2011].
- Lafranchis T., 2004. Butterflies of Europe. Diatheo, Paris, 351 pp.
- Leigheb G., Leo P., Crnjar R. & Balletto E., 2005. A distribution atlas of the butterflies of Sardinia (First part). *Linneana belgica*, 20 (4): 135–144.
- Leigheb G., Leo P., Crnjar R. & Balletto E., 2006. A distribution atlas of the butterflies of Sardinia (Second part). *Linneana belgica*, 20 (6): 234–244.

- Leo P, 2011. I Lepidotteri diurni della Foresta Demaniale di Montimannu (Sardegna sud-occidentale) (Lepidoptera: Hesperioidae, Papilionoidea), pp. 799–811. In: Nardi G., Whitmore D., Bardiani M., Birtele D., Mason F., Spada L. & Cerretti P. (eds), Biodiversity of Marganai and Montimannu (Sardinia). Research in the framework of the ICP Forests network. Conservazione Habitat Invertebrati, 5. Cierre Edizioni, Sommacampagna, Verona.
- Mason F., Cerretti P., Nardi G., Whitmore D., Birtele D., Hardersen S. & Gatti E., 2006b. Aspects of biological diversity in the CONECOFOR plots. IV. The InvertebrateBiodiv pilot project, pp. 51–70. In: Ferretti M., Petriccione B., Bussotti F. & Fabbio G. (eds), Aspects of biodiversity in selected forest ecosystems in Italy: status and changes over the period 1996–2003. Third report of the Task Force on Integrated and Combined (I&C) evaluation of the CONECOFOR programme. Annali dell'Istituto sperimentale per la Selvicoltura, 30, Supplemento 2.
- Parenzan P. & Porcelli F., 2006. I Macrolepidotteri italiani. "Allegato in .pdf". Phytophaga, 15 (CD-ROM): 1–1051.
- Tolman T. & Lewington R., 2009. Collins butterfly guide. HarperCollins, London, 384 pp.