Odonata checklist of Nature Reserve “Complesso Speleologico Villasmundo - S. Alfio” (Sicily, Italy)

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ABSTRACT

From March to September 2018 and 2019, a first monitoring of Odonata promoted by CUTGANA was conducted inside the Nature Reserve named “Complesso Speleologico Villasmundo - S. Alfio”, in Melilli (Syracuse), in south-eastern Sicily. A total of 18 different species were recorded, 6 belonging to the Zygoptera suborder and 12 to the Anisoptera suborder, including Onychogomphus uncatus and Libellula fulva. Some information on uncommon species recorded in the neighbouring areas are also reported.

KEY WORDS

Dragonflies; Monitoring; Libellula fulva; Onychogomphus uncatus; Protected areas.

Received 06.12.2020; accepted 16.01.2020; published online 15.03.2021

INTRODUCTION

165 species of Odonata have been reported for the Mediterranean basin area, up to date (Boudot et al., 2009, Boudot & Kalkman, 2015). 144 species have been reported for Europe and 96 for Italy, of which 58 species for Sicily (Riservato et al., 2014; Galasso et al., 2016; Viganò et al., 2017; Surdo, 2017; Corso & Penna, 2020). The number of species in Sicily is bound to increase constantly, mainly thanks to the intensification of research activities on the field and updating knowledge.

This short paper qualifies as a solid contribution to the study of main features and geographic distribution of this group in the region, focusing on an important area of south-eastern Sicily that has never been studied before. The location is part of the Hyblaean Mountains, an area characterized by an articulated hydro-geographical network of great interest for Odonata group.

MATERIAL AND METHODS

Study area

The study area is located in the eastern coast of Sicily (Fig. 1) and it is part of the Syracuse’s province of Melilli.

The Nature Reserve named “Complesso Speleologico Villasmundo - S. Alfio” was established in 1998 from Regione Sicilia (Assessorato Regionale del Territorio e dell’Ambiente), preserving a compound of karst caves which is currently managed by CUTGANA (Centro Universitario per la Tutela e la Gestione degli Ambienti Naturali e degli Agro-ecosistemi), of Catania University. Furthermore, this area falls into a Special Area of Conservation (SAC ITA090024) known as “Cozzo Ogliastri” (Fig. 2).

This Nature Reserve is located between 90 and 170 meters a.s.l., in the “lower-dry thermomediter-
RESULTS

Systematics

Ordo ODONATA Fabricius, 1793
Subordo ZYGOPtera de Sélys Longchamps, 1854
Família CALOPTERYGIDAE Sélys, 1850
Genus Calopteryx Leach, 1815
Calopteryx haemorrhoidalis (Vander Linden, 1825)
A considerable population of this species was found in the study area, uniformly present along the whole stream’s course and regularly observed from late March to September of both years with many imagoes. Reproduction ascertained in the study area that can be considered an important site for this species south-eastern of Sicily.

Família LESTIDAE Calvert, 1901
Genus Chalcolestes Kennedy, 1920
Chalcolestes viridis (Vander Linden, 1825)
Males and females observed regularly and frequently in August and September, both in 2018 and in 2019, also in tandem and mating, mostly in some stretches of the main stream where the water flow was weaker, forming pools shaded by trees. Reproduction ascertained.

Família COENAGRIONIDAE Kirby, 1890
Genus Ceriagrion Sèlys, 1876
Ceriagrion tenellum (de Villers, 1789)
Many imagoes regularly and frequently observed from May to September of both years in low water flow stretches, rich in vegetation. Reproduction ascertained.
Genus Coenagrion Kirby, 1890
Coenagrion scitulum (Rambur, 1842)
Many imagoes of this species regularly observed in May and June of both years, including
males and females in mating and oviposition, mostly in low water flow rich in vegetation. Reproduction ascertained.

Genus *Erythromma* Charpentier, 1840

*Erythromma lindenii* (Selys, 1840)

Few specimens, males and females, observed from June to late September, both in 2018 and in 2019, exclusively in small pools and weaker water flow stretches of the stream. Reproduction ascertained in the study area.

Genus *Ischnura* Charpentier, 1840

Figure 1. Geographical location of the study area, in the Eastern Sicily.

Figure 2. Study area with main points of interest for Odonata monitoring and delimitation of the protected area, in green.

Figure 3. Representative habitats of the points of monitoring activity (photos by P. Galasso and R. Ientile).
Ischnura genei (Rambur, 1842)

The commonest damselfly recorded in the area, regularly and abundantly observed from early March to September, in all the habitats monitored close to the water. Reproduction ascertained.

Subordo ANISOPTERA de Sélys Longchamps, 1854
Familia Aeshnidae Rambur, 1842
Genus Aeshna Fabricius, 1775

Aeshna isocelaes (Müller, 1767)

Few imagoes, both males and females, regularly observed from late April to early June 2018-19, near to pools and generally along the main water stream, also in tandem and mating. Reproduction ascertained in the study area.

Aeshna mixta (Latreille, 1805)

Only 1 record of an adult male in late September 2018, probably due to the period of this study, since the species is usually seen starting from late September to November (Galliani et al., 2017). Reproduction not ascertained in the study area.

Genus Anax Leach, 1815

Anax imperator (Leach, 1815)

Regularly observed from May to September 2018 and 2019 in all the sunny and open habitats, both sexes, also during mating and oviposition.

Familia Gomphidae Rambur, 1842
Genus Onychogomphus Selys, 1854

Onychogomphus forcipatus (Linnaeus, 1758)

Imagoes regularly observed in August 2018 and 2019 (Fig. 4) in the most sunny stretches of the main stream characterised by outcropping stones. Males showed aggressive and territorial behavior, reproduction highly probable in the study area.

Onychogomphus uncatus (Charpentier, 1840)

Regularly observed from late May to late June 2018 and 2019, exclusively in sunny stretches with outcropping stones used for perching (Fig. 5). Less common and less abundant than O. forcipatus despite they share the same habitat. Males showed aggressive and territorial behavior, reproduction highly probable in the study area.

Familia Libellulidae Rambur, 1842
Genus Libellula Linnaeus, 1758

Libellula fulva Müller, 1764

Few imagoes observed, not frequently, from May to August 2018 and 2019, also in mating. Reproduction ascertained for the study area.

Genus Orthetrum Newman, 1833

Orthetrum brunneum (Fonscolombe, 1837)

Quite common Orthetrum in the study area: males regularly observed in all the sunny habitats from May to September, both in 2018 and in 2019. Few females observed as well, also in tandem and mating. Reproduction ascertained.

Orthetrum coerulescens (Fabricius, 1798)

Only few males observed in August of both years along the main stream, showing territorial and aggressive behaviour; reproduction highly probable but not ascertained.

Genus Crocothemis Brauer, 1868

Crocothemis erythraea (Brullé, 1832)

Commonly and frequently observed in all kinds of habitats, from April to September of both years, also in tandem, mating and oviposition, thus, its reproduction was ascertained.

Genus Sympetrum Newman, 1833

Sympetrum fonscolombii (Selys, 1840)

Observed from late March to September 2018 and 2019, not frequently, exclusively in sunny and open habitats, also in tandem and mating. Reproduction ascertained.
records of Onychogomphus uncatus and Libellula fulva. Standing to the regularity and abundance of imagoes observed of O. uncatus, it is clear that this area represents an important and ideal habitat for these species; furthermore, this species is not commonly recorded in Sicily and, indeed, it is reported only for 7 UTM squares 10x10 km for the whole region (Odonata.it, 2019). It can be also considered a good bio-indicator, since it prefers well-preserved environments with oxygenated waters (Galliani et al., 2017).

Libellula fulva is only reported for 6 UTM squares 10x10 km for the whole region, but only 3 of them are related to updated data for the years 2000-2018 (Odonata.it, 2019). The study area then represents an important site for the breeding of the species in Sicily. From a point of view of conservation, all the species recorded (Table 1) are currently included by the Italian Dragonflies Red List into the LC (Least Concern) IUCN category, both for the Italian and global population (Riservato et al., 2014b).

In addition, we also report data about uncommon species recorded in other localities at short distance from the study area:
- Onychogomphus uncatus and Libellula fulva: respectively 2 adult ♂♂ on 13.V.2018 and 2 adult ♂♂ on 16.VI.2018, both species were observed in the Nature Reserve of Pantalica, Valle dell’Anapo and Torrente Cava Grande, SAC ITA090009 (Sortino, Syracuse, 37°08’26” N, 15°02’27” E);
- Orthetrum trinacria: 1 adult ♂ on 20.VI.2020 and 1 young ♂ male on 20.VIII.2020 observed inside the Nature Reserve “Grotta Palombara”, SAC

**DISCUSSION AND CONCLUSIONS**

A total of 18 different species were found in the Nature Reserve “Complesso Speleologico Villasmundo - S. Alfio”, of which 6 belong to the Zygoptera suborder and 12 to the Anisoptera suborder. The following families are so represented: 1 species of Calopterygidae (Odonata, Zygoptera), 1 species of Lestidae (Odonata, Zygoptera), 4 species of Coenagrionidae (Odonata, Zygoptera), 3 species of Aeshnidae (Odonata, Anisoptera), 2 species of Gomphidae (Odonata, Anisoptera) and 7 species of Libellulidae (Odonata, Anisoptera). The Odonata community of this area represents 31% of the total Sicilian species. Particularly interesting are the
Sympetrum striolatum: at least 2 adult ♂♂ on 10.X.2018 observed inside the Nature Reserve “Grotta Monello”, SAC ITA090011 (Syracuse, 37°01’05’’ N, 15°09’54’’ E).

This survey, together with similar ones conducted in the same period in other areas of Sicily (Galasso & Ientile, 2020) can be considered an additional important contribution to the knowledge of Sicilian dragonflies, especially considering the current deficiency of published data about their distribution in the region, and encourages activities of ecotourism such as Dragonflies-watching.

Table 1. List of species recorded in the studied area “Complesso Speleologico Villasmundo - S. Alfio”.

<table>
<thead>
<tr>
<th>ORDER</th>
<th>SUBORDER</th>
<th>FAMILY</th>
<th>SPECIES</th>
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<tbody>
<tr>
<td>Zygoptera</td>
<td>Calopterygidae</td>
<td>Calopteryx haemorrhoidalis (Vander Linden, 1825)</td>
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<td></td>
<td>Lestidae</td>
<td>Chalcolestes viridis (Vander Linden, 1825)</td>
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<td></td>
<td>Coenagrionidae</td>
<td>Ceriagrion tenellum (de Villers, 1789)</td>
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<td>Coenagrion scitulum (Rambur, 1842)</td>
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<td>Erythromma lindenni (Selys, 1840)</td>
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<td></td>
<td></td>
<td>Ischnura genei (Rambur, 1842)</td>
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<tr>
<td>Odonata</td>
<td>Sub-total of families: 3</td>
<td>Sub-total of species: 6</td>
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<td></td>
<td>Aeshnidae</td>
<td>Aeshna isceles (Müller, 1767)</td>
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<td>Aeshna mixta Latreille, 1805</td>
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<td>Anax imperator Leach, 1815</td>
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<td>Gomphidae</td>
<td>Onychogomphus forcipatus (Linnaeus, 1758)</td>
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<td></td>
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<td>Onychogomphus uncatus (Charpentier, 1840)</td>
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<td></td>
<td>Libellulidae</td>
<td>Libellula fulva Müller, 1764</td>
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<td>Orthetrum brunnneum (Fonscolombe, 1837)</td>
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<td>Orthetrum coerulescens (Fabricius, 1798)</td>
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<td>Crocothemis erythraea (Brullè, 1832)</td>
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<td>Sympetrum fonscolombii (Selys, 1840)</td>
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<td>Sympetrum striolatum (Charpentier, 1840)</td>
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<td>Trithemis annulata (Palisot de Beauvois, 1807)</td>
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<td>Anisoptera</td>
<td>Sub-total of families: 3</td>
<td>Sub-total of species: 12</td>
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</tr>
<tr>
<td>Total</td>
<td>Families: 6</td>
<td>Number of species: 18</td>
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In the Table 1 are listed all the species recorded during this survey.

ACKNOWLEDGMENTS

The survey was supported through funds provided to Cutgana by Assessorato Territorio Ambiente Regione Sicilia (Italy) for the management of Regional Nature Reserves. We would like to thank Andrea Corso (Syracuse, Italy) and Salvatore Surdo (Trapani, Italy) for the comparison with their data and the sharing of personal observations and opinions. We also thank Sandro Privitera, director of the Nature Reserve “Grotta Palombara” and Salvatore...
Costanzo, director of the Nature Reserve “Grotta Monello”. Finally, we want to thank Giuliano Giammusso for his help on other aspects.

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