

## 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.

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## 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 Ogliastrì” (Fig. 2).

This Nature Reserve is located between 90 and 170 meters a.s.l., in the “lower-dry thermomediterranean” climate zone.

anean” climate zone with dry summer and mild, wet winters.

The monitoring activities of Odonata were concentrated along the stream “Belluzza” and in the surroundings areas. The “Orto del Monaco” spring, which is located in the left side of the stream, guarantees the water flows also during the summer season. In addition, the occurrence of a weir allows the formation of a small lake. There are two species of fish into the stream and into the lake, *Rutilus rubilio* Bonaparte, 1837 (Cypriniformes Cyprinidae) and *Gambusia affinis* (S.F. Baird & Girard, 1853) (Cyprinodontiformes Poeciliidae); there is also a freshwater crab, *Potamon fluviatile* (Herbst, 1785) (Decapoda Potamidae).

Along the stream’s banks it is possible to see arboreal vegetation with *Platanus orientalis* L., *Salix pedicellata* Desf. and *Salix alba* L. Moving away from the water, the surrounding area is characterised by a dense Mediterranean scrub that includes species as *Myrtus communis* L., *Pistacia lentiscus* L. and *Euphorbia dendroides* L. on limestone soils and *Pyrus amygdaliformis* Vill. on volcanites; furthermore, *Quercus ilex* L. and *Quercus virgiliana* (Ten.) Ten. can be found along the slopes. There are also vegetation aspects of garrigue, represented by *Sarcopoterium spinosum* (L.) Spach and steppe grasslands represented by *Hyparrhenia hirta* (L.) Stapf.

The cattle grazing is the only human activity practiced in this area, especially from October to May.

### Samples

The method of “capture-identification-release” was used, walking through transects along the main stream, often focusing on small ponds and other habitats with Mediterranean scrub far from the water (Fig. 3). These transects were carried out once a week, from March 2018 to September 2018 and from March 2019 to September 2019. The sampling was done always during the morning and with good weather conditions (no rain, no wind), when the dragonflies activity is more intense.

The identification was made mainly by collecting and releasing the specimens with entomological nets, or, in other cases, through direct observation with binocular and collection of photographic material.

## RESULTS

### Systematics

Ordo ODONATA Fabricius, 1793

Subordo ZYGOPTERA de Selys Longchamps, 1854

Familia CALOPTERYGIDAE Selys, 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.

Familia 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 mains stream where the water flow was weaker, forming pools shaded by trees. Reproduction ascertained.

Familia COENAGRIONIDAE Kirby, 1890

Genus *Ceriagrion* Selys, 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.

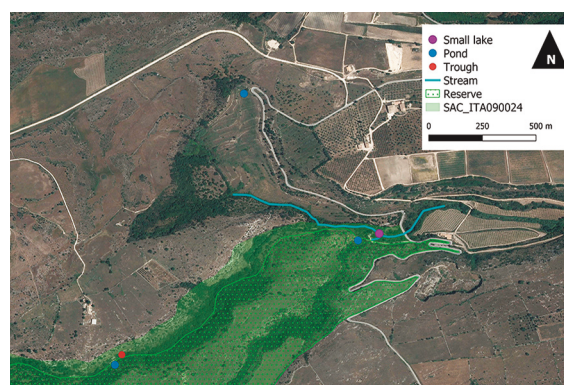


Figure 2. Study area with main points of interest for Odonata monitoring and delimitation of the protected area, in green.



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 isoceles* (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.



Figure 4. *Onychogomphus forcipatus*, adult male photographed on 1.VIII.2018 (photo by P. Galasso).



Figure 5. *Onychogomphus uncatus*, adult male photographed on 21.V.2018 (photo by P. Galasso).

### *Sympetrum striolatum* (Charpentier, 1840)

Many imagoes of both sexes observed together exclusively in late September 2018, around the small lake. Reproduction highly probable but not ascertained.

Genus *Trithemis* Brauer, 1868

### *Trithemis annulata* (Palisot de Beauvais, 1807)

Quite common species, frequently and regularly observed from May to September of both years, also in tandem and mating, thus, the reproduction was ascertained in the study area.

## 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

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

ORDER	SUBORDER	FAMILY	SPECIES
Odonata	Zygoptera	Calopterygidae	<i>Calopteryx haemorrhoidalis</i> (Vander Linden, 1825)
		Lestidae	<i>Chalcolestes viridis</i> (Vander Linden, 1825)
		Coenagrionidae	<i>Ceriagrion tenellum</i> (de Villers, 1789)
			<i>Coenagrion scitulum</i> (Rambur, 1842)
			<i>Erythromma lindenii</i> (Selys, 1840)
			<i>Ischnura genei</i> (Rambur, 1842)
		Sub-total of families: 3	Sub-total of species: 6
	Anisoptera	Aeshnidae	<i>Aeshna isocetes</i> (Müller, 1767)
			<i>Aeshna mixta</i> Latreille, 1805
			<i>Anax imperator</i> Leach, 1815
		Gomphidae	<i>Onychogomphus forcipatus</i> (Linnaeus, 1758)
			<i>Onychogomphus uncatus</i> (Charpentier, 1840)
		Libellulidae	<i>Libellula fulva</i> Müller, 1764
			<i>Orthetrum brunneum</i> (Fonscolombe, 1837)
			<i>Orthetrum coerulescens</i> (Fabricius, 1798)
			<i>Crocothemis erythraea</i> (Brullè, 1832)
			<i>Sympetrum fonscolombii</i> (Selys, 1840)
			<i>Sympetrum striolatum</i> (Charpentier, 1840)
			<i>Trithemis annulata</i> (Palisot de Beauvois, 1807)
		Sub-total of families: 3	Sub-total of species: 12
Total		Families: 6	Number of species: 18

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

ITA090012 (Melilli, Syracuse, 37°06'20" N, 15°11'36" E);

- *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.

In the Table 1 are listed all the species recorded during this survey.

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## SITOGRAHY

<http://www.odonata.it/>

