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### The Genus *Hydroptila* DALMAN, 1819 in Italy

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**Abstract.** To date, twenty seven species of the genus *Hydroptila* have been found in 397 sites over 4326 sampling sites located in lotic and lentic waters in Italy, comprising 18 peninsular regions, 2 insular regions (Sicilia and Sardegna) and 2 islands of the Tuscan Archipelago (Elba, Capraia). The most widespread species are *H. vectis* found in 16 regions and 3 islands and *H. angulata* found in 14 regions and 2 islands. *H. fiorii* Malicky & Moretti 1987 is endemic to Sardegna.

**Key words.** *Hydroptila*, Italian species, ecology, chorology

#### Introduction

In the Third List of Italian Trichoptera updated to 2000 (Cianficconi, 2002), the Family Hydroptilidae comprised 9 genera (*Stactobia*, *Orthotrichia*, *Ithytrichia*, *Oxyethira*, *Microptila*, *Agraylea*, *Hydroptila*, *Allotrichia*, *Tricholeiochiton*). The genus *Hydroptila* comprised 25 species.

The aim of this work is to provide an updated distribution of the *Hydroptila* species in the Italian Peninsula and Islands based on a review of the available bibliography after 2000. Ecological and zoogeographical considerations concerning the Italian *Hydroptila* species are also discussed.

#### List of the Italian *Hydroptila* species updated to 2010

Recent data on the *Hydroptila* species in Italy allowed us to update the Third List of Italian Trichoptera (1990-2000) (Cianficconi, 2002 and literature therein) up to 2010.

The bibliographical review highlighted the actual distribution of the *Hydroptila* species in Italy, summarized as follows:

- 1) There are 27 *Hydroptila* species in Italy.
- 2) A synonymy was reported (Malicky, 2005): *Hydroptila serrata* Morton 1898 (= *H. bifurcata* Mosely 1930).
- 3) Three species were found for the first time in Italy:
  - *Hydroptila acuta* in Piemonte (Malicky, 2002), Liguria (Malicky, 2002) and Toscana (Valle, 2001).
  - *Hydroptila angustata* in Piemonte, Lombardia and Emilia Romagna (Valle, 2001).
  - *Hydroptila tacheti* in Friuli-Venezia Giulia (Coppa & Malicky, 2005)
- 4) Sixteen species have a wider distribution than the one reported in the Third List of Italian Trichoptera (Cianficconi, 2002):
  - *H. aegyptia* – Sicilia (Valle, 2001); Puglia (Cianficconi et al., 2002).
  - *H. angulata* – Liguria (Malicky, 2004); Veneto (Bertuetti et al., 2001); Friuli-Venezia Giulia (Malicky, 2004).
  - *H. brissaga* – Piemonte (Malicky, 2004).
  - *H. cognata* – Lombardia (Malicky, 2002).
  - *H. forcipata* – Liguria (Malicky, 2004).
  - *H. martini* – Friuli-Venezia Giulia (Di Giovanni et al., 2004).
  - *H. occulta* – Abruzzo (Di Giovanni et al., 2004).
  - *H. phaon* – Basilicata (Valle, 2001); Sicilia (Valle, 2001).
  - *H. simulans* – Liguria (Valle, 2001); Molise (Cianficconi et al., 2010); Campania (in River Volturno, 2/5/1982, 3♂, 3♀ leg. Moretti, unpublished data); Sicilia (Valle, 2001).
  - *H. sparsa* – Lombardia (Bertuetti et al., 2006); Emilia Romagna (Bertuetti et al., 2001).

- *H. stellifera* – Piemonte and Liguria (Malicky, 2002).
- *H. tigurina* – Sicilia (Valle, 2001).
- *H. tineoides* – Piemonte (Malicky, 2004); Veneto (Cianficconi, 2006); Marche (Cianficconi et al., 2007 in press); Lazio (Cianficconi et al., 2011).
- *H. uncinata* – Piemonte (Malicky, 2004); Sardegna (Moretti & Cianficconi, 1983, not reported in Cianficconi, 2002: Third List of Italian Trichoptera)
- *H. vectis* – Liguria (Malicky, 2004); Trentino-Alto Adige (Cianficconi et al., 2005); Emilia Romagna (Bertuetti et al., 2001).
- *H. vichtaspa* – Lombardia (Bertuetti et al., 2006).

The number of *Hydroptila* species found in Italy, comprising 18 peninsular regions, 2 insular regions (Sicilia and Sardegna) and 2 islands of the Tuscan Archipelago (Elba and Capraia) are reported in Fig. 1.

The list of *Hydroptila* species in the Italian regions and islands is reported in Table 1. The columns refer to the number of localities for each species.

*H. vectis* (16 regions, 3 islands -115 localities) and *H. angulata* (14 regions, 2 islands -137 localities) were the most widespread species. *H. vichtaspa* (Lombardia, Umbria) and *H. ivisa* (Veneto, Friuli-Venezia Giulia) were found in only two regions. *H. fiorii*, *H. cortensis* and *H. serrata* were only found in a few sites in Sardegna.

In Italy, 4326 sampling sites were investigated. *Hydroptila* species were found in 397 sites. In the Italian Peninsula, Umbria had the most species (15 species in 542 sampling sites) while Trentino-Alto Adige (3 species in 180 sampling sites) and Campania (3 species in 27 sampling sites) had the least. Regarding the Italian Islands, the most species were found in Sardegna (8 species in 305 sampling sites) and only *H. vectis* was found in Elba (1 species in 27 sampling sites). None were found in the Valle d'Aosta (49 sampling sites).

#### Ecological remarks

In Italy, *Hydroptila* aquatic stages have a wide ecological valence (Tab. 2). Seven species are found in both lotic and lentic waters but the majority (25 species) inhabit lotic waters from the crenal to the epipotamal zones, preferably the rithral zone with a substrate made of gravel and stones covered with aquatic vegetation. Among these 25 species, 4 are often found in canals, 5 in falls, and 5 in hygropteretic habitats. *H. martini* and *H. ruffoi* are also found in mosses especially *Rhynchostegium riparoides*, *Cratoneuron filicinum* and *Fissidens crassipes* (Cianficconi et al. 2005). In Puglia, *H. aegyptia* and *H. sparsa* also inhabit coastal brackish water (salinity Cl<sup>-</sup> = 0.5-2.2 gr/l) (Cianficconi et al. 2002). *H. angulata* and *H. forcipata* were also found in marshes. Indeed, the most euryecious species in Italy are *H. vectis*, *H. martini*, *H. sparsa* and *H. aegyptia*. The most stenoecious species are *H. brissaga* and *H. ivisa*, found only in the rithral; *H. angustata* and *H. tigurina*, found only in the epipotamal.

#### Chorological remarks

The geographical distribution has been updated based on French ([www.opie-benthos.fr/opie/insecte.php](http://www.opie-benthos.fr/opie/insecte.php)) and Greek (Malicky, 2005) check lists. The chorotypes of each species are reported in Fig. 2. The zoogeographical balance shows a predominance of species having European distribution (37% - EUR, WEU, EEU, SEU), followed by those having Mediterranean distribution (26% - MED, WME, EME) and W-Palaearctic distribution (22%).

Endemic to the Italian fauna are 15% of the species (reported in Figs 1, 2): *H. fiorii* (Fig.3) is only found in Sardegna and

*H. cortensis* is found in Sardegna and Corsica. Endemic to the Alps and Apennines are *H. stellifera* (Piemonte, Liguria, Toscana, Umbria and Basilicata) and *H. ruffoi* (Lombardia, Toscana, Umbria, Abruzzo and Basilicata).

### Conclusions

The genus *Hydroptila* in Italy has a wide ecological valence but most species inhabit lotic environments. The review of recent literature on the Italian trichopteran fauna, thanks mainly to the researches of H. Malicky and M. Valle, confirms that this genus is one of the richest with 27 species, 37% mainly with a European distribution.

This study points out two new findings in the last ten years as well as the wider distribution of sixteen species with respect to what is reported in the Third List of Italian Trichoptera (1990-2000) (Cianficconi, 2002). We recommend an intensification of the research on the *Hydroptila* species mainly in the Valle d'Aosta region.

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Fig. 1 - Number of the *Hydroptila* species found in the Italian regions and islands and distribution of the endemic species.

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<i>Hydroptila acuta</i>	WME
<i>H. aegyptia</i>	EME
<i>H. angulata</i>	WPAL
<i>H. angustata</i>	WPAL
<i>H. brissaga</i>	SEU
<i>H. cognata</i>	SEU
<i>H. cornuta</i>	EUR
<i>H. cortensis*</i>	SACO
<i>H. fiorii*</i>	SARD
<i>H. forcipata</i>	EUR
<i>H. giudicellorum</i>	WEU
<i>H. insubrica</i>	WME
<i>H. ivisa</i>	EEU
<i>H. martini</i>	EUR
<i>H. occulta</i>	WPAL
<i>H. phaon</i>	MED
<i>H. ruffoi*</i>	ALAP
<i>H. serrata</i>	WME
<i>H. simulans</i>	MED
<i>H. sparsa</i>	WPAL
<i>H. stellifera*</i>	ALAP
<i>H. tacheti</i>	SEU
<i>H. tigurina</i>	WEU
<i>H. tineoides</i>	WPA
<i>H. uncinata</i>	SEU
<i>H. vectis</i>	WPAL
<i>H. vichtaspa</i>	MED

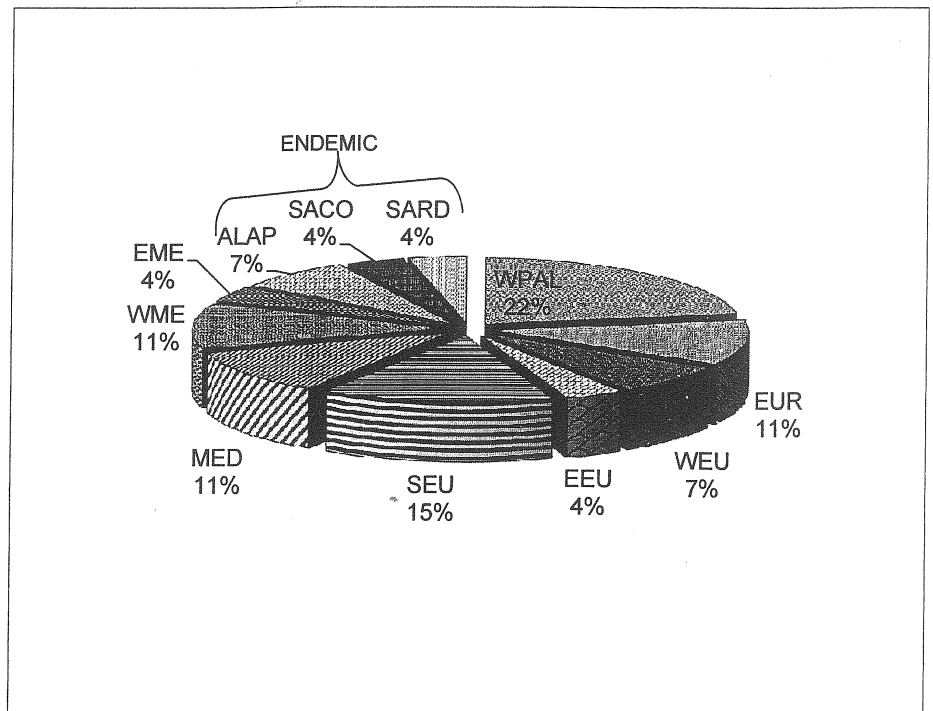


Fig. 2 - Main chorotypes (Vigna Taglianti et al., 1999) of the Italian *Hydroptila* species and percentage of their geographical distribution. \* = endemic species; WPA=W-Palearctic, EUR=European, WEU=W-European, EEU=E-European, SEU=S-European, MED=Mediterranean, WME=W-Mediterranean, EME=E-Mediterranean, ALAP=Alpino-Apenninic endemic, SACO=Sardo-Corsican endemic, SARD=Sardinian endemic.

Regions and islands	regions													islands					Total finding sites					
	Piemonte	Valle d'Aosta	Liguria	Lombardia	Trentino A.A.	Veneto	Friuli V.G.	Emilia R.	Toscana	Umbria	Marche	Lazio	Abruzzo	Molise	Campania	Puglia	Basilicata	Calabria		Sicilia	Sardegna	Elba	Capraia	Total regions / islands
1 <i>Hydropilia acuta</i> Mosely, 1930	1		6					2															3	9
2 <i>H. aegyptia</i> Ulmer, 1963			1	1	1	1	1	3	21	9					1				2				8	39
3 <i>H. angulata</i> Mosely, 1922	9		1	6	1	1	6	11	58	16	10	2			1	2	2	4	7				16	137
4 <i>H. angustata</i> Mosely, 1939	5		3				2												1				3	10
5 <i>H. brissaga</i> Malicky, 1996	1																						3	4
6 <i>H. cognata</i> Mosely, 1930			2		1	1		2						1									5	7
7 <i>H. cornuta</i> Mosely, 1922	1							1															3	3
8 <i>H. cortensis</i> Mosely, 1937																				1			1	1
9 <i>H. fiorii</i> Malicky & Moretti, 1987																				3			1	3
10 <i>H. forcipata</i> (Eaton, 1873)	6		1	4	1	1	1	6	11	3	1												9	34
11 <i>H. giudicellorum</i> Botosaneanu, 1980																			2	1		1	3	4
12 <i>H. insubrica</i> Ris, 1903				1	1				13			1				1							5	17
13 <i>H. ivisa</i> Malicky, 1972					1	1																	2	2
14 <i>H. martini</i> Marshall, 1977						1			13	10	6	1	1		3	4	1	1					10	41
15 <i>H. occulta</i> (Eaton, 1873)	1								4	3		1											4	9
16 <i>H. phaon</i> Malicky, 1976								3	2							1	3	1					5	10
17 <i>H. ruffoi</i> Moretti, 1981				1				3	2			1				1							5	8
18 <i>H. serrata</i> Morton, 1898																					5		1	5
19 <i>H. simulans</i> Mosely, 1920	1		2					4	7	4	1		2	1		1		2					10	25
20 <i>H. sparsa</i> Curtis, 1834	6		14			1	5	1	7		1				4		1	1					10	41
21 <i>H. stellifera</i> Morton, 1893	1		2					1	1							1							5	6
22 <i>H. tachei</i> Coppa & Malicky 2005																							1	3
23 <i>H. figurina</i> Ris, 1894				1										1					1				3	3
24 <i>H. tineoides</i> Dalman, 1819	1		6	1	1				9		1				1	1	1	4				1	11	27
25 <i>H. uncinata</i> Morton, 1893	1							3	2	4		1			1		3	2	1				9	18
26 <i>H. vecfis</i> Curtis, 1834	7		2	6	1	2	1	2	4	11	1	1	1		1	5	11	21	23	1			19	115
27 <i>H. vichtaspa</i> Schmid, 1959			2						1														2	3
Total species	13	0	6	12	3	6	10	5	13	15	7	9	7	4	3	7	9	6	11	8	1	2		
Total finding sites	20	0	12	33	1	4	9	6	32	99	37	25	8	3	2	11	9	14	33	37	1	1		
Total sampling sites	221	49	109	339	180	82	100	89	324	542	295	156	408	107	27	41	111	311	484	305	27	19		

Table 1 - List of the Italian *Hydropilia* species updated to 2010. Number of localities per regions / islands for each species

	Hygropetric	Crenal	rithral	Epipothamal	Fall	Canal	Brackish water	Moss	Lake	Agricultural lake	Marsh	total habitats
<i>H. acuta</i>			7	2								2
<i>H. aegyptia</i>			1	7	1	1	1		27			6
<i>H. angulata</i>			29	66		5			9	1	1	6
<i>H. angustata</i>				10								1
<i>H. brissaga</i>			4									1
<i>H. cognata</i>			1	2					2			3
<i>H. cornuta</i>			1	2								2
<i>H. cortensis</i>			1									1
<i>H. fiorii</i>		1	1									2
<i>H. forcipata</i>			9	16					1		1	4
<i>H. giudicellorum</i>			2	1								2
<i>H. insubrica</i>		1	6	5	1							4
<i>H. ivisa</i>			1									1
<i>H. martini</i>		6	14	6	2	2		1	8			7
<i>H. occulta</i>		2	4	1								3
<i>H. phaon</i>			4	5								2
<i>H. ruffoi</i>	2	2	1					1				4
<i>H. serrata</i>	1	2	2									3
<i>H. simulans</i>	1	2	11	9								4
<i>H. sparsa</i>		1	4	25	1		2		3			6
<i>H. stellifera</i>		1	4									2
<i>H. tacheti</i>			1	2								2
<i>H. tigurina</i>				2								1
<i>H. tineoides</i>	1	1	9	4	1				5			6
<i>H. uncinata</i>			9	5								2
<i>H. vectis</i>	4	7	35	39		1						5
<i>H. vichtaspa</i>		1	2									2
Total species	5	12	25	19	5	4	2	2	7	1	2	

Table 2 - Number of localities related to different habitats for each *Hydroptila* species



Fig. 3 - Sampling site of *Hydroptila fiorii*: Fonte su Cologone spring, Nuoro, Sardegna, 90 m a.s.l. (photo Marinelli)