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Trichoptera and their symbionts in the eastern Italian Alps.

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Abstract. The Trichoptera list of the eastern Italian Alps derives from a study of collections housed in the Natural Sciences Museums of Verona, Bergamo, Udine and Tarcento; from the study of specimens caught mainly by light traps in 1994 and 1996 and from bibliographical quotes. The 221 sampling sites are situated in the Dolomiti, Alpi Carniche, Alpi Giulie and Prealpi Venete. One hundred sixty-three sites were epigeal (in lotic and lentic waters) and 58 hypogeal. On the whole, the list up to 1997 is made up of 181 species, which is 20 more than the previous lists. Seventeen species were hitherto unknown in this region and 3 are new to Italian fauna (*Synagapetus krawanyi, Ithytrichia lamellaris* and *Tinodes rostocki*). The highest number of species (121) was found in the Dolomiti. The species with European *sensu lato* distribution are dominant (68%). Four species with Balkanic distribution extend their area to the eastern Alps (*Rhyacophila palmeni, Hydroptila ivisa, Psychomyia klapaleki, Beraeamyia schmidi*). As far as we know *Metanoea rhaetica* can be considered endemic to the central and eastern Alps, and *Ecclisopteryx malickyi, Chaetopteryx euganea, Sericostoma subaequale* and *S. timidum* to the eastern Alps. New drawings of the male genitalia of *Microptila minutissima* and male and female genitalia of *Rhadicoleptus alpestris* are given. The presence of symbionts was observed in 18 species of Trichoptera. The larval instar was most frequenty affected. Parasites (Gregarinida, Microsporida, Nematomorpha, Hydracarina, Hymenoptera) and epibionts (Peritricha and Rotatoria) were observed. Gregarinida were observed most frequently and in some cases 100% of the larvae were infested.

Key words: Eastern Italian Alps, checklist, zoogeography, symbionts.

A list of Trichoptera of the eastern Italian Alps (in the Trentino-Alto Adige, Veneto and Friuli-Venezia Giulia regions) can be derived from the second list of Italian Trichoptera updated to 1989 (CIANFICCONI and MORETTI, 1991). This list derives from bibliographical data, from study of collections housed in the Museo Civico di Scienze Naturali, in Verona (CIANFICCONI and MORETTI, 1985) and from our research in Friuli -Venezia Giulia (CIANFICCONI and MORETTI, 1987). Subsequently, Moretti identified Trichoptera specimens from the Fiume Adige (Moretti & Cianficconi 1976) and from Trentino-Alto Adige (CIANFICCONI *et al.*, 1993), the latter housed in the Museo Civico di Scienze Naturali "E. Caffi", in Bergamo and specimens from caves of Friuli-Venezia Giulia (MORETTI and CIANFICCONI, 1993), housed in the Museo Archeologico-Naturalistico, in Tarcento. Studies on specimens from the Museo Friulano di Storia Naturale, in Udine, are still under way.

Field samplings in Friuli-Venezia Giulia were carried out by Pantini, Valle and by us in June 1994, and by Pantini and Valle in summer 1996.

The aim of the present work is to update the list of the Trichoptera fauna of the eastern Italian Alps, from Passo del Brennero to the eastern end of the Alps, as well as to analyse their present distribution, by considering the 4 subdivisions into zones, namely Dolomiti, Alpi Carniche, Alpi Giulie and Prealpi Venete (Fig. 1).

In addition, a list of symbionts that develop in these insects is also included.

Sampling stations and methods

Adults and aquatic instars of the Trichoptera were sampled in various lotic and lentic waters. In particular, in 1994 and 1996, the adults were also collected, using light traps which were operated during the night near the banks.

The sampling sites were located at different altitudes (170-2400 m a.s.l.), in different hydrographic basins (Adige, Piave, Tagliamento) and mountain massifs. The lotic environments are more numerous than the lentic ones and can be divided into: hygropetrics, springs, karst springs, brooks, streams and rivers. The lentic environments include alpine lakes (Misurina, Braies, Tovel, Predil), ponds, marshes and limnocrenous springs.

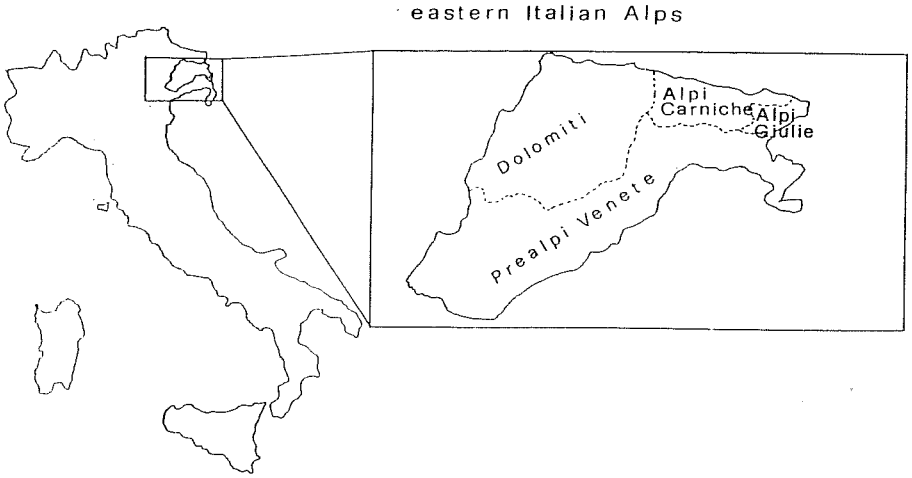

Fig. 1 - Subdivisions into zones of the eastern Italian Alps.

The hypogeal biotopes investigated by several speleologists, were numerous, due to the prevailing karstic environment. A total of 221 sites (163 epigeal, 58 hypogeal) were investigated. They were distributed in each zone as follows: Dolomiti (41 epigeal, 1 hypogeal); Alpi Carniche (28 epigeal, 3 hypogeal); Alpi Giulie (26 epigeal) and Prealpi Venete (68 epigeal, 54 hypogeal). The sampling sites are shown in the map of the eastern Alps, they cover 51 quadrates of 100 Km^2 (Fig. 2).

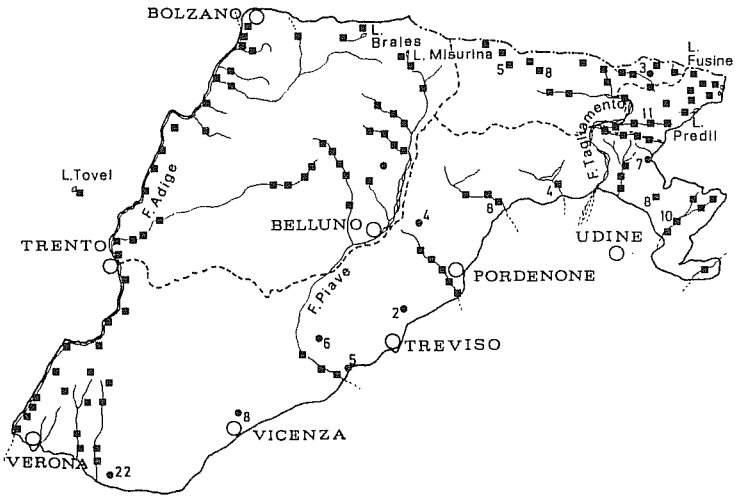

Fig. 2 - Sampling sites of Trichoptera in the eastern Italian Alps. The numbers indicate several sites close together. ■ = epigeal sites, ● = hypogeal sites.

Species collected

The Trichoptera found in the eastern Italian Alps up to 1997 are listed in Table 1, which contains the species given in the 1991 and 1993 lists, and the species collected in 1994 and 1996, listed here for the first time. The species total is 181. Of these 17 are reported for the first time in the eastern Italian Alps *(Rhyacophila laevis, Glossosoma boltoni, G. conformis, Synagapetus dubitans, Stactobia caspersi, Hydroptila forcipata, H. sparsa, Microptila minutissima, Wormaldia mediana, Lype phaeopa, Tinodes dives jeekelii, T. sylvia, Ecclisopteryx madida, Rhadicoleptus alpestris, Allogamus antennatus, Lepidostoma hirtum, Beraeamyia squamosa),* and 3 are new to the Italian fauna *(Synagapetus krawanyi, Ithytrichia lamellaris, Tinodes rostocki).* The species found constitute 42 % of the Trichopteran fauna of Italy and belong to 17 families and 67 genera (of the total of 19 families and 92 genera recorded in Italy). The families Thremmatidae and Helicopsychidae have not been found, most of the species belong to the families Rhyacophilidae (49 % of the species found in Italy), Limnephilidae (55 %, mainly of the genera *Drusus* and *Limnephilus*), Phryganeidae (75 %) and Sericostomatidae (60%). Of the 181 species, 17.2 % are limited to the eastern Alps, 27.8 % are also distributed along the Italian alpine chain and 55.5 % are also found along the Apennines. A comparative analysis of Trichoptera species between the

Table 1 - List of the eastern Italian Alps Trichoptera. Zones: 1 = Dolomiti, 2 = Alpi Carniche, 3 = Alpi Giulie, 4 = Prealpi Venete. Symbols. ●= previously listed, ■= new finding in zone, + = new finding in eastern Italian Alps, ❖= new finding in Italy, O= in Italy recorded only in the eastern Alps.

1-Dolomiti 2-Alpi Carniche 3-Alpi Giulie 4-Prealpi Venete

		1	2	3	4
	RHYACOPHILIDAE				
	Rhyacophila aquitanica McL.	●	●		●
	R. aurata Brauer	●	●		●
O	*R. bonaparti* Schmid	●			
	R. dorsalis Curtis	●			●
O	*R. fasciata* Hagen			●	●
	R. glareosa McL.	●			
O	*R. hirticornis* McL.	●	●		●
	R. intermedia McL.	●	●		
	R. laevis Pictet	+			+
O	*R. palmeni* McL.			●	
	R. pascoei McL.	●			
	R. producta McL.	●		●	
	R. pubescens Pictet	●			
	R. simulatrix McL.	●	●		
	R. stigmatica Kolenati	●	■		
	R. torrentium Pictet	●	●		●
	R. tristis Pictet	●	■		●
	R. vulgaris Pictet	●	●	●	●
	GLOSSOSOMATIDAE				
	Glossososma bifidum McL.		●		●
	G. boltoni Curtis	+			
	G. conformis Neboiss	+		+	
O	*Synagapetus dubitans* McL.	+	+		
O	*S. krawanyi* Ulmer			❖	
O	*Agapetus delicatulus* McL.				●
	A. fuscipes Curtis	●	●		
	A. nimbulus McL.	●			●
	HYDROPTILIDAE				
	Ptilocolepus granulatus Pictet	●	●		
	Stactobia caspersi Ulmer				+
	S. eatoniella McL.		●		●
	S. moselyi Kimmins			●	
	Orthotrichia costalis Curtis		●		
	Ithytrichia lamellaris Eaton				❖
	Hydroptila aegyptia Ulmer		●		
O	*H. cognata* Mosely		●		
	H. forcipata Eaton			+	
	H. insubrica Ris	●			
O	*H. ivisa* Malicky				●
	H. sparsa Curtis			+	
	H. tineoides Dalman	●			
	H. vectis Curtis			●	
	Agraylea sexmaculata Curtis	●			■
	Microptila minutissima Ris				+
	PHILOPOTAMIDAE				
	Philopotamus ludificatus McL.	●	●	●	●

		1	2	3	4
	P. montanus Donovan	●			
	P. variegatus Scop.	●	●	●	●
	Wormaldia copiosa McL.	●	●	●	●
	W. mediana McL.			+	
	W. occipitalis Pictet	●	●	●	●
	HYDROPSYCHIDAE				
	Diplectrona atra McL.	●		■	
	Hydropsyche angustipennis Curtis	●	●		
O	*H. guttata* Pictet			●	
	H. instabilis Curtis	●			●
	H. modesta Navas		●		
	H. pellucidula Curtis	●			●
O	*H. saxonica* McL.				●
	H. tenuis Navas	●			●
	Cheumatopsyche lepida Pictet			●	
	POLYCENTROPODIDAE				
	Neureclipsis bimaculata L.	●			
	Plectrocnemia conspersa Curtis	●	●	●	
	P. geniculata McL.	●			●
O	*Polycentropus excisus* Klapalek			●	
	P. flavomaculatus Pictet	●		●	●
	Cyrnus trimaculatus Curtis	●	●		●
	PSYCHOMYIDAE				
O	*Psychomyia klapaleki* Malicky				●
	P. pusilla Fabricius	●	●		●
	Lype phaeopa Stephens		+		
	Tinodes dives Pictet	●	●		●
	T. dives jeekeli Botosaneanu				+
	T. maclachlani Kimmins		●		
O	*T. pallidulus* McL.				●
O	*T. rostocki* McL.			❖	
	T. sylvia Ris			+	
	T. unicolor Pictet		●		
	T. waeneri L.	●			●
	T. zelleri McL.	●			
	ECNOMIDAE				
	Ecnomus tenellus Rambur	●	●		
	PHRYGANEIDAE				
O	*Agrypnia obsoleta* Hagen		●		
O	*A. pagetana* Curtis	●			
	A. varia Fabricius	●			
	Phryganea nattereri Brauer	●		●	
	Oligotricha striata L.	●		●	
	Oligostomis reticulata L.		●		
	BRACHYCENTRIDAE				
	Micrasema minimum McL.	●			●
	M. morosum McL.	●	●		■

		1	2	3	4
	LIMNEPHILIDAE				
	Drusus alpinus Meyer-Dür	•			
	D. biguttatus Pictet	•	•		■
O	*D. chrysotus* Rambur	•			
	D. discolor Rambur	•	•		
	D. melanchaetes McL.	•	■		
	D. monticola McL.	•			
	Ecclisopteryx guttulata Pictet	•			
O	*E. madida* McL.			+	
O	*E. malickyi* Moretti	•			
	Cryptothrix nebulicola McL.	•			
	Metanoea rhaetica Schmid	•	■	•	•
	Limnephilus affinis Curtis	•		•	
O	*L. binotatus* Curtis	•			
	L. bipunctatus Curtis			•	
O	*L. borealis* Zetterstedt	•			
	L. centralis Curtis	•			
	L. extricatus McL.	•			
	L. flavicornis Fabricius	•	•		•
	L. flavospinosus Stein	•	•		
	L. hirsutus Pictet	•			
	L. ignavus McL.	•			
	L. lunatus Curtis	•	•		•
	L. rhombicus L.		•	•	•
	L. rhombicus reseri Malicky	•			
O	*L. sericeus* Say	•			
	L. sparsus Curtis	•			
	L. stigma Curtis	•			
O	*L. subcentralis* Brauer	•			
	L. vittatus Fabricius			•	
	Grammotaulius nigropunctatus Retzius				•
O	*G. nitidus* O. F. Müller		•		
	Anabolia lombarda Ris		•		
	Rhadicoleptus alpestris Kolenati		+		
	Potamophylax cingulatus alpinus Tobias	•	•	•	
O	*P. nigricornis* Pictet		•		
	Leptotaulius gracilis Schmid	•			
	Halesus digitatus Schrank	•	•		
	H. radiatus Curtis	•	•		•
	H. rubricollis Pictet	•			
	Melampophylax melampus McL.	•			•
	Anisogamus difformis McL.	•			
	Parachiona picicornis Pictet	•	•		
	Stenophylax mitis McL.	•	•		•
	S. mucronatus McL.	•			
	S. permistus McL.	•			•
	S. vibex Curtis		•		•
	Micropterna fissa McL.	•			•
	M. lateralis Stephens				•
	M. nycterobia McL.	•	•		•
	M. sequax McL.	•			•
	M. testacea Gmelin	•	•		•
	Mesophylax aspersus Rambur	•	•		•
	M. impunctatus McL.	•	•		•

		1	2	3	4
	Allogamus antennatus McL.		+		
	A. auricollis Pictet	•	•		•
	A. hilaris McL.	•			
	A. uncatus Brauer	•	•		
	Consorophylax consors McL.	•			
O	*Chaetopteryx euganea* Mor.& Mal.				•
O	*C. fusca* Brauer			•	
	C. gessneri McL.	•			
	Pseudopsilopteryx zimmeri McL.	•	•		
	GOERIDAE				
	Lithax niger Hagen	•	•		
	Silo nigricornis Pictet	•	•		•
	S. pallipes Fabricius	•	•		•
	S. piceus Brauer		•		
	LEPIDOSTOMATIDAE				
	Lepidostoma hirtum Fabricius			+	
	Lasiocephala basalis Kolenati	•			
	Crunoecia irrorata Curtis	■	•	•	•
	LEPTOCERIDAE				
	Athripsodes aterrinus Stephens	■	•	•	
	Ceraclea aurea Pictet	•			
	C. dissimilis Stephens	•	•		
	C. fulva Rambur		•		
	C. senilis Burmeister		•		
	Mystacides azurea L.	•			•
	M. longicornis L.		•		
	M. nigra L.		•		
	Oecetis furva Rambur		•		
	O. lacustris Pictet		•		
	O. ochracea Curtis	•			•
	Setodes argentipunctellus McL.		•		
	Adicella cremisa Malicky			•	
	A. filicornis Pictet	•			
	A. reducta McL.			•	
	SERICOSTOMATIDAE				
	Sericostoma galeatum Rambur	•			
	S. pedemontanum McL.	•			•
	S. personatum Kirby & Spence	•	•		
O	*S. subaequale* McL.	•			
O	*S. timidum* Hagen	•			•
	S. turbatum McL.	•			
	BERAEIDAE				
	Beraea dira McL.		•		•
	B. maurus Curtis	•	•		•
	B. pullata Curtis	•	■		
	Ernodes articularis Pictet		■	•	
	E. vicinus McL.	■	•		■
O	*Beraeamyia schmidi* Botosaneanu				•
	B. squamosa Mosely	+			
	ODONTOCERIDAE				
	Odontocerum albicorne Scopoli	•	•	•	

	181 - Total species	121	81	39	68
	exclusive species	42	22	18	13

Table 2 - A comparison by percentage of the sampling sites and number of species per family in the western and eastern Italian Alps.

	western Alps	eastern Alps	Total
Sampling stations	130	221	351
%	37	63	

Families	N. of species (%)		Total
	western Alps	eastern Alps	
Rhyacophilidae	66	75	24
Glossosomatidae	44	88	9
Hydroptilidae	36	84	19
Philopotamidae	87	75	8
Hydropsychidae	72	81	11
Psychomyidae	25	100	7
Phryganeidae	33	100	6
Brachycentridae	33	66	3
Limnephilidae	63	82	73
Lepidostomatidae	66	100	3
Leptoceridae	47	79	19
Sericostomatidae	50	100	6
Beraeidae	28	100	7

western and eastern Italian Alps, considering the diverse number of sampling sites in the two zones, shows that the most representative families in the eastern Alps, are Psychomyidae, Phryganeidae, Sericostomatidae and Beraeidae. These families are least represented in the western Alps (Table 2). The affinity of the Trichoptera species (Sörensen index) between the western and eastern Alps is low (27%), due to Philopotamidae, Goeridae, Lepidostomatidae and Sericostomatidae.

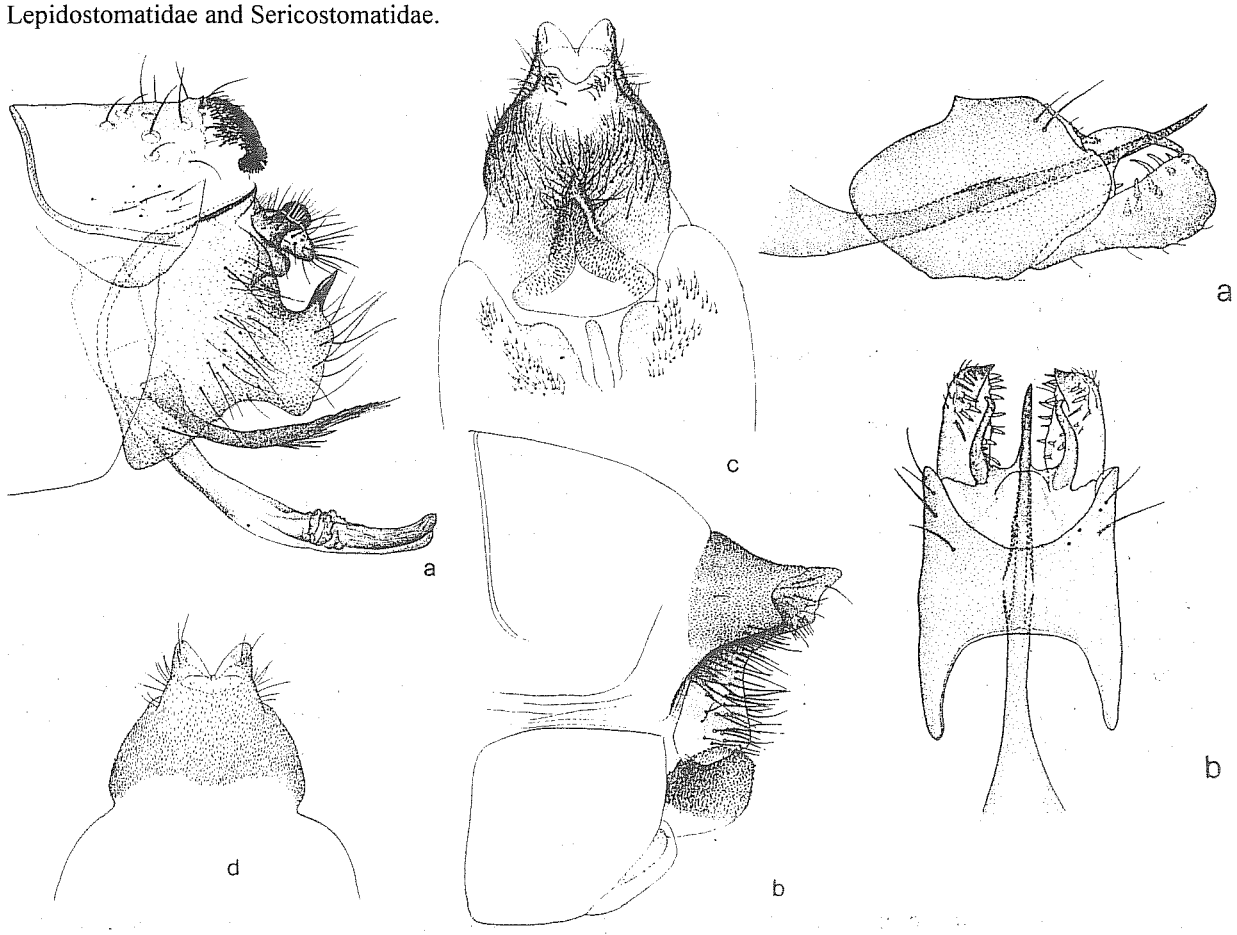

Fig. 3 (left) - *Rhadicoleptus alpestris* Kol. a = ♂ genitalia, lateral view. b, c, d = ♀ genitalia: b= lateral view, c= from above, d= from below. Alpi Carniche: Passo Pragallo, 1600 m, 6.VIII.1978, leg. Morandini (Museo di Udine). Fig. 4 (right) - *Microptila minutissima* Ris. ♂ genitalia, a = lateral view, b = dorsal view. Prealpi Venete, T. Cellina, Malga Casavento, Pordenone, 950 m a.s.l., leg. Pantini and Valle.

The division according to zones indicates that the Dolomiti have most species (121), mainly belonging to the families Limnephilidae, Phryganeidae and Sericostomatidae. Forty-two species (24 belonging to Limnephilidae) are found only in this zone. *Sericostoma subaequale* and *S. turbatum* are endemic to this zone.

The Alpi Carniche follow with 81 species, 22 of which (7 from Leptoceridae and 5 from Hydroptilidae families) are limited to this zone. *Rhadicoleptus alpestris* was until now known only in the central Alps (Fig. 3). It was observed, for 5 consecutive years that *Philopotamus ludificatus* has hypogeal aquatic instars and adults in the cave of Attila, Udine, 1768 m a.s.l. (MORETTI and CIANFICCONI, 1993).

In the Alpi Giulie 39 species, belonging to 14 families, are present; 18 species (equal to 45 %) are found only in this zone. *Synagapetus krawani,* collected by Weinzierl *in litt.* (Rio del Lago, near Laghi di Fusine, Villa Alta, 850 m a.s.l.) and *Tinodes rostocki,* collected by us using light traps (Rio Bianco, Uccea, Resia, Udine, 600 m) are the only data available for Italy.

In the Prealpi Venete, 68 species are present, 13 of which are found only in this area. *Stactobia caspersi,* collected in hygropetric habitat (Montereale, Valcellina, Pordenone, 23.VII.1996) by Pantini and Valle, was until now known only in the central Apennines. *Microptila minutissima* (Fig. 4) and *Tinodes dives jekelii,* found by us in 1994, were previously found only in the central Alps (CIANFICCONI et al., 1993). *Ithytrichia lamellaris,* collected by Pantini and Valle (Zoppola, Ponte F. Meduna, Pordenone, 16.VII.1996) is new to Italian fauna. It is important to note that the name *Metalype fragilis* in the previous list (MORETTI and CIANFICCONI, 1991) has to be replaced by *Psychomyia klapaleki* MALICKY 1995, a similar but different species. Ten species of Stenophylacinae were collected in the caves investigated in this zone.

Symbionts

A study of the presence of symbionts in the Trichopteran fauna of the eastern Alps showed that 18 species were infested with parasites and epibionts (Tab. 3). Most of the specimens examined were in the winged stage. Since it is mainly the aquatic instars that are usually infested, the low number of species affected may under estimate the real situation. Only two adults of *Rhyacophila intermedia* and *Odontocerum albicorne* were parasitized with Hydracarina larvae.

Regarding the pupal instar, *Rhyacophila dorsalis* harboured larvae of Nematomorpha encysted in the midgut musculature while various pupal cases of *Silo nigricornis* and *Silo pallipes* showed the characteristic brown ribbon-like structure produced by *Agriotypus armatus.*

The larval instar is most often affected by the phenomenon of symbiosis. Epibionts including Ciliophora Peritricha and Rotatoria were found in larvae in the lakes of the Dolomiti while they were not observed in their usual host, *Hydropsyche* larvae. Among the parasites, the Gregarinida are the most numerous both in terms of the number of species identified, as well as in the number of individuals present in a single larva; in some cases the infestation was nearly 100% of the larvae examined (*Rhyacophila dorsalis, Stenophylax permistus, Allogamus auricollis* of the Torrente Carnappo). The larvae of *Allogamus auricollis* also had many Microsporida in the midgut.

Parasitism by *Gordius villoti* (Nematomorpha) was not frequent but is interesting. It occured in *Halesus radiatus* from the lakes in the Dolomiti (MORETTI & CORALLINI SORCETTI 1991) and was present in great numbers not only in the larvae but also in the pupae. In additon, the larval populations of *Allogamus auricollis* of the Torrente Avisio (Fiemme Valley) were so infested that even in the stomach contents of *Salmo trutta marmoratus,* a fish predator of Trichoptera, there were many parasitic larvae and numerous Nematomorpha.

Conclusions

Analysis of the taxa found provides interesting ecological and zoogeographical information about trichopteran fauna in the eastern Italian Alps.

The ecological aspect is characterized by the presence of lotic, lentic and hypogeal specimens. Considering only the exclusive species of the eastern Alps, the lotic species include the crenobionts *Chaetopteryx euganea,*

Table 3. Symbionts of Trichoptera.

TRICHOPTERA	SYMBIONTS						
	PERITRICHA	GREGARINIDA	MICROSPORIDA	ROTATORIA	NEMATOMORPHA	HYDRACARINA	HYMENOPTERA
Rhyacophila dorsalis		*Asterophora mucronata* Lèger			cyst		
Rhyacophila intermedia						larve	
Rhyacophila torrentium		*Asterophora mucronata* Lèger					
Rhyacophila vulgaris		*Asterophora heeri* (Kolliker)					
Hydropsyche instabilis		*Asterophora hydropsyches* Baudoin *Globulocephalus hydropsyches* Baudoin					
Hydropsyche modesta		*Asterophora hydropsyches* Baudoin *Globulocephalus hydropsyches* Baudoin					
Hydropsyche pellucidula		*Asterophora hydropsyches* Baudoin *Globulocephalus hydropsyches* Baudoin					
Cheumatopsyche lepida		*Asterophora heeri* (Kolliker)					
Polycentropus flavomaculatus		*Asterophora heeri* (Kolliker)					
Limnephilus bipunctatus		*Gregarina pusilla* Baudoin					
Limnephilus rhombicus reseri	*Epistylis rotans* Sveç *Vorticella* sp.	*Gregarina limnophili* Zwetkow *Gregarina sericostomae* A.M.Baudoin		*Philodina* sp.			
Potamophylax cingulatus alpinus		*Pileocephalus sinensis* Schneider					
Potamophylax nigricornis		*Gregarina stenophylacis* Zwetkow					
Halesus radiatus	*Epistylis rotans* Sveç *Carchesium polipinum* Clap & L.	*Gregarina limnophili* Zwetkow *Gregarina sericostomae* A.M.Baudoin *Gregarina stenophylacis* Zwetkow		*Philodina* sp.	*Gordius villoti* Rosa		
Stenophylax permistus		*Pileocephalus agilis* Geus *Asterophora tiaroides* Baudoin					
Allogamus auricollis		*Gregarina sericostomae* A.M.Baudoin *Gregarina stenophylacis* Zwetkow	spore				
Allogamus uncatus	*Epistylis rotans* Sveç	*Gregarina limnophili* Zwetkow *Gregarina sericostomae* A.M.Baudoin			*Gordius villoti* Rosa		
Silo nigricornis							*Agriotypus armatus* Walk
Silo pallipes							*Agriotypus armatus* Walk
Sericostoma pedemontanum		*Gregarina limnophili* Zwetkow *Gregarina sericostomae* A.M. Baudoin					
Odontocerum albicorne		*Gregarina sericostomae* A.M.Baudoin				larve	

C. fusca, the crenophilous *Rhyacophila bonaparti, R. hirticornis, Tinodes pallidulus, Ecclisopteryx madida* and the rhithrobionts *Rhyacophila palmeni, Metanoea rhaetica, Sericostoma subaequale* and *S. timidum.* Among the lentic species, *Agrypnia obsoleta, A. pagetana, Limnephilus borealis, L. binotatus, L. subcentralis* and *L. sericeus* were found. All species of Stenophylacinae found in Italian caves, were present in the eastern Alps.

Orophilous species predominate, including *Drusus alpinus, D. biguttatus, D. melanchaetes, Limnephilus bipunctatus, L. vittatus* and *Lithax niger.*

High larval densities for *Drusus biguttatus, D. discolor* and *Potamophylax cingulatus alpinus* were observed.

A zoogeographical balance shows a dominance of species with European *sensu lato* distribution *(68 %),* followed by those with wider distribution (11.6%, holarctic, palearctic, eurosiberian). Among the most significant examples of Central European origin, the following are noteworthy: genera limited in Italy to the Alps (*Neureclipsis, Oligostomis, Cryptothrix, Metanoea, Anabolia, Rhadicoleptus, Parachiona, Pseudopsilopteryx, Lithax),* genera found in the Alps with a group of species different from those in the central Apennines (eg. different species of *Drusus*), species vicariated by similar species (eg. *Rhyacophila vulgaris*) or subspecies (eg. *Wormaldia copiosa, Tinodes dives*) along the peninsula (CIANFICCONI *et al.,* 1997). 5% of Trichoptera species had eastern distribution. If the exclusive species of each zone are considered, from West to East, there is an increase in species with Balkanic distribution. *Microptila minutissima, Tinodes dives jeekelii* and *Rhadicoleptus alpestris* have the western Italian boundary of distribution in the central Alps, *Rhyacophila palmeni* and *Polycentropus excisus* in the Alpi Giulie, *Hydroptila ivisa, Psychomyia klapaleki* and *Beraeamyia schmidi* in the Prealpi Venete. *Metanoea rhaetica* can be considered endemic to the central and eastern Alps; *Ecclisopteryx malickyi, Chaetopteryx euganea, Sericostoma subaequale* and *S. timidum* are endemic to the eastern Alps. It is interesting to note that *Metanoea rhaetica* is vicariated by *M. flavipennis* Pictet in the western Alps.

These data give information about trichopteran populations in the eastern Italian Alps which mainly came from Central Europe and from the Dinarides.

While most Trichoptera in the eastern Alps have no host symbionts, some interesting aspects were obtained: for the first time Microsporida were reported in *Allogamus auricollis* and in some streams, the infestation level of Gregarinida and Nematomorpha was nearly 100% in the trichopteran larval population.

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Addendum. While this paper was being printed, two species have been identified in the Prealpi Venete: *Hydroptila brissaga* MALICKY, Prealpi Giulie, T.Torre, S.Osvaldo, Tarcento, Udine, leg. Desio; *Synagapetus krawanyi* ULMER, Prealpi Giulie, Pulfero, affluente Natisone, Udine, leg. Valle & Pantini.

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