

Aeshna subarctica elisabethae, new to the fauna of Italy (Odonata: Aeshnidae)

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Abstract

In August 2009 a single adult male of *Aeshna subarctica elisabethae* was collected at the 'Lago Nero' peat bog (municipality of Capriana; province Trento, northeastern Italy). This specimen represents the first Italian record of the species and adds a further record of *A. subarctica* to the few known records in the southern Alps.

During a targeted search in the summer of 2010, the species was found in three other sites in the region Trentino-South Tyrol in northern Italy, where it now has to be considered as autochthonous.

Riassunto

Nell'Agosto 2009 presso la torbiera del Lago Nero di Monte Corno (Comune di Capriana; Provincia Trento) è stato rinvenuto un esemplare maschile di *Aeshna subarctica elisabethae*. Ciò rappresenta il primo ritrovamento di questa specie per territorio italiano, e uno dei pochi a sud del crinale Alpino.

In seguito a ricerche specifiche nell'estate 2010 *A. subarctica* è stata rinvenuta in altri tre siti del Trentino-Alto Adige, dove la specie è da ritenersi autoctona.

Zusammenfassung

Im August 2009 wurde am Schwarzensee am Trudner Horn (Gemeinde Capriana, Provinz Trient, Norditalien) ein männliches Exemplar von *Aeshna subarctica elisabethae* gefangen. Dieser Fund stellt den Erstdnachweis dieser Art für Italien und einen der wenigen Nachweise südlich des Alpenhauptkamms dar.

In Folge einer systematischen Suche im Sommer 2010 wurde die Art an drei weiteren Standorten der Region Trentino-Südtirol nachgewiesen, wo sie damit als bodenständig gelten muss.

Introduction

Aeshna subarctica has a circumpolar, holarctic distribution and occurs from North America to Japan, Siberia and Europe. In Europe it is present in the subspecies *A. subarctica elisabethae*, which is considered as a west-Siberian faunal element.

In appearance and phenology *A. subarctica* is similar to *A. juncea* and in most sites with populations of the former, the latter also occurs. Those similarities very likely resulted in *A. subarctica* having been overlooked in Italy. In central Europe, *A. subarctica* appears largely confined to floating sphagnum mats of oligotrophic acid bogs (SCHMIDT 1964; STERNBERG 2000).

In Europe the species has its core area in the northeastern part of the continent, around the Baltic Sea. The western border of its distribution, with several relict populations, is scattered along the river Rhine in France, Germany, Belgium and the Netherlands (STERNBERG 2000; DIJKSTRA 2006).

The southern limit of *A. subarctica* in Central Europe is chiefly represented by the Alps, where several populations are distributed along the northern part of the mountain range. In Switzerland the main distribution area is situated between the valley of the Saane (Canton Fribourg) and Lake Lucerne (Canton Lucerne), with an isolated autochthonous population in the Region of the Upper Engadin (WILDERMUTH et al. 2005; WILDERMUTH 1995). In southern Germany, the species is present in parts of Baden-Württemberg (STERNBERG 2000) and in the Alps and pre-Alps of Bavaria (NUNNER & STADELMANN 1998). In Austria, *A. subarctica* has been recorded in the alpine regions of Vorarlberg, Tyrol, Salzburg, Upper Austria, Lower Austria and Styria (RAAB et al. 2007). In France the species is known only from the Jura and Vosges Mountains and has not been recorded from the Alps (DOMMANGET 2011).

In the southern part of the Alps, *A. subarctica* is known only from a few sites, namely the 'Šijec' peat bog in the Triglav National Park, Slovenia (BEDJANIČ 1999; BROCKHAUS 1999) and the 'Seebenmoor' peat bog near St. Oswald in Styria, Austria (RAAB et al. 2006).

In August 2009, a single adult male of *A. subarctica* was collected at the peat bog of 'Lago Nero di Monte Corno' (Community Capriana; Province Trento), which represented the first record of this species for Italy (cf. BOUDOT et al. 2009). From a biogeographic point of view this record is highly remarkable, as the site belongs to the Mediterranean Basin. Even if the bog has to be classified as a suitable habitat for *A. subarctica*, the fact that only one individual had been found meant that it was not possible to decide whether it was part of a local population. Therefore, in the summer of 2010 this and four other sites in the region Trentino-South Tyrol were surveyed with the specific aim of detecting populations and to ascertain local reproduction of *A. subarctica*.

Study area and methods

Between July and September 2010, the 'Lago Nero di Monte Corno' and four other potentially suitable sites for *Aeshna subarctica* in the Italian southern Alps of South Tyrol were investigated. The sites were selected consulting WILDERMUTH (2005), who describes the typical alpine habitat of *A. subarctica* as active raised bogs and transition mires of the montane to the subalpine zone with a treeless center and surrounded by conifer forest, where the larval habitats are represented by bog hollows that typically have *Drosera* sp., *Scheuchzeria palustris* and *Carex limosa*.

In order to find the most suitable localities, the Natura 2000 sites of the category "Active raised bogs" (Natura 2000 codex 7110), which is often associated with the typical larval habitats of the species "Transition mires and quaking bogs" (codex 7140) and "Depressions on peat substrates of the Rhynchosporion" (codex 7150), was searched on the database of the nature conservation offices of the Trento and Bolzano/Bozen provinces. Additionally, GÖTTLICH (1991) was consulted and orthophotos of potential sites were analyzed for the occurrence of a "bog eye".

The investigated sites were 'Lago Nero di Monte Corno' (Schwarzensee am Trudner Horn; name invented by myself to discriminate between the two sites called 'Lago Nero'), 'Lago Bianco' (Weissensee), 'Lago di Vedes' and 'Torbiera Tschinnger' (Tschinngermoor), which are all situated on the mountains east of the river Adige and belong to the Mediterranean Basin. The fifth locality, 'Lago Nero di Monte Covolo' (Schwarzsee am Seikofel; name invented by myself to discriminate between the two sites called 'Lago Nero') however is situated in the Sexten valley that represents a headwater of the river Drava and therefore is part of the Danube Basin. All localities refer to typical active raised bogs at an altitude between 1,330 and 1,741 m above sea level, covering 0.5 to 1.5 ha, and are surrounded by *Picea abies* dominated forests. All investigated localities are characterised in Tables 1 and 2.

The selected sites were visited between July and September 2010, when *A. subarctica* is most abundant in the Alps (LEHMANN & LANDMANN 2005).

Individual *A. subarctica* were caught with a net, determined and released or observed with binoculars. Additionally the reachable larval habitats of every site were searched for exuviae. All other Odonata species observed were also noted.

Results

Aeshna subarctica was found in four of the five investigated sites:

Lago Nero di Monte Corno

This peat bog, where in 2009 the first Italian record of *Aeshna subarctica* was taken, was visited around noon of 19-viii-2010, which was a sunny and hot summer

Table 1. List of localities in Trentino-South Tyrol, northern Italy, that were investigated for the occurrence of *Aeshna subarctica* in 2010. – Tabelle 1. Zusammenstellung der Lokalitäten in der Region Trentino-Südtirol, Norditalien, die 2010 auf das Vorkommen von *Aeshna subarctica* untersucht wurden. Provinces, Provinzen: TN Trento, BZ Bolzano/Bozen; SCI Site of Community Importance according to the EU Habitats Directive 92/43/EEC, Gebiet von gemeinschaftlicher Bedeutung nach der Flora-Fauna-Habitat-Richtlinie 92/43/EWG der EU.

Locality	Lago Nero di Monte Corno	Lago Bianco	Lago di Vedes	Torbiera Tschinnger	Lago Nero di Monte Covolo
Province	TN	BZ	TN	BZ	BZ
Municipality	Capriana	Salorno/ Salurn	Cembra	Nova Ponente/ Deutschnofen	Sesto/ Sexten
Altitude [m a.s.l.]	1,740	1,643	1,489	1,330	1,741
UTM WGS84 coordinates	32T y: 5128160 x: 678359	32T y: 5127635 x: 678022	32T y: 5122866 x: 674788	32T y: 5145092 x: 684204	33T y: 5173563 x: 761373
SCI Code	IT3120019	IT3110036	IT3120048	IT3110032	IT3110020
Treeless bog area [ha]	0.6	1.1	0.5	1.1	0.8

day. At this site approximately 30 adults of *A. subarctica* were observed (Fig. 1), including mating and oviposition. During almost two hours of observation *A. subarctica* was more abundant than *A. juncea*. The patrolling males of *A. juncea* were more aggressive than those of *A. subarctica*. No exuviae were found.

Lago Bianco

This site is only ca. 700 m from Lago Nero di Monte Corno and was investigated during the afternoon of the same day. The abundance of *A. subarctica* appeared to be lower than that of *A. juncea*. Females were observed while ovipositing and one male was captured. No exuviae were found.

Torbiera Tschinnger

This peat bog was investigated on the 02-vii-2010 on a sunny afternoon. The adult Aeshnidae which could be determined to species level all belonged to *A. juncea*. However, three exuviae that were collected in small depressions in the *Sphagnum* mosses pertained to *A. subarctica*.

Lago Nero di Monte Covolo (Fig. 2)

The visit to this site on 08-ix-2010 was preceded by a longer period of bad weather. However, a male of *A. subarctica* was observed sun-basking on a tree trunk and a female was also seen ovipositing. No exuviae were found.

Table 2. Important plant species (except *Sphagnum* spp.) of the localities listed in Table 1, recorded in the respective Natura 2000 data sheet. – Tabelle 2. Relevante Pflanzenarten (außer *Sphagnum* spp.) der Lokalitäten aus Tabelle 1, wie sie im jeweiligen Natura 2000-Datenblatt protokolliert wurden.

Locality	Lago Nero di Monte Corno	Lago Bianco	Lago di Vedes	Torbiera Tschinger	Lago Nero di Monte Covolo
<i>Andromeda polifolia</i>	x	x		x	x
<i>Carex gracilis</i>			x		
<i>C. limosa</i>	x	x	x		
<i>C. pauciflora</i>	x		x	x	x
<i>C. rostrata</i>		x			
<i>Comarum palustre</i>		x			
<i>Dactylorhiza maculata</i>					x
<i>D. majalis</i>					x
<i>Drosera anglica</i>	x	x	x	x	x
<i>D. intermedia</i>			x		
<i>D. rotundifolia</i>	x	x	x	x	x
<i>Eriophorum vaginatum</i>	x			x	x
<i>Lycopodiella inundata</i>	x		x		
<i>Pedicularis palustris</i>			x		
<i>Pinguicula vulgaris</i>					x
<i>Potentilla palustris</i>			x		
<i>Primula farinosa</i>					x
<i>Pseudorchis albida</i>	x				
<i>Rhynchospora alba</i>	x			x	
<i>Scheuchzeria palustris</i>	x	x	x	x	
<i>Schoenus ferrugineus</i>				x	
<i>Trichophorum alpinum</i>		x			
<i>Vaccinium oxycoccus</i>	x	x	x	x	x
<i>V. uliginosum</i>	x				
<i>Viola palustris</i>		x			

Lago di Vedes

This site was visited on 21-ix-2010. No adult *A. subarctica* were observed and no exuviae were found.

In addition to those five sites investigated by myself, the protected peat bog 'Torbiera Totes Moos' (SCI code IT3110030) also has to be regarded as a recording site. Franziska Winkler (pers. comm.) caught a single male of *A. subarctica* there on 21-viii-2010. This site is situated only 2 km from the Torbiera Tschinnger at an altitude of 1,470 m above sea level, and F. Winkler kindly submitted the list of the other observed species of Odonata in Table 3.



Figure 1: Male *Aeshna subarctica* in the Lago Nero di Monte Corno peat bog near Capriana, Province Trento, Trentino, Italy (19-viii-2010). – Abbildung 1: Männchen von *Aeshna subarctica* im Hochmoor Schwarzensee am Trudner Horn bei Capriana, Provinz Trient, Trentino, Italien (19.08.2010).

Discussion

Distribution

Prior to 2009, *Aeshna subarctica* was known only from two localities in the southern Alps and had not been recorded for Italy (BOUDOT et al. 2009). The species was first recorded for Italy in the year 2009. The discovery of three other Italian sites in 2010 as a result of targeted searches proves that the species' distribution in the southern Alps is wider than previously assumed (Fig. 3).

It is obvious that *A. subarctica* has been overlooked in Italy for a long time, probably due to its similarity to *A. juncea* and the few odonatological studies that were carried out in suitable sites in the past. Out of a total of almost 900 publications on Italian Odonata – the bibliography consulted was compiled by the Italian Odonatological Society, ODONATA.IT – only a few pertain to localities that are potentially suitable for *A. subarctica*, namely MARCUZZI & LORENZONI (1968), BUCCIARELLI (1972), BALESTRAZZI et al. (1983), MASCAGNI & TERZANI (1983) and PECILE (1991). Even in a recent work that investigated the Odonata of both Lago Nero di Monte Corno and Lago Bianco (FESTI et al. 2009), the species had been overlooked, probably due to the fact that the sites had been investigated before and



Figure 2: The Lago Nero di Monte Covolo peat bog near Sesto, Province Bolzano, South Tyrol, Italy. Floating *Sphagnum* mats, the typical habitat of *Aeshna subarctica* larvae, are in the foreground. (08-ix-2010) – Abbildung 2: Hochmoor Lago Nero di Monte Covolo bei Sexten, Provinz Bozen, Südtirol, Italien. Im Vordergrund ist *Sphagnum*-Schwingrasen als typisches Larvenhabitat von *Aeshna subarctica* erkennbar (08.09.2010).

Table 3. Odonata recorded at six bog sites in the southern Alps in the region Trentino-South Tyrol, Italy, during targeted searches for *Aeshna subarctica* in 2010. – Tabelle 3. Libellenarten, die bei der gezielten Suche nach *Aeshna subarctica* im Jahr 2010 an sechs Moorstandorten in der Region Trentino-Südtirol, Italien, nachgewiesen wurden. o records only from previous visits, Nachweise nur aus früheren Begehungen (FESTI et al. 2009; F. Winkler pers. comm.)

Locality	Lago Nero di Monte Corno	Lago Bianco	Lago di Vedes	Torbiera Tschinnger	Lago Nero di Monte Covolo	Torbiera Totes Moos
<i>Lestes sponsa</i>	X			X	X	X
<i>Coenagrion hastulatum</i>	o	o		o		o
<i>C. puella</i>						X
<i>Aeshna caerulea</i>	X					
<i>A. cyanea</i>				X		X
<i>A. juncea</i>	X	X	X	X	X	X
<i>A. subarctica</i>	>30 adults (♀;♂)	3-10 adults (♀;♂)		3 exuviae	2 adults (♀;♂)	1 adult (♂)
<i>Anax imperator</i>				X		X
<i>Cordulia aenea</i>				o		o
<i>Somatochlora arctica</i>	X	X		X	X	
<i>Leucorrhinia dubia</i>	o	o		o		o
<i>Libellula depressa</i>		o				o
<i>L. quadrimaculata</i>	o	o		o		o
<i>Sympetrum danae</i>	X	X		X	X	X
<i>S. fonscolombii</i>				X		

after the peak flight period of *A. subarctica*. It seems likely that additional investigations in suitable sites will reveal more localities of this species in the Italian Alps. For instance, a promising site for the presence of *A. subarctica* is the ‘Pian di Gembro’ peat bog in the Cammonica valley in Lombardia, where BALESTRAZZI et al. (1983) recorded the Odonata in 1980. Therefore this locality should be newly examined, especially under consideration of the presence of an autochthonous population in a peat bog near St. Moritz, in the Swiss Upper Engadin (WILDERMUTH 1995), at a distance of only 40 km.

Torbiera Tschinnger is the only locality where exuviae of *A. subarctica* were found, which is proof that an autochthonous population is present in Italy.

The single male *A. subarctica* captured by F. Werth in the Torbiera Totes Moos is no proof of local reproduction at this site. Considering that STERNBERG (1995) reported migration distances for *A. subarctica* of up to 8 km and that the Torbiera Tschinnger is only 2 km away, the observed specimen could possibly derive from there.

The relatively high abundance of more than 30 individuals, which were observed at the Lago Nero di Monte Corno together with reproductive behaviour, is also a strong indication that the species there reproduces locally. Also at Lago Lago Bianco and Lago Nero di Monte Covolo, where females were observed ovipositing, autochthonous populations seem highly likely.

Lago Nero di Monte Corno and Lago Bianco have to be considered as a joint population of *A. subarctica*, as they are only 700 m apart. On the other hand, Lago Nero di Monte Covolo, which is situated almost 100 km from the other investigated bogs, certainly harbours a different meta-population.

Conservation

Aeshna subarctica is classified as «least concern» in the European Red List of Dragonflies (KALKMAN et al. 2010), but in most Central European countries the species is regarded as being more threatened.

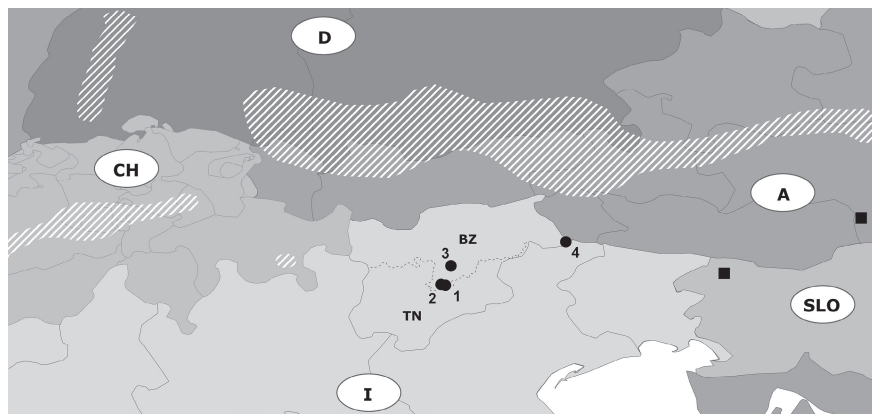


Figure 3: Distribution of *Aeshna subarctica* in the Alps. – Abbildung 3: Verbreitung von *Aeshna subarctica* in den Alpen. Hatched areas: distribution in the northern Alps, Schraffierte Flächen: Verbreitung in den Nordalpen (STERNBERG 2000; WILDERMUTH et al. 2005; RAAB et al. 2007; BAYERISCHES LANDESAMT FÜR UMWELTSCHUTZ 2009). Black symbols: records in the southern Alps, schwarze Symbole: Nachweise in den Südalpen; black squares: old records, schwarze Quadrate: alte Nachweise (RAAB et al. 2006; BEDJANIČ 1999). Black circles: new sites in Italy, schwarze Punkte: neue Fundorte in Italien; 1 Lago Nero di Monte Corno; 2 Lago Bianco; 3 Tobiera Tschinnger; 4 Lago Nero di Monte Covolo.

In Switzerland *A. subarctica* is considered «vulnerable» (GONSETH & MONNERAT 2002) and in Germany it is classed as «critically endangered» in the foothills of the Alps of Baden Württemberg (HUNGER & SCHIEL 2006) and as «endangered» in Bavaria (WINTERHOLLER 2003).

In Austria it is considered generally as «endangered» (RAAB et. al. 2007) and classified as «critically endangered» on a regional level in Vorarlberg (HOSTETTLER 2001), Tyrol (LANDMANN 2005) and Lower Austria (RAAB & CHWALA 1997).

From Slovenia only a single record of *A. subarctica* is known, and here the species is considered «critically endangered» (BEDJANIČ 1999).

Due to their marginal and relict distribution, in the Mediterranean basin, those Odonata species with a Central European or Boreo-Alpine distribution, like *A. subarctica*, have to be considered under threat. Additionally, they are sensitive to global warming and the desiccation of breeding habitats (RISERVATO et al. 2009). Furthermore peat bogs, which are the typical habitat of *A. subarctica* in the Alps, are potentially threatened by application of fertilizers, grazing or drainage, even if most of them are classified as Sites of Community Importance (SCI) according to the EU Habitats Directive 92/43/EEC.

In the sites investigated *A. subarctica* was always found together with *Somatochlora arctica*, and *Leucorrhinia dubia* was often present additionally. This well known syntopy of these three species, which share similar larval habitats (STERNBERG 2000), can be exploited for further searches for *A. subarctica*. Any Italian site which is known to host *S. arctica* and *L. dubia* should be carefully checked for the presence of *A. subarctica*.

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