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THE PYGMY DAMSELFLY *NEHALENNIA SPECIOSA* IS STILL PART OF THE ODONATE FAUNA OF ITALY (INSECTA, ODONATA, COENAGRIONIDAE)

Riassunto. *La damigella* Nehalennia speciosa *è tuttora parte dell'odonatofauna italiana. (Insecta, Odonata, Coenagrionidae).* Gli autori fanno una breve sintesi sulla presenza e distribuzione dell'odonato *Nehalennia speciosa* in Friuli, insieme ai risultati delle ricerche condotte nella regione Friuli-Venezia Giulia. La conferma delle stazioni friulane già note in passato e la sua scoperta in tre località inedite, testimoniano che la specie non è estinta sul territorio nazionale.

Summary. Authors make a short synthesis on the presence and distribution of the odonate *Nehalennia speciosa* in Friuli, along with the results of the researches conducted in the Friuli-Venezia Giulia region. The confirmation of the friulian presence, which was already known in the past, and its discovery in three unknown locations, testify that the species is still present in Italy.

Keywords: *Nehalennia speciosa*, distribution, Italy.

Introduction

Nehalennia speciosa (Charpentier, 1840) is a damselfly that in Europe during the last decades had a massive decline of its once widespread range. It was discovered in Italy in 1970 and was then recorded from a few sites: two in Lombardy (peat bogs at Iseo, BS: Balestrazzi & Bucciarelli, 1971, 1975; Lagozzetta di Besnate, VA: Ravizza, 1973) and two in Friuli (peat bogs in Moruzzo, UD: Pecile, 1981a, 1981b; peat bog in Cima Corso, UD: Pecile, 1991). Data were resumed by Utzeri & D'Antonio (2005). In Lombardy the species was observed till mid 1980s but is at the moment extinct because of alterations to its habitats (Balestrazzi, 1999), while in Friuli the available data show its presence at least until 1990 (Pecile, 1991). The absence of successive observations made presume that the species, following the more general tendency of all the range known in Western and Central Europe, was already extinct on a national extent (Sahlén et al., 2004; Wildermuth, 2004; Bernard & Wildermuth, 2005; Dijkstra & Lewington, 2006).

To verify the current existence of Italian populations, during 2007 and 2008 some specific researches were conducted in the friulian sites already signalled in due time by Ivo Pecile and in similar ecologically territorial context.

Materials and methods

In late spring and summer, in 2007 and 2008, 22 peat bogs, swamps and lakes potentially appropriate for the presence of *Nehalennia speciosa* were visited, including the two sites where the species had been recorded by Pecile (1981a, 1991) (tab. 1). The research was made respecting the current preservation laws on minor fauna, with observations on alive specimens only (temporarily captured by means of a net, taking care not to harm animals) and by checking specimens captured in spider webs. In fact, the pygmy damselfly *Nehalennia*

Site name	Surface	Height (m)	Municipality	Time of visits	Protection
Torbiera di Brazzacco	~ 2.5 ha	180	Moruzzo	10.V.07 10.VI - 4.VII.08	L. 42/96 b.6
Torbiera del Chialcinat	~ 2 ha	180	Moruzzo	09.V.07 10.VI - 4.VII.08	P.R.G.
Torbiera di Borgo Pegoraro	~ 30 ha	180	Moruzzo	20.V.08 10.VI - 4.VII.08	L. 42/96 b.19 sic.it3322029
Torbiera di Lazzacco	~ 1 ha.	180	Pagnacco	28.IV - 01.VII.07 02.VI - 10.VII.08 23.VII.08	L. 42/96 b.6
Prato torboso dei Quattroventi	~ 2 ha	180	Pagnacco	20.VI.08	P.R.G.
Torbiera di Modoletto	~ 2,2 ha	185	Pagnacco	21.VI.08 09.VII.08	P.R.G.
Torbiera del Rio Le Baranzone	~ 5,3 ha	165	Fagagna	25.V.08	L. 42/96 b.17 sic.it3320022
Sorgenti dello Scolo Pra Forano	~ 3,5 ha	180	Rive d'Arcano	25.V.08	L. 42/96 b. 9
Torbiera di Rivatte	~ 3,6 ha	155	Rive d'Arcano	25.V.08	P.R.G.
Sorgenti del Colle Val Doria	~ 1,8 ha	162	San Daniele del Friuli	25.V.08	P.R.G.
Torbiera di Case Cichinot	~ 15 ha	190	Cassacco	28.V.08	L. 42/96 b.24
Torbiera dei Casali Floreali	~ 2 ha	180	Buia	28.V.08	No
Palude di Fontana Abisso	~ 10 ha	160	Buia	28.V.08 22.VI.08	L. 42/96 b. 8 sic.it3320021
Palude di Andreuzza	~ 16 ha	160	Buia	28.V.08 22.VI.08	sic.it3320021
Palude di Casasola	~ 42 ha	160	Majano	28.V.08 22.VI.08	L. 42/96 b. 8 sic.it3320021
Palude Coccoli	~ 2 ha	180	San Daniele del Friuli	25.VI.08	P.R.G.
Lago di Ragogna	~ 44 ha	180	Ragogna/S. Daniele d. F.	25.VI.08	sic.it3320020
Lago Minisini	~ 1 ha	208	Gemona del Friuli	28.VI.08	P.R.G.
Palude di Cima Corso	~ 2,5 ha	839	Ampezzo	01.VII - 28.VII.07 13.VII - 18.VII.08	L. 42/96 b.3
Torbiera di Avasinis	~ 2 ha	185	Trasaghis	22.VI.08	P.R.G.
Palude di Vuarbis	~ 12 ha	270	Cavazzo Carnico	22.VI.08	P.R.G.
Palude Fontanaz	~ 2 ha	290	Cavazzo Carnico	22.VI.08	P.R.G.

Tab. 1. Details of visited sites (for details see MARINELLI, 1912; FIORENZA et al., 1997; MUSI, 2004).

speciosa (fig. 1) can be recognized at sight. It is small (actually, the smallest and most frail odonate in Europe, with length not exceeding 26 mm), with a gun-barrel grey dorsally colored head and with a light transversal postocular line. The forehead has a well-defined egde, fundamentally green-metal-blue colored. The general aspect, its minute size, the particular color of its pterostigma, the shape of the 10th abdominal sternite (S10), and the large and rounded male sexual appendage are the distinctive characters of the species, along with the extremely thin abdomen.

Fig. 1. Couple of *Nehalennia speciosa* in Lazzacco peat bog, Pagnacco (Udine). Photo by Tiziano Fiorenza.

Results

During the studies the presence of *Nehalennia speciosa* was found in the following sites:

Torbiera di Lazzacco (Lazzacco peat bog), m 180, Municipality of Pagnacco, Udine (46° 7' 51'' N - 13° 9' 52" E):
- ♂♂ e ♀♀ from 28.IV.2007 to 1.VII.2007.
- ♂♂e ♀♀ from 2.VI.2008 to 10.VII.2008.
The species was not observed in previously nor after the above-mentioned periods.

The Lazzacco peat bog (fig. 2) is a humid area of about one hectare size which originated from the partial filling of an ancient little intermorainal postwurmiam lake. The peat bog is situated in a hollow in the first ring of morainal hills. Since 1988 the lake has never dried itself up, not even during the driest years (personal observation). The humid area is constituted by a central area occupied by a stretch of water 150-200 cm deep, with a minimum height of 35 to 40 cm, with poor aquatic vegetation, even if *Utricularia vulgaris* and *Utricularia minor* are present. Around the pool cyperaceous grow luxuriant, in particular *Carex elata*, *Typha latifolia*, *Sparganium erectum*, *Epipactis palustris*, *Iris pseudacorus*, *Frangula alnus*, *Alnus glutinosa*, *Lythrum salicaria*, *Lysimachia vulgaris* may be found. By going away just some meters from the stretch of water, in particular on the western side, you can find a three meter deep firm and humid peat bog grass where *Schoenus nigricans*, *Eriophorum latifolium*, *Gentiana pneumonanthe*, *Parnassia palustris*, *Potentilla erecta*, *Rynchospora alba*, *Myosotis scorpioides*, *Mentha aquatica*, *Gladiolus palustris*, *Valeriana dioica* can be found, among other species. Around this site a nice, well-evoluted magredo (meager grass) stretches along with a hill wood. This humid area, along with the close-by Brazzacco peat bog, fall into regional biotope n.6 "Torbiera di Lazzacco" for about 15.2 hectares (D.P.G.R. n. 0214/Pres.

del 12.061998). On the whole the conservation status of this site is very good. The alterations found are due to episodic dangerous waste and to massive fish imputs (*Lepomis gibbousus*, *Scardinius erythrophthalmus*, *Carassius* sp., *Ameiurus* sp., *Micropterus salmoides*).

In this site the species seems to be sufficiently abundant, particularly in June, on the northern border of the stretch of water, while flying or lying among the *Carex* and *Frangula alnus* and *Alnus glutinosa* bushes.

Fig. 2. Lazzacco peat bog, Pagnacco (Udine). Photo by Tiziano Fiorenza.

Torbiera di Brazzacco (Brazzacco peat bog), 180 m, Municipality of Moruzzo, Udine (46° 7' 56"N – 13° 9' 37"E):
- 1 ♂ e 1 ♀ 10.V.2007.
No observations during 2008.

This peat bog (fig. 3), which stretches for about 2,5 ha, is situated less than 200 meters from the Lazzacco one and it is characterized by the presence of a wide Phragmitetum (*Phragmites australis*) and Cladietum (*Cladium mariscus*) with a significative presence of *Betula pubescens*.

It is the only strip of a peat bog which has remained after the wide Quattroventi drainage made in the years immediately after the second world war. The stretches of water have shrunk into small pools, sometimes colonized by vegetation, and are subject to drying up in dry spells in the years when precipitations are scarce. Around the pools you may easily find the fibrinous clover (*Menyanthes trifoliata*). Very few humid peat-bog meadows have survived, on which the *Primula farinosa* has bloomed, among the other species. In the northern part of the site, in correspondence to a morainal slope, some springs can be noted, where it is easy to find many *Schoenus nigricans* and *Pinguicula alpina*. The areas neighbouring this site are consti-

tuted by powerful hedges of *Quercus robur*, well developed meager grass and extensive farming.

The Brazzacco peat-bog, with the Lazzacco peat-bog, 15,2 ha, fall within the regional biotope n. 6, called "Torbiera di Lazzacco".

The hydraulic and drainage works made in the close area of Quattroventi seems to cause a progressive drying up of this site, where it is possible to observe a progressive colonization by bushes and briers. In the past, in the humid peat bog meadows, peat bog was taken away to be used as garden soil. In dry and cold winter months the grove of reeds is often put on fire.

Observations of *N. speciosa* in this location are only sporadic and it cannot be excluded that their presence is due to specimens coming from the very close Lazzacco peat bog.

Fig. 3. Brazzacco peat-bog, Moruzzo (Udine). Photo by Tiziano Fiorenza.

Torbiera del Chialcinat (Chialcinat peat bog), m 180, Municipality of Moruzzo, Udine (46° 8' 1"N – 13° 8' 28" E):
- 1 ♀ 09.V.2007.
- 3 ♂♂ and 1 ♀ from 10.VI.2008 to 4.VII.2008.

This peat bog (fig. 4) too has originated from the filling of an ancient lake basin after the post Wurmian regression. It stretches for more than 2 hectares and is situated slightly less than two km away from Lazzacco peat-bog. The presence of water, as in most of the Tilaventina morainal amphitheatre, is principally due to the streaming of rainwater and in small part to hydrologic manifestations characteristic of the morainal amphitheatre that origin from "leaks" in the Tagliamento basin (Mosetti, 1983). The principal stretch of water having disappeared, at present small pools completely surrounded by thick populations of *Carex* sp. pl. and *Sparganium erectum*, *Alnus glutinosa*, *Frangula alnus* remain. The Caricetum stretches considerably in the western part of this location, while in its inner part there are also are a Cladietum and in the southerner area a well-preserved hydrophilic wood where *Alnus glutinosa* prevails. There can be found a small strip of peat bog humid grass (put to farming in the '90s) where *Eriophorum latifolium*, *Schoenus nigricans*, *Epipactis palustris*, *Dactylorhiza incarnata*,

Parnassia palustris, *Potentilla erecta*, *Primula farinosa*, *Gentiana pneumonanthe*, *Mentha aquatica* still live. The spots neighboring this location are made up of wide farmings, strips of hill bushes and of Brometum.

At the moment the peat bog has been mapped as an area of botanical and naturalistic interest, but during the '90s the western part, constituted by a stretch of water about 0.5 ha big, was completely covered with dangerous waste, then reclaimed with earth and now used as farm land. What is at present menacing this location are mainly hydraulic drainage works and the farming of marginal parts of the biotope. In 2007 and 2008 *Nehalennia speciosa* was not abundant.

Fig. 4. Chialcinat peat bog, Moruzzo (Udine). Photo by Tiziano Fiorenza

Torbiera di Modoletto (Modoletto peat-bog), m 185, Pagnacco Municipality, Udine (46° 8' 4"N – 13° 10' 1"E):
- 1 ♂ 8.VII.2008

As in the previously indicated areas even this small humid spot (fig. 5) (about 2.2 ha) is the result of the filling of an ancient small postglacial lake. This site is located 500 meters from the Lazzacco peat-bog. The central zones are made of modest but deep permanent stretches of water. The most significative botanical species to be found in the pools are *Utricularia minor*, *Utricularia vulgaris* and *Potamogetom natans*. Around the pools many species of *Carex* sp. pl., *Alnus glutinosa* and *Frangula alnus* can be found. The extension of the peat-bog humid grass is considerable, as is the presence of relevant botanical species, especially the cyperaceous *Rhynchospora alba*. Other species to be cited are *Phragmites australis*, *Eriophorum*

latifolium, *Schoenus nigricans*, *Epipactis palustris*, *Iris pseudacorus*, *Dactylorhiza incarnata*, *Orchis palustris*, *Gladiolus palustris*, *Parnassia palustris*, *Potentilla erecta*, *Calluna vulgaris*, *Erica hederacea*, *Primula farinosa*, *Gentiana pneumonanthe*, *Gentiana asclepiadea*, *Mentha aquatica*, *Valeriana dioica.*

The peat-bog has been mapped as an area of botanical and naturalistic interest. What is at present threatening this location are hydraulic drainage works that during the last years has determined a progressive drying up of this site, and attempts to put to farming peripherical portions of the area. Strips of humid grass were put to farming in the '90s, then during the year 2008 this use was momentously suspended. The most southern part of the area, where a nice Caricetum grows, is vulnerable because of anthropic activities (drainages) and of the potential building expansion of the village of Modoletto. Recently, the presence of the fish *Lepomis gibbosus* was noticed.

In this location the presence of *Nehalennia speciosa* is to be considered sporadic.

Fig. 5. Modoletto peat bog, Pagnacco (Udine). Photo by Tiziano Fiorenza

Palude di Cima Corso (Cima Corso Swamp), m 839, Municipality of Ampezzo, Udine (46° 23' 44" N – 12° 44' 39" E):
- ♂♂ and ♀♀ 01.VII.2007 to 28.VII.2007.
- ♂♂ and ♀♀ 18.VII.2008.

The Cima Corso swamp (fig. 6) stretches on 2.5 ha and is one of the rare humid areas in the Carnic Prealps. Even this humid area is the result of the filling of an ancient postglacial lake by vegetation and debris deriving from water streaming. The present hydrographic grid is principally represented by the Teria stream that origins on the slopes north from the locality of Nemboluzza. It is a wonderful biotope extremely rich in rare botanical species. The central

part of this site is constituted by a perennial stretch of water, surrounded by a Caricetum and Phragmitetum. Well represented are also *Cladium mariscus, Carex acuta*, *Carex rostrata*, *Potentilla erecta*, *Trichophorum alpinum*. In the stretches of water even the carnivorous *Utricularia minor* can be found. The presence of *Menyanthes trifoliata* is abundant. In solid areas where the humid peat-bog grass prevails *Eriophorum latifolium*, *Schoenus nigricans*, *Epipactis palustris*, *Gladiolus palustris*, *Parnassia palustris*, *Calluna vulgaris*, *Primula farinosa*, *Pinguicula alpina*, *Gentiana pneumonanthe*, *Mentha aquatic*a live. Extremely valuable is the presence of *Sparganium minimum*, *Liparis loeselii*, *Carex diandra*, *Carex appropinquata*, *Dactylorhiza traunsteineri*, *Carex lasiocarpa*, *Thelypteris palustris* and the extraordinary carnivorous *Drosera rotundifolia.* The site is surrounded by wide mixed woods, where *Pinus sylvestris* seems to prevail.

Cima Corso swamp, already individuated as area deserving protection in the regional urban plan (Carbone, 1977; Piano Urbanistico Regionale, D.P.G.R. 826/78, Ambito di Tutela Ambientale B1 – Valle del Tagliamento e Palude di Cima Corso), also falls into the groups of regional biotopes n. 3 ("Palude di Cima Corso") for a total surface of 8,1 ha (D.P.G.R. n. 0212/Pres. Del 12.06.1998).

Fig. 6. Cima Corso swamp, Ampezzo (Udine). Photo by Tiziano Fiorenza.

Conclusions

The researches made in the years 2007 and 2008 demonstrate that the pygmy damselfly *Nehalennia speciosa* is still present in Friuli and it is not extinct in the national territory. Nevertheless, the only two populations that appear to be really vital are those of the Lazzacco peat bog, Pagnacco (UD) and that of Cima Corso swamp, Ampezzo (UD), the last one just reported by Pecile (1991). The presence of this species in Brazzacco (just reported by Pecile (1981a, 1981b), Modoletto and Chialcinat peat bogs is witnessed by sporadic observations

Fig. 7. Principal habitat of *Nehalennia speciosa*, Lazzacco peat bog, Pagnacco (UD). Photo by Tiziano Fiorenza.

and the actual existence of stable populations is still to be verified. In the case of Brazzacco and Modoletto peat bogs, which are located less than 500 meters from the Lazzacco one, the presence could be due to erratic individuals coming from that population, as well as for the Chialcinat peat bog, which is 2 km away.

From observations made, it appears that *N. speciosa* needs peat bogs in presence of a stretch of water and results absent or very rare in similar biotopes lacking stretches of water of considerable size. It flies and constantly lands on the principal water banks on *Carex* sp.pl. stalks but in particular *Carex elata* and among *Frangula alnus* and *Alnus glutinosa* bushes (fig. 7).

In the hill site of Lazzacco adult specimens can be observed prevalently in June, while in the alpine site Cima Corso the period of flight is postponed of about 10-15 days.

All sites frequented by the species fall into protected areas, regulated by specific regional laws or by municipal regulating plans. Nevertheless, because of the small extension and the intrinsic frailty of humid environment, many factors threat their conservation (drying up for drainage or groundwater fall, the impact due to farming in the surrounding areas with a consequent eutrophization, urbanization, water pollution, animal and vegetable exotic species input).

For the small amount of populations and the threat factors, *N. speciosa* is to be considered a species which is severely menaced with extinction nationwide and in the absence of a specific management plan correctly applied its survival is absolutely not to be taken for granted.

In particular the very good conservation status of the sites home of the two vital populations must be provided, as well as *ad hoc* interventions to create (or recreate) habitats that are suitable for this species in next future sites, to allow the establishing of vital populations thus reducing the risk of extinction in Italy.

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