

The backswimmer *Notonecta glauca* L. (Hemiptera, Notonectidae) in Central Norway

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In Central Norway, the backswimmer *Notonecta glauca* L., 1758 occurs on the northern margin of its distribution area. The species has recently dispersed northwards, both naturally along the west coast and inland from an introduced population in Trondheim. The history of *N. glauca* records in the Trondheim district is presented in detail, and new records from Central Norway and some habitat characteristics are given. In the next few decades, we expect the species to become more widely distributed and abundant in Central Norway and northwards.

Key words: Hemiptera, *Notonecta glauca*, distribution, Central Norway

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Introduction

Three species of backswimmer, *Notonecta glauca* L., 1758, *N. lutea* Müller, 1776 and *N. reuteri* Hungerford, 1928, have been recorded in Norway. *N. glauca* and *N. lutea* are present in Southern, Southeastern, Southwestern and Central Norway (Olsvik 1981, Dolmen 1996, Coulianos et al. 2008), and the latter also extends into the southern part of Northern Norway (Dolmen & Aagaard 1973). *N. glauca* usually occurs in lowland localities with rich aquatic vegetation, while *N. lutea* is mostly found in dystrophic ponds or lakelets with scarce aquatic vegetation, but also sometimes in eutrophic ponds and small lakes in agricultural land (Dolmen 1991, Coulianos et al. 2008). The third species, *N. reuteri*, has been recorded in a few eutrophic ponds and forest or

bog ponds or lakelets with little vegetation, apart from *Sphagnum* mosses, in the southeastern part of the country (Dolmen 1989a). *N. lutea* and *N. reuteri* have fairly similar life cycles and hibernate in the egg stage, whereas *N. glauca* hibernates in the imago stage.

The imago of *N. glauca* is easily distinguished from that of *N. lutea* by its black scutellum, while *N. lutea* has a light-coloured scutellum (Figure 1). *N. reuteri* also has a light scutellum, but is chiefly distinguished from *N. lutea* by the male copulatory organ or the last abdominal sternum of the female (Jansson 1996).

N. glauca in Central Norway

The first records of *N. glauca* in Central Norway,

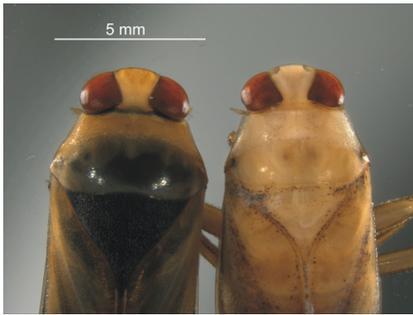


Figure 1. *Notonecta glauca* (left) and *N. lutea*. (Photo: G. Kjørstad)

which comprises the three counties of Møre & Romsdal, Sør-Trøndelag and Nord-Trøndelag, were in two small ponds in Kristiansund in the mid-1970s (Dolmen & Olsvik 1977). In 1984–86, it was found in high densities in four ponds in and near Trondheim, one at the Ringve Botanical Gardens, a nearby pond called Madsjø, and two neighbouring ponds at Udduvoll (Dolmen 1989b, Figure 2). The Ringve pond was dug out in 1976 and various plants were later introduced into it from, for instance, Bergen, Oslo and Central

Europe. Since *N. glauca* is known to lay its eggs in plant tissue (e.g. Svensson et al. 2000), it was assumed that it was introduced to the Trondheim area with imported plants (Dolmen 1989b). Once it had become established in the pond at the Botanical Gardens, it could easily disperse to other suitable localities in the vicinity. Madsjø and the Udduvoll ponds were later drained or filled in, and at the end of the 1980s the Botanical Gardens pond was the only known *N. glauca* locality in the Trondheim district (Dolmen 1989b). However, in 1993, nymphs and many imagines were recorded in Lake Kyvatnet in Trondheim (Dolmen 1995), approximately 7 km from the Botanical Gardens pond.

In 1988, 2005 and 2007–08, the species was recorded at some localities in the municipality of Aure, not far from Kristiansund (where it was recorded earlier), in 2004 on the island of Frøya, and in 2007–08 in several new localities in various parts of Central Norway. Figure 2 illustrates the known history of records of *N. glauca* in the

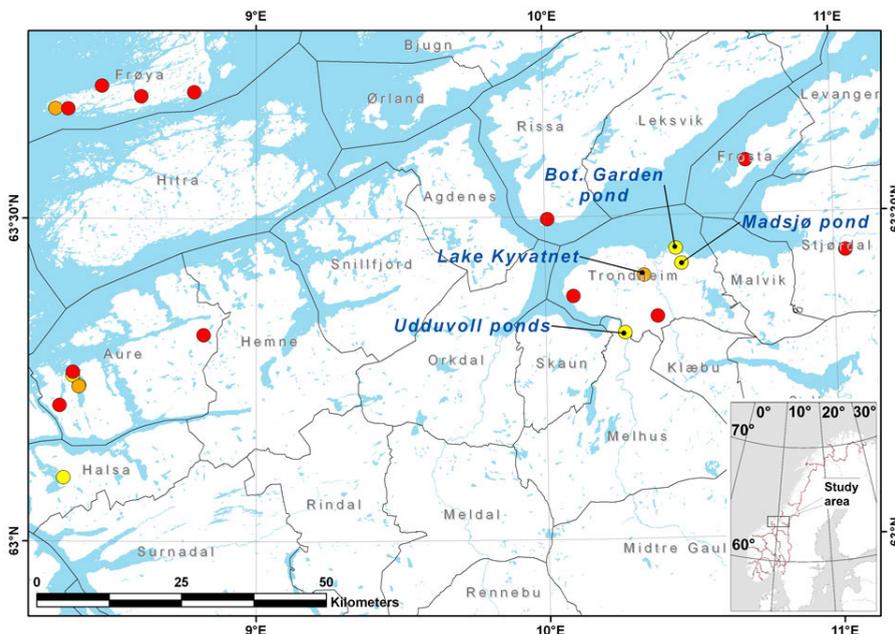


Figure 2. Localities of *Notonecta glauca* with colour codes indicating the first year of registration. Yellow dots = 1984–1989, orange dots = 1993–2005 and red dots = 2007–2008. The map shows the municipalities and their boundaries.

Trøndelag counties and in Aure and Halså in Møre & Romsdal.

In the 1980s, when *N. glauca* was first recorded in the Trondheim district, the pond fauna of the area was already fairly well known, and the species was without doubt correctly appraised as new to the area (Dolmen 1989b). Since several hundred lowland ponds and lakes in this region have been investigated for invertebrates in recent years (e.g. Dolmen & Aagaard 2003, Dolmen et al. 2005, Aagaard & Dolmen 2006, Kjærstad 2006, Dolmen 2008), we are certain that *N. glauca*, unlike *N. lutea*, is rare in the Trøndelag counties. Since its (probable) introduction to Trondheim more than 20 years ago, *N. glauca* seems for some unknown reason to have been unable to disperse outside the Trondheim district. However, in 2008, several specimens were found in three ponds outside Trondheim, in the municipalities of Stjørdal, Frosta and Rissa (Kjærstad 2008), as well as in some new localities in two parts of Trondheim (Tilseth 2008). Adult backswimmers are strong fliers (Briers & Warren 1999), and *N. glauca* could easily disperse from Trondheim across the fjord to the new localities at Frosta and Rissa, and eastwards to Stjørdal, approximately 20, 25 and 30 km away, respectively.

The species also seems to have been expanding its natural distribution area in the county of Møre & Romsdal, and further northwards from there along the coast to the island of Frøya. Earlier surveys of ponds and lakes on Frøya (e.g. Grendstad et al. 2000) failed to reveal *N. glauca*, thus suggesting that its presence on the island is relatively new.

Habitat of *N. glauca*

N. glauca occurs here in dystrophic, mesotrophic and eutrophic lakelets and ponds from sea level up to 200 m (Table 1). The term “pond” is used for localities with a surface area up to about 2500 m² and a “lakelet” is usually slightly larger. The species has also been recorded in farm ponds, moorland ponds, garden ponds, woodland ponds and one slowly-flowing stream. *N. glauca* may also be present in small, shallow eutrophic ponds



Figure 3. Habitat of *Notonecta glauca* (Pond 1), Tiller, Trondheim. (Photo: E. Tilseth)



Figure 4. Habitat of *Notonecta glauca*, Rissa. (Photo: G. Kjærstad)

close to the sea and fertilized by seaweed and frequently visiting seagulls. Figures 3–5 show different types of locality for *N. glauca*. These habitats strongly resemble those described by Coulianos et al. (2008), who say that *N. glauca*



Figure 5. Habitat of *Notonecta glauca*, Skipheia, Frøya. (Photo: Hans A. Olsvik)

prefers lowland localities up to 100 m above sea level with rich aquatic vegetation, sediments of dy/gyttja or clay/gyttja, a high water temperature, high concentrations of calcium and magnesium, and a high water colour. It avoids sites with poor aquatic vegetation and stony shores, and is significantly absent from localities with low water temperatures, low concentrations of calcium, a low pH and which are higher than 200 m.

The Atlantic climate on the Norwegian west coast, with relatively high and even precipitation

Table 1. New localities for *Notonecta glauca* in Central Norway. Region refers to “Strand-region” in accordance with Økland (1981). ET = Eva Tilseth, GK = Gaute Kjærstad and HAO = Hans A. Olsvik. DL = dystrophic lakelet, DP = dystrophic pond, L = lakelet (mesotrophic or eutrophic), P = pond (mesotrophic or eutrophic) and S = slowly-flowing stream.

Locality	Region	Municipality	EIS	UTM 32V	Datum	Date of collection	Leg./Det.	Alt. (m)	Loc. type
Littlebullvatn, Ertvågøya	MRY	Aure	90	MR 679 139	ed50	16 July 1988	HAO	67	DL
Vollavatn, Ertvågøya	MRY	Aure	90	MR 684 145	ed50	28 July 1988	HAO	23	L
Olsvika, Ertvågøya	MRY	Aure	90	MR 694 126	ed50	3-4. February 2005	HAO	<10	P
Svarttjønna, Lia, Ertvågøya	MRY	Aure	90	MR 661 095	ed50	26 April 2007	HAO	75	DL
Pond near Ordvassbekken	MRY	Aure	90	MR 909 213	wgs84	12 May 2008	HAO	195	P
Outlet stream, Grimsvikvatn	MRY	Aure	90	MR 685 152	ed50	3 May 2008	HAO	22	S
Lakelet on Langøya	MRY	Averøy	84	MQ 234 936	ed50	30 September 1991	HAO	25	DL
Rishaugvatn	MRY	Averøy	84	MQ 307 982	ed50	26 May 1998	HAO	26	L
Lakelet SE of Sveggen	MRY	Averøy	84	MQ 299-300	952 ed50	26 May 1998	HAO	15	L
Lakelet near Sandvik	MRY	Fræna	84	MQ 073 859	ed50	28 May 1998	HAO	15	L
Pond at Maleremmen	MRY	Fræna	84	MQ 017 829	ed50	5 November 2005	HAO	15	P
Lakelet at Áfarli	MRY	Halsa	85	MQ 667 970	ed50	2 September 1989	HAO	30	DL
Lille Rensvikvatnet	MRY	Kristiansund	84	MQ 410 968	wgs84	8 August 1977	HAO	27	L
Lille-Kari, Kariholta	MRY	Kristiansund	90	MR 347 008	ed50	1 October 1991	HAO	3	L
Bog pond near Orevollhaugen	MRY	Sandøy	83	LQ 708 597	ed50	30 July 2005	HAO	15	DP
Pond on Flatøya, Veidholmveien	MRY	Smøla	90	MR 500 397	ed50	18 May 2008	HAO	10	P
Bog pond W of Vollavatn	MRY	Tingvoll	85	MQ 549 886	ed50	21 September 1999	HAO	110	DP
Ratvikvatn	MRY	Ålesund	76	LQ 592 293	ed50	8 July 1992	HAO	15	L
Pond near Titran	STY	Frøya	95	MR 653 604	ed50	3 October 2004	HAO	1	P
Lakelet near Skipheia	STY	Frøya	95	MR 676 604	ed50	6 October 2007	HAO	15	DL
Ponds near Kvisten	STY	Frøya	95	MR 734 643	ed50	6 October 2007	HAO	<10	DP
Lakelet near Engdal	STY	Frøya	95	MR 803 627	ed50	6 October 2007	HAO	20	L
Svarttjønna	STY	Frøya	95	MR 894 634	ed50	6 October 2007	HAO	30	L
Prestgårdsdammen	STY	Rissa	92	NR 503 413	wgs84	3 September 2008	GK	10	P
Tiller, loc. 25	STI	Trondheim	92	NR 694 246	wgs84	27 July 2008	ET	160	P
Tiller, pond 1	STI	Trondheim	92	NR 697 246	wgs84	1 August 2008	ET	120	P
Tiller, pond 2	STI	Trondheim	92	NR 697 245	wgs84	1 August 2008	ET	120	P
Hangerås vestre	STI	Trondheim	92	NR 548 280	wgs84	20 August 2008	ET	160	P
Hogstaddammen	NTI	Frosta	97	NR 845 516	wgs84	2 September 2008	GK	105	P
Bergsmodammen	NTI	Stjørdal	93	PR 181 362	wgs84	1 September 2008	GK	115	P

throughout the year, makes desiccation of ponds a rare problem, and the size of the locality therefore seems not to be a limiting factor for the species. Consequently, *N. glauca* is often recorded in small coastal ponds with rich, submersed vegetation. Due to generally relatively high winter temperatures, ice thickness and bottom freezing do not pose problems that can affect the survival of hibernating individuals. These factors are probably very important for the survival of the species in small localities and also control its

distribution northwards.

Both *N. glauca* and *N. lutea* are present in Central Norway, but at least in Møre & Romsdal, the latter seems much less common than *N. glauca* in coastal lowland areas. However, *N. lutea* is the dominant backswimmer species further inland. Where the two species coexist, *N. lutea* is found in open areas, whereas *N. glauca* is found in its highest densities in the most vegetated parts of the locality. This is also true in all the localities where

N. glauca is the sole backswimmer species.

Zoogeographical remarks

As mentioned above, *N. glauca* is found in a great variety of habitats, but seems to prefer lowland localities with a relatively high water temperature. Jastrey (1981) did not find the species in mountain districts which he visited in Norway. In Sweden, its northern limit is at Umeå and Bjuröklubb (C.-C. Coulianos, pers. comm.), which is at approximately the same latitude as Central Norway. Temperature may thus have been the key limiting factor preventing the species from extending its range beyond the Trondheim area over the last 25 years. On the other hand, it has recently dispersed naturally northwards along the west coast of Norway, and is now moving northwards further inland, probably from an origin in the introduced population in Trondheim. This “sudden” expansion may, at least in part, be a result of better climatic conditions in recent years. Distribution areas are very dynamic, i.e. when a distribution barrier (time, climate, habitat, etc.) is broken down, a species will start expanding its range. A further increase in temperature due to global warming, will probably result in a further expansion to higher altitudes and latitudes. Accordingly, we believe that the species has the potential, in the near future, to disperse further north in lowland areas, even into Northern Norway. A similar expansion has been observed in the last 40 years in the dragonfly *Lestes sponsa* Hansemann, 1823 in Central Norway. From being a very rare species in this part of the country in the 1960s and 1970s (see Aagaard & Dolmen 1971), it has now (2008) become quite common in eutrophic and more dystrophic ponds and lakelets in both the Trøndelag counties (Dag Dolmen, unpubl.).

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