

Two land snail species new to Finland: *Macrogastra borealis* (O. Boettger, 1878) and *Quickella arenaria* (Potiez & Michaud, 1835) (Mollusca: Gastropoda)

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Records are presented of two land snail species which were not earlier known from Finland. *Macrogastra borealis* (O. Boettger, 1878) (Clausiliidae) was found already in the year 2006 from a nature reserve in Urjala, southwestern Finland (WGS84 lat: 60.9924 lon: 23.4476), but at first the species was misidentified. Totally 14 specimens were collected. The habitat is old mixed forest on dolomitic bedrock. The nearest records of *Macrogastra borealis* are from Estonia, 300 km southeast to Urjala. *Quickella arenaria* (Potiez & Michaud, 1835) (Succineidae) was found in the year 2013 from Oulanka National Park in Kuusamo, northeastern Finland (WGS84 lat: 66.3574 lon: 29.5998). Totally 19 specimens were collected from wet vegetation along a calcareous spring brook. The nearest records of *Quickella arenaria* have been made in northern Sweden, more than 600 km southwest to Kuusamo. Data about accompanying molluscs are given for both of the two new species. It is suggested that the present remote sites of *Macrogastra borealis*, *Quickella arenaria* and some other snail species are perhaps relics from wider ranges in earlier more favourable climatic periods.

Macrogastra borealis (O. Boettger, 1878)

I made a short inventory of land snails 21.7.2006 in Kivijärvi nature reserve (Finnish reserve code YSA040436, Natura 2000 area code FI0348002) in Urjala, southwestern Finland. From two sample sites, 50m from each other, I found 7 adult and 7 juvenile specimens of the door snails, which I then determined as *Macrogastra plicatula*. Several years later I checked them again and identified them as *Macrogastra borealis* (also the name *Macrogastra/Iphigena/Clausilia latestriata* (Schmidt, 1856) has been used for the species). The species has earlier been recorded nei-

ther from Finland nor from Sweden. In order to confirm the identification, I compared my shells to *M. borealis* shells collected from Estonia, Latvia and Carpathian area (Ormio 2015a).

The range of *M. borealis* is central and eastern European. It has been found among others in Baltic countries, Russia, Poland and Carpathian countries, but not in Scandinavian countries or Germany (Welter-Schultes 2012). In Estonia and Latvia it is rare (Kiristaja et al 2014, Rudzīte et al 2010). In the latest Red List of Estonian species *M. borealis* is classified as Data Deficient (DD) (Eesti Teaduste Akadeemia Looduskaitse Komisjon 2008). The records nearest to Urjala have been made in the eastern coast of Estonia, 300

km southeast to Urjala. However, Koivunen et al (2014) assumed that *M. borealis* might be found also in Finland.

In Urjala *M. borealis* was living on a low forested hill called Kalkkimäki ("Lime Hill"). On the hill there are some small historical limestone quarries and remnants of lime kilns. Between the years 1737–1849 about 30 tons of dolomite were quarried (Geologian tutkimuskeskus 2003). The dominant tree is big *Populus tremula*; other trees are *Tilia cordata* and *Picea abies*. Among bushes *Lonicera xylosteum* dominates; in addition *Ribes nigrum* and *Rubus idaeus* are present. In field layer the most abundant vascular plants are *Pulmonaria obscura*, *Oxalis acetosella*, *Actaea spicata*, *Hepatica nobilis*, *Rubus saxatilis*, *Viola mirabilis*, *Stachys sylvatica* and *Valeriana sambucifolia*. The amount of mosses is small. One of the two litter samples (6–06) was taken from the edge of a low limestone pit which is seasonally full of water. Its WGS84-coordinates are lat: 60.9924 lon: 23.4476. The other sample (7–06) was taken 50m southeast to it, from the shelves and foot of a 4 metres high, eroding quarry cliff.

Quickella arenaria (Potiez & Michaud, 1835)

In 2010 and 2013 I collected mollusc samples from calcareous fens and springs in Oulanka National Park, Kuusamo. When sieving wet mosses 18.7.2013 along a calcareous spring brook in Korvasvaara area (WGS84 lat: 66.3574 lon: 29.5998), I found 19 specimens of the Sandbowl snail *Quickella arenaria* in one 0.25 m² sample. Also the name *Catinella arenaria* (Bouchard-Chantreaux 1837) is used for the species. The height of the biggest shells was 5.5 mm, and the shells were camouflaged with mud particles. In the years 2010 and 2013 I took mollusc samples altogether in 17 calcareous fen and spring sites in Oulanka National Park, but I found *Q. arenaria* only in one site.

The range of *Quickella arenaria* is western European but very scattered. In the calcareous fens of Swedish Gotland and Öland it is a characteristic species (von Proschwitz 2010), but elsewhere it is very rare. It is included in Red Lists in most countries where it is found. In the coastal areas of

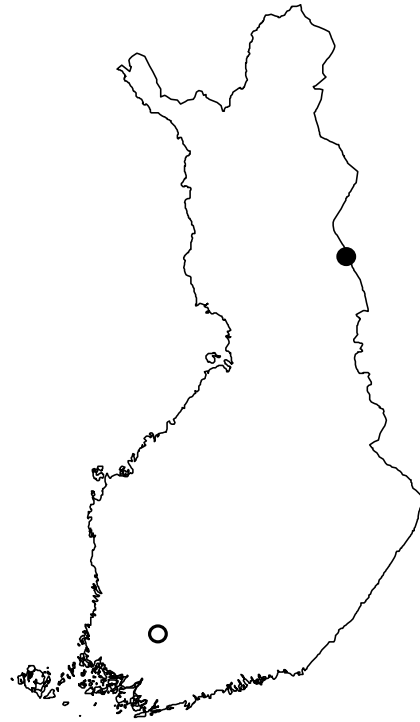


Fig. 1. Localities of the new snail species in Finland. Open circle: *Macrogaster borealis*. Closed circle: *Quickella arenaria*.

the North Sea it lives in damp hollows between sand dunes, in Ireland also in flooded and grazed lake shore meadows (Byrne et al 2009, Joint Nature Conservation Committee 2010). In continental area there are some records of *Q. arenaria* in Swiss Alps and in the calcareous spring fens of northern Sweden. In Norway there are just few very old records, and the species is there classified as vulnerable (Norges Rødliste 2010). In Estonia it does not exist, and in Germany it is 2012 classified as regionally extinct (Wiese 2014). The records nearest to Kuusamo have been made in Lycksele Lappmark, Sweden, 600 km southwest to Kuusamo (von Proschwitz 2006).

In Kuusamo *Quickella arenaria* lives along a brook coming from a calcareous spring. The vegetation consists mainly of wet *Drepanocladus revolvens* moss and *Saxifraga aizoides*. Among other vascular plants are *Eriophorum latifolium*, *Carex flava*, *Salix myrsinites*, *Potentilla erecta* and *Selaginella selaginoides*.



Fig. 2. *Macrogastra borealis* (right) compared to *Macrogastra plicatula* (left). The shell colour of *M. borealis* is paler brown; the ribs are sharper, and the space between the ribs is broader. In the shell aperture of *M. borealis* a palatal fold is clearly visible. Photo Pekka Malinen.



Fig. 3. Shell of *Quickella arenaria*. The shell has been camouflaged with mud particles. Photo Pekka Malinen (published earlier in Koivunen et al 2014).

Discussion

Several narrow-niche snail species have in Finland curious remote sites of occurrence, far from their main ranges. Besides the two for Finland new species *Macrogastra borealis* and *Quickella arenaria* now introduced, this concerns also the door snails *Macrogastra ventricosa* (Koivunen et al 2012), *Cochlodina orthostoma* (Routio 2007), *Clausilia dubia* and *Bulgarica cana* (Koivunen et al 2012, Koivunen et al 2014). Also the helioid *Arianta arbustorum* has this type of distribution. *A. arbustorum* is nowadays quickly spreading in southern cultural habitats, but it has also old, completely natural sites of occurrence in some calcareous hill forests in northern Finland, for instance in the strict nature reserves Pisavaara

Table 1. Snail species accompanying *Macrogastra borealis* in Urjala. The samples 6-06 and 7-06A were sifted from the litter in laboratory, and the sample 7-06B was searched manually on the site (Ormio 2015b). The figures are numbers of individual shells in the sample.

	Litter 6-06	Litter 7-06A	Search 7-06B
<i>Carychium minimum</i>	-	10	-
<i>Carychium tridentatum</i>	374	104	-
<i>Cochlicopa lubrica</i>	104	156	3
<i>Cochlicopa lubricella</i>	60	64	2
<i>Cochlicopa sp. juv.</i>	680	260	-
<i>Columella edentula</i>	73	34	-
<i>Discus ruderatus</i>	164	174	5
<i>Euconulus fulvus</i>	33	126*	3
<i>Euconulus praticola</i>	13	*	-
<i>Euconulus sp. juv.</i>	76	*	-
<i>Fruticola fruticum</i>	5	5	1
<i>Macrogastra borealis</i>	6	7	1
<i>Nesovitrea hammonis</i>	42	43	-
<i>Nesovitrea petronella</i>	95	32	1
<i>Nesovitrea sp. juv.</i>	41	63	-
<i>Punctum pygmaeum</i>	450	83	-
<i>Vallonia costata</i>	1334	605	8
<i>Vitrina pellucida</i>	1	19	-
<i>Galba truncatula**</i>	1**	-	-
Specimens total	3552	1785	
Litres of litter (8 mm sieve)	4.6	5.2	

* *Euconulus fulvus* and *E. praticola* were not separated.
** Aquatic snail

in Tervola and Malla in Enontekiö (Luther 1901, Koli 1955, Ormio 2015b). All of these remote sites of occurrence are natural habitats, some of them even wilderness. So it is difficult to believe anthropogenic origin for these snail sites. Keeping in mind the limited moving ability of snails, the importance of lime to them, and the general lack of lime in the Finnish soil, it is easy to assume that these sites of occurrence are relics of ancient wider ranges of the species, from climatically easier post-glacial periods. The snails survive in the last suitable sites, where life still continues thanks to exceptionally rich lime content in the soil, favourable wintering and snow conditions, or long-term stabile microclimate in their

Table 2. Snail species accompanying *Quickella arenaria* in Kuusamo. The 0.25 m² sample 41-13 consists of 4 subsamples (25 x 25 cm) of wet *Drepanocladus revolvens* and *Saxifraga aizoides* vegetation along the spring brook. The sample was sieved with 8 mm sieve. The figures are numbers of individual shells in the sample (Ormio 2015b). *Vertigo genesii* is classified as endangered (EN) in the Finnish 2010 Red List.

	Moss 41-13
<i>Cochlicopa lubrica</i>	9
<i>Euconulus praticola</i>	8
<i>Nesovitrea hammonis</i>	4
<i>Nesovitrea petronella</i>	6
<i>Punctum pygmaeum</i>	4
<i>Quickella arenaria</i>	19
<i>Vertigo genesii</i>	67
<i>Vertigo substriata</i>	1
<i>Galba truncatula*</i>	62*
Specimens total	180
Density, specimens/m²	720

* Aquatic snail

home habitat. For instance, the post-glacial range of *Quickella arenaria* has been far wider in Europe than the present range (AnimalBase 2015). Due to the acidity of Finnish soil the snail shells are not preserved, thus there are no subfossil evidence of them.

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