

Three land-snail species new to the Norwegian fauna: *Pupilla pratensis* (Clessin, 1871), *Vertigo ultimathule* von Proschwitz, 2007 and *Balea sarsii* Philippi, 1847 [= *B. heydeni* von Maltzan, 1881]

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Three land-snail species are reported as new to Norway: *Pupilla pratensis*, which has been segregated from *P. muscorum* s. lat., occurs in three isolated, calcareous wetland sites in the counties of Hedmark and Oppland and two calcareous rock habitats in Nordland County; *Vertigo ultimathule*, recently described from the northernmost part of Swedish Lapland, has been found in seven localities in the adjacent Norwegian county of Finnmark – the species is probably endemic to northernmost Scandinavia; finally *Balea sarsii* [= *B. heydeni*], a pronounced Atlantic element, which has been segregated from *B. perversa* s. lat., is found in five sites in Hordaland County and one in Sogn og Fjordane County – the locality at Florø in the latter province is the northernmost known for the species.

Key words: Norway, new records, Gastropoda, *Pupilla pratensis*, *Vertigo ultimathule*, *Balea sarsii*.

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INTRODUCTION

The Norwegian land-snail fauna must be considered as very well known. The ground was set by the classical paper by Økland (1925). Since then, the extensive investigations by H. W. Waldén 1966–1991 have given detailed information on the species' distribution (Waldén 1995a), although distribution maps have not been published for all species. A modern Check-List for Norway, with updated nomenclature according to the CLECOM-project (Check-List of European COntinental Mollusca) (see Falkner et al. 2001) was published by Olsen (2002) and comprises 96 species. A further species is added by Bevanger (2005), giving the total number 97.

New species are added to a national checklist in three ways. Beside the ongoing dispersal of species by the help of man – at least two of the new species presented by Olsen (2002: 71–73)

as new to Norway are anthropochorous – new species can also be found in the indigenous fauna as: 1) Undetected/undescribed species and 2) Species 'hiding' in other species (species complexes/sibling species). The species presented here are examples of the two latter ones.

MATERIAL AND METHODS

All Norwegian material of the species groups treated, present in the collections of the natural history museums in Göteborg and Stockholm (Sweden) as well as parts of the material in Oslo and Bergen (Norway), has been revised.

Abbreviations used in the locality lists: GNM = Göteborg Natural History Museum; RM = Swedish Museum of Natural



Figure 1. *Pupilla pratensis* (Clessin, 1871) Sweden, Östergötland, Ombergsliden. Photo: C. Schander, Bergen. Scale bar 1 mm.



Figure 2. *Pupilla muscorum* (Linnaeus, 1758) Sweden, Västergötland, Borgunda church. Photo: C. Schander, Bergen. Scale bar 1 mm.



Figure 3. The distribution in Norway of *Pupilla pratensis* (■); *Vertigo ultimathule* (●), the locus typicus in Sweden is marked with a larger dot, and *Balea sarsii* (▲). Map Göteborg Natural History Museum.

History (Riksmuseet), Stockholm; NHMO = Natural History Museum, University of Oslo; BM = Bergen Museum, University of Bergen.

RESULTS

Pupilla pratensis (Clessin, 1871) (Figure 1)

Introductory remarks: The taxon *P. pratensis* has long been neglected in the malacological literature, or considered a morphologically weakly defined ecophenotype – found in wet, calcareous habitats – of the variable *Pupilla muscorum* (Linnaeus, 1758). The form, however, represents a distinct species, which has recently been shown in a study combining morphological, ecological and molecular data (von Proschwitz et al. 2007; 2009).

Diagnostic features: The shell of *P. pratensis* (Figure 1) is larger – especially in diameter (1.86–2.06 mm), but often also in height (3.48–4.54 mm) – and the number of whorls (6.0–7.5) is usually greater compared to that of *P. muscorum* (Figure 2). The form is cylindrical in both species, but in *P. muscorum* the last whorls converge rather smoothly towards the apex; in *P. pratensis* the convergence is somewhat more abrupt, giving the apex a blunt appearance. The whorls are usually more vaulted in *P. pratensis*, and the suture is somewhat deeper. The colour of the shell varies from brown to brown-grey in both species, but *P. pratensis* is often more of a darkish chestnut brown. In *P. muscorum* the colour is more variable, ranging from reddish brown to horny grey. The shell surface is nearly smooth in both species. It appears thinner in *P. pratensis*, in which it is sometimes slightly translucent. The growth-lines are very fine in *P. muscorum* and somewhat coarser in *P. pratensis*. The apertural lip is often rather weakly developed in *P. pratensis* in contrast to *P. muscorum*, in which it is thicker and more pronounced. The apertural teeth are more weakly developed in *P. pratensis*, and always arise directly from the apertural walls, never from a callus (as is sometimes the case in *P. muscorum*). A weakly developed parietal tooth is rather frequently present, often together with a very weak, simply indicated palatal, but the mouth is often completely toothless (at least in Scandinavian material). For the variation in both species: see Figs 1A–H in von Proschwitz et al. 2009: 316). It should be remarked, that in some samples from western and northern Norway some specimens of *P. muscorum* seem to be larger than in Swedish and German populations, and hence in size close to *P. pratensis* – this requires further studies.

Norwegian localities: Hedmark County, Trysil municipality, Jordet, closely NW of the Smeiflobrua. Calcareous springs at brook course in E-slope. H. W. Waldén 1970-IX-5. (24 specimens GNM); Hedmark County, Alvdal municipality, S

of Lomsjøvala, at Ormbole. Wet S-slope with springs. H. W. Waldén 1967-VI-7. (5 specimens GNM); Oppland County, Gran municipality, at the W bay of Skirstadtjern. Calcareous fen. H. W. Waldén 1973-IX-17. (138 specimens GNM, ZMO); Nordland County, Brønnøy municipality, closely N of Brønnøysund, at Trålvika. Meadow vegetation on calcareous rocks. H. W. Waldén 1971-VIII-17. (65 specimens GNM); Nordland County, Vevelstad municipality, Forvik, above the ferry berth. Mossy, calcareous W slope. H. W. Waldén 1971-VIII-17 (16 specimens GNM). Totally 248 specimens.

Distribution: Due to the fact that *P. pratensis* having been overlooked, its distribution is only fragmentarily known. A wide, but scattered distribution, mainly in calcareous areas in Central, Northern and Western Europe is to be expected. So far, scattered localities are, however, known from Germany, Poland and the Czech Republic. Recently it has also been shown to occur in a site in Ireland. It has also been identified in material from Denmark. In Sweden it is locally not uncommon in suitable habitats in calcareous districts throughout the country, from Skåne in the south to Lapland in the north. In Norway *P. pratensis* has been found in three isolated sites in the SE part of the country (Hedmark and Oppland counties) and two somewhat more to the north, in Nordland County (Figure 3).

Ecology: *P. pratensis* is a pronounced hygrophilous species, inhabiting open, richer, often calcareous moist and wetland habitats. The character of the sites in SE Norway (calcareous fen, sloping wetlands with springs) is in good accordance with this and with the habitats of *P. pratensis* in Sweden; where it occurs as a typical species of open calcareous fens or wet, moist calcareous meadows (cf. details in von Proschwitz et al. 2009: 319). In Nordland County the habitats are of a different type, calcareous, rocky slopes close to the sea. Probably the wet climate in the western, coastal Norway makes it possible for the species to widen its ecological occurrence.

Vertigo ultimathule von Proschwitz, 2007 (Figure 4)

Introductory remarks: *Vertigo ultimathule* has recently been described on material from the Pältsan-area in the northernmost corner of Swedish Lapland (von Proschwitz 2007; 2008), where it occurs in two localities. Among material sent back to the Göteborg museum after the death of H. W. Waldén in 2008, samples of a *Vertigo*-species, some labelled '*V. finnmarkense* n. sp.' and some '*V. finnmarkiana* n. sp.', from localities in the province of Finnmark, northernmost Norway were found. An examination showed that the specimens were identical with *V. ultimathule*. Remarks on this new species (as *Vertigo* n. sp.) are made in publications by Waldén (1995a: 115, 1995b: 58) and Olsen (2002: 70), but as no description was published '*V. finnmarkense*' and '*V. finnmarkiana*' are nomenclatorically

invalid manuscript names.

Diagnostic features: *Vertigo ultimathule* is a medium sized *Vertigo*, which reaches a height of 2.1–2.2 mm and a diameter of 1.3–1.4 mm, the number of whorls is 4.6–4.7 (Figure 4). The shell is almost cylindrical, with marked convex whorls, which are separated by a marked, deep suture. The shape is not distinctly ovoid, as in some other *Vertigo*-species, and the last whorl does not narrow markedly at the base. In side view from left the outer margin of the last whorl forms a blunt angle close to the umbilicus. The aperture is completely toothless or with only a small, delicate, rather deeply set parietal denticle. The mouth-edge is simple and scarcely thickened. The colour of the shell is light yellow – dark yellow-brown. The surface is glossy, with marked, but irregular, rather coarse striation. In size the shell resembles *Vertigo ronneybyensis* (Westerlund, 1871), but differs from this species in the weaker dentition of the aperture (3–4 denticles in *V. ronneybyensis*), the deeper suture and the yellow, glossy surface (darker brown and not so glossy in *V. ronneybyensis*). Also the shell sculpture is different, in *V. ronneybyensis* it is finer and more regular, and the relationship

between the two species concerning this character somewhat resembles that between *Columella aspera* Waldén, 1966 and *Columella edentula* (Draparnaud, 1805) (see von Proschwitz 2007).

Norwegian localities: Finnmark County, Karasjok municipality, 700 m S of Marevaeddi. H. W. Waldén 1991-VII-29 (2 specimens GNM); Finnmark County, Karasjok municipality, 4 km NNW of Gaevnoivi. H. W. Waldén 1991-VII-29 (5 specimens GNM); Finnmark County, Karasjok municipality, 1.9 km N of Ruovtut. H. W. Waldén 1991- VII-29 (2 specimens GNM); Finnmark County, Karasjok municipality, 2.2 km SSW of the bridge at Karigasniemi. H. W. Waldén 1991-VII-29 (2 specimens GNM); Finnmark County, Karasjok municipality, 6,5 km WSW of Cuvesnjarga. H. W. Waldén 1991-VII-29 (2 specimens GNM); Finnmark County, Karasjok municipality, Guovzaskaidi, 400 m S of p. 282. H. W. Waldén 1991-07-30 (5 specimens GNM); Finnmark county, Karasjok municipality, ENE slope of Basecåkka, 3.6 km SSW of the church at Valljåkka. H. W. Waldén 1991-VII-30 (14 specimens GNM). Totally 32 specimens.

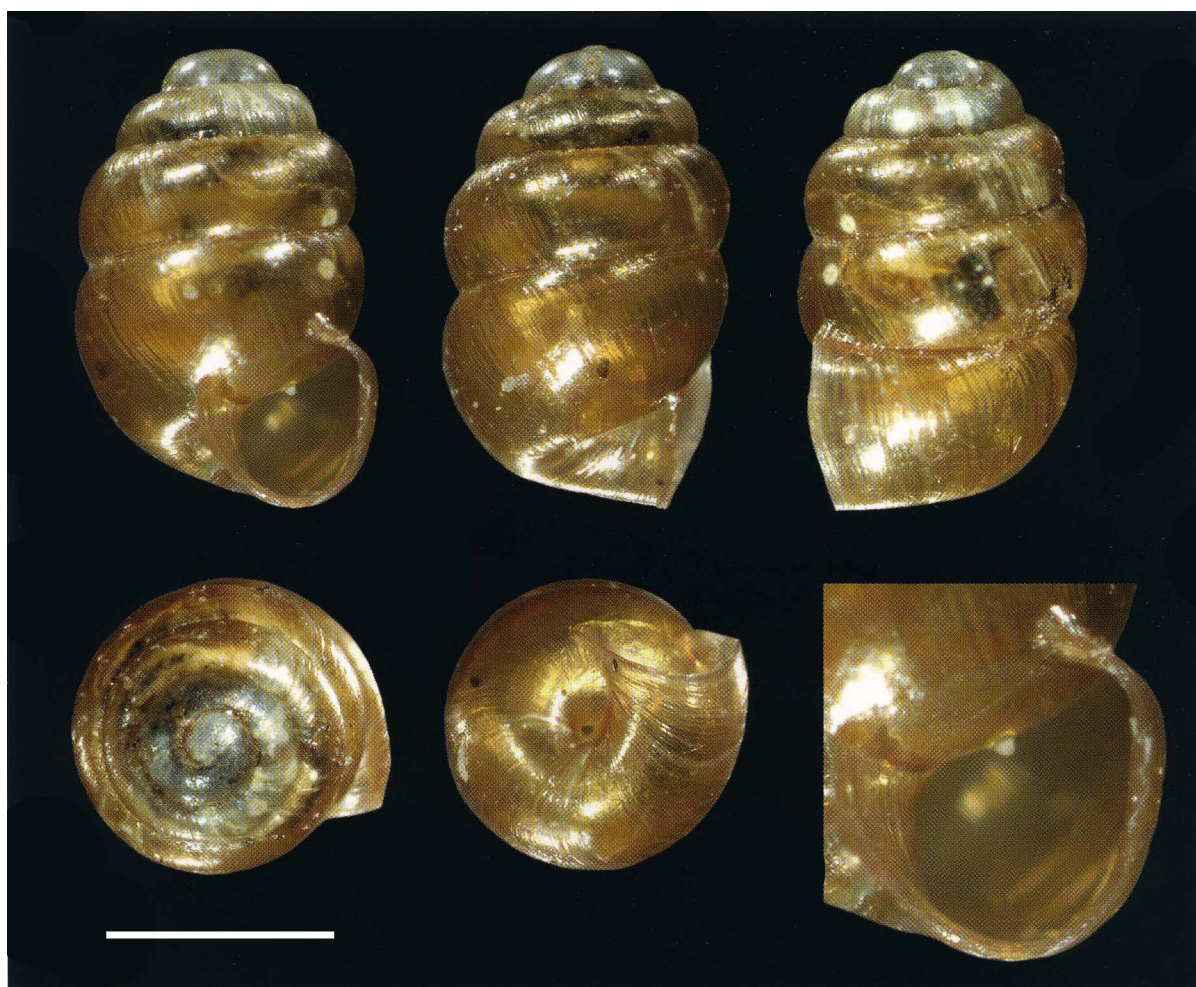


Figure 4. *Vertigo ultimathule* von Proschwitz, 2007 Sweden, Lappland, Pältsan area, Gobmevari, SSE of Pältsastugan (Holotypus). Photo: P. Glöer, Heitlingen. Scale bar 1 mm.

Distribution: So far, *V. ultimathule* has only been recorded from two localities in the very northernmost part of Sweden (Pältsan) and seven in Finnmark County in the river valleys of the River Tana and its tributary Anarjohka (Figure 3). The gap between the *locus typicus* and the Norwegian localities is approximately 240 km, and although so far not found in samples from the interjacent area, occurrences here are to be expected as well as in other parts of Finnmark and adjacent parts of Finland and Sweden. At the present state of knowledge, *V. ultimathule* must be considered a rare element with a very limited distribution – endemic to northernmost Norway and Sweden.

Ecology: The localities are brook valleys or mountain slopes with mountain birch and often *Salix* shrubs. The pH of the ground litter was measured in two of the localities, the values obtained were 6.75 and 6.0. *V. ultimathule* does, however, not appear to be a demanding species. In some of the localities the vegetation is rich and dominated with herbs; in others it is markedly poor, dominated by mosses and *Vaccinium*-species. In one of its sites, with vegetation of *Vaccinium vitis-idaea* and *Empetrum*, the only other snail species found was the eurytopic and common *Euconulus fulvus* (O. F. Müller, 1774). The Norwegian localities are situated at 180–200 m altitude; the Swedish somewhat higher, at 520–620 m altitude (cf. von Proschwitz 2007).

Balea sarsii Philippi, 1847
[= *B. heydeni* von Maltzan, 1881]
(Figure 5)

Introductory remarks: This species has been separated from the closely related, common and wide-spread *Balea perversa* (Linnaeus, 1758) and redescribed by Gittenberger et al. (2006) under its junior synonym name *Balea heydeni* von Maltzan, 1881. The valid name for this taxon is, however, *Balea sarsii* Philippi, 1847 – a separate publication on the nomenclature is in preparation. Recent revisions of Scandinavian material have revealed that *B. sarsii* occurs as a very rare element also in Denmark, Norway and Sweden (von Proschwitz 2009).

Diagnostic features: *B. sarsii* (Figure 5), differs from *B. perversa* (Figure 6) through its, in most cases, shorter, broader shell, in which the whorls increase more quickly in width. *B. sarsii* reaches a maximal height of 7 mm; *B. perversa* might be higher (up to 10 mm). The sculpture in *B. sarsii* is also more wrinkled, coarser and less regular, compared to the fine, regular riblets typical for *B. perversa*. The shell colour is also yellowish – light brown, compared to the usually somewhat darker brown in *B. perversa*. A weak, parietal denticle may be present in *B. perversa*, but not in *B. sarsii*. All these characters are, however, variable; especially the shell dimensions (cf. Gittenberger et al. 2006: 147, Figs 1-11). The most reliable

character to use in separating the two species is the form of the apical whorls: in *B. perversa* this part of the shell is almost cylindrical, but in *B. sarsii* it is conical.

Norwegian localities: Hordaland County, Bergen. M. Sars 19th century (2 specimens RM); Hordaland County, Meland municipality, Holsnøy, Rosland. S-facing, clefted precipice and boulder slope. H. W. Waldén 1986-V-10 (1 specimen GNM); Hordaland County, Kvinnherad municipality, Hatlestrand, Netlandsvågen, clefted precipice close to the sea. T. von Proschwitz & T. Solhøy 2010-VI-23 (1 specimen GNM); Hordaland County, Osterøy municipality, Haus, Vikna. T. Solhøy 1974-X-1 (4 specimens BM); Hordaland County, Tysnes municipality, Ånuglo. ‘Student excursion’ 1967-VI-4 (1 specimen BM); Sogn og Fjordane County, Flora municipality, Florø, close to the sea. M. Sars 19th century *Locus typicus*. (8 specimens NHMO). Totally 17 specimens.

Distribution: In contrast to the widely spread, mainly continental *B. perversa*, *B. sarsii* is a western-Atlantic element, found on the Atlantic Islands, in Portugal, NW Spain, and the coastal parts of France, Belgium and the Netherlands. In Britain and Ireland it is the commoner of the two *Balea* species, occurring also in the inland (Gittenberger et al. 2006: 146-148). The only Scandinavian locality, cited in that paper is Møns Klint in Denmark. A recently undertaken revision of *Balea*-material from Sweden and Norway in the Göteborg Natural History Museum and the National Museum of Natural History (Riksmuseet) in Stockholm revealed two localities for *B. sarsii* from the Swedish west coast (the Island of Vinga outside Göteborg and the Island Storön in the archipelago of Väderöarna in the province of Bohuslän (von Proschwitz 2009: 53–54). In the Norwegian samples only two occurrences, in Hordaland County, were found. Three further occurrences have, after revision of material in the museums in Oslo and Bergen been reported to me by K. M. Olsen, Oslo (identity verified by photo) and a fourth new locality was found by T. von Proschwitz & T. Solhøy in June 2010. Totally the species is now known from six Norwegian localities, of which five are situated in Hordaland County. The sixth is Florø in Sogn og Fjordane County – this latter locality being the northernmost known in Europe is also the *locus typicus* for *B. sarsii*. As only sixteen Norwegian specimens have been found, among thousands of *B. perversa*, it must be considered a very rare species. This is supported by information from K. M. Olsen (pers. comm.), who reported that no specimens of *B. sarsii* are present in his own *Balea*-material from Norway.

Ecology: On the localities at Florø and Holsnøy, and in both Swedish localities, *B. sarsii* co-occurred with *B. perversa*. Such sympatric occurrences are not uncommon in other parts of the distribution area, and probably both species have very similar ecology (Gittenberger et al. 2006: 148-149). *Balea*-species are rarely found on the ground, they are climbers and live on verti-



Figure 5. *Balea sarsii* Philippi, 1847 Norway, Hordaland, Bergen. Photo: P. Gløer, Heitlingen. Scale bar 1 mm.



Figure 6. *Balea perversa* (Linnaeus, 1758) Norway, Telemark, Vråvannet. Photo: P. Gløer, Heitlingen. Scale bar 1 mm.

cal surfaces (rocks, trees etc.) (Boycott 1921). Their main food is lichens, which may also serve as shelter (Baur & Baur 1997). The nine, so far known, Scandinavian localities are all situated close to, and in some cases exposed to, the sea, in a pronounced Atlantic climate, and hence connect well to its so far known European distribution.

CONCLUDING REMARKS

The three here presented new species, rise the number of land snails in the Norwegian fauna from 97 – Olsen (2002: 73) lists 96, a further, the introduced slug *Milax gagates* (Draparnaud, 1801) is added by Bevanger (2005: 107) – to 100. More species are probably hiding in the genera *Cochlicopa* and *Euconulus*, but more work is needed before the complex taxonomical and nomenclatural problems concerning these are fully cleared.

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