

Seven species of land-snails (Gastropoda) new to the Faroe Islands

Fyrsta staðfestingin av sjeý landsniglasløgum

(Gastropoda) í Føroyum

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Úrtak

Síðan kannningina, sum Solhøy framdi 1977-79 (Solhøy, 1981) er eingin skipað kannning gjørd innan útbreiðslu av landsniglum. Nógur innflutningur av byggitilfari og urtagarðs tilhoyri hevur skapað karmar fyri innførsu av nýggjum sniglasløgum til oyggjarnar. Hendan greinin er grundað á innsavnað tilfar og eygleiðingar seinnu mongu árini frá heimildarfólki kring landi, sum hava vent sær til Jens-Kjeld Jensen. Úrslitið higartil er ein staðfesting av sjeý sniglasløgum, afturat teimum 20 sum Solhøy hevur skráset í Føroyum. Umframt var eitt slag innført við vinnu fyri eyga, sum ikki tykist tola føroyska veðurlagið.

Hvørjar avleiðingar búsetingin hjá nýggju sniglasløgnum hevur, er ilt at siga, eitt nú kunnu tey virka sum millumvertir fyri sníkar, sum eru endavertir hjá ketu og hundi.

Abstract

Since the investigation performed by Solhøy between 1977 and 1979 (Solhøy, 1981) no organized investigation has been performed on the distribution of land snails in the Faroes. Intense importation of building and gardening materials

has since increased the risk of introducing new snail species to the islands. This article is based on material and observations from observers around the islands over several years, who have contacted the first author. This has resulted in the discovery of seven new species to the islands in addition to Solhøy's twenty species. Four of the new species are snails, while two are slugs. An additional species was introduced for commercial purpose but does not seem to have survived well in the Faroese climate.

It is difficult to predict the consequences of the settlement of these new Faroese gastropod species, but they may act as intermediate hosts for parasites, having cats and dogs as final hosts.

Introduction

Land slugs in inhabited areas are a general subject of interest and curiosity among Faroese citizens, in particular amongst garden enthusiasts. Despite the public interest, the local literature on the subject is scarce. Fog (1971) made an overview, based primarily on the collections at the Zoological Museum of the University of Copenhagen, a material for the most part collected by H. Lemche in 1925-26 and J. P. Kryger in 1926. This resulted in a list comprising 22 species. An investigation in 1977-79 formed basis for a revised list, resulting in the total amount of twenty species (Solhøy, 1981).

Due to unrestrained import of plants, soil, turf and building material, we can add six species to the Faroese species list, excluding the introduced Burgundy Snail (*Helix pomatia*). Knowledge on the distribution of the recently introduced land snail species in inhabited areas may be important regarding incidences of certain parasites infesting dogs (Pagh and Jensen, 2010). It is known, that the Lungworm *Crenosoma vulpis* and the French Heartworm *Angiostrongylus vasorum* currently spreads *i.e.* in Denmark and that both species have land slugs as intermediate hosts (Conboy, 2000; Pagh and Jensen, 2010; Willesen, 2004).

Material and Methods

This article is not based on a single investigation, but rather on land slugs collected and photos taken by the Faroese public, having subsequently sent these to the first author.

Next to each record is the name of the person, who has identified the specimen(s) (det.). When a species is relatively straightforward to identify, the identification of an observer (obs.) is accepted. *Arion lusitanicus* can, on the other hand, easily be mistaken for other land slugs, and is therefore listed only, when recorded in large numbers.

The identifications by the first author are based on Kerney and Cameron (1979) and on Pflieger and Chatfield (1988).

Those specimens marked „Leg.“ are kept in the first authors private collection, except for a single specimen of *Cepaea nemoralis* recorded in Vestmanna which is kept at the Faroese Museum of National History (NGS), one specimen of *Cepaea hortensis* recorded in Sandur, kept by Hanna Joensen, and finally 52 specimens of *Arianta arbustorum* were sent to Dr. Angus Davison, University of Nottingham, UK.

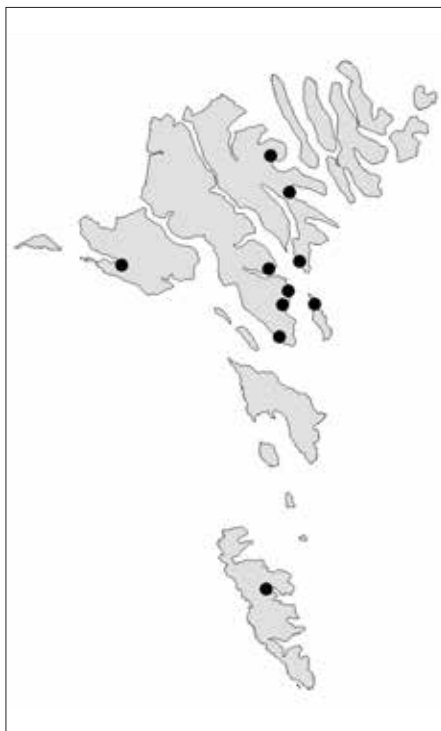
Results

Arianta arbustorum (Linné 1758)(Fig. 1)

Figure 1. *Arianta arbustorum*



Map 1. Records of *Arianta arbustorum* in the period March-November 2003-2012.



Tórshavn

1 specimen, 6.vi.2004. Leg. Andreas Rein, det. Torstein Solhøy.

1 specimen, 17.vi.2004. Leg. Andreas Rein, det. J-K.J.

1 specimen, 10.vii.2004. Leg. Edit Johannesen, det. Torstein Solhøy. 3 specimens, 8.viii.2005. Leg. Hildur Nielsen, det. J-K.J.

2 specimens, 8.viii.2006. Leg. Dagfinn Højgaard, det. Angus Davison.

3 specimens, 12.viii.2008. Leg. Andreas Rein, det. Angus Davison.

2 specimens, 1.xi.2012. Leg. Sólfinn Kjærbo and Bjarni Jacobsen (10+ observed), det. J-K. J.

Hoyvík

18 specimens, 16.viii.2005. Leg. Hildur Nielsen, det. J-K. J.

40 specimens, 7.viii.2006. Leg. Hildur Nielsen, det. Angus Davison.

19 specimens, viii.2005. Leg. Rannvá Rasmussen, det. J-K. J.

Kirkjubøur

1 specimen, vii.2012. Photo Andy Sutton, det. J-K. J.

Nólsoy

1 specimen, 2.ix.2003. Leg. Áshild Thomsen, det. Torstein Solhøy.

Numerous observations 2005. Leg. J-K.J., det. J-K. J.

1 specimen, 21.vii.2006 and 1 specimen 9.viii.2006. Leg. J-K.J., det. Angus Davison.

2 specimens, 21.vii.2006. Leg. Áshild Thomsen, det. Angus Davison.

1 specimen, 15.iv.2007. Leg. J-K.J., det. J-K.J.

Toftir

1 specimen, 5.ix.2003. Leg. Dagfinn Højgaard, det. Torstein Solhøy.

3 specimens, 7.viii.2006. Leg. Dagfinn Højgaard, det. Angus Davison.

Trongisvágur

30.v.2012. Photo Kristian Stórhamar, det. J-K.J.

Fuglafjørður

3.vii.2008. Photo Diana Hansen, det. J-K.J.

Kaldbak

viii.2011. Photo Ásfríð Mortensen, det. J-K.J.

Sørvágur

31.iii.2008. Photo Rodmund á Kelduni, det. J-K.J.

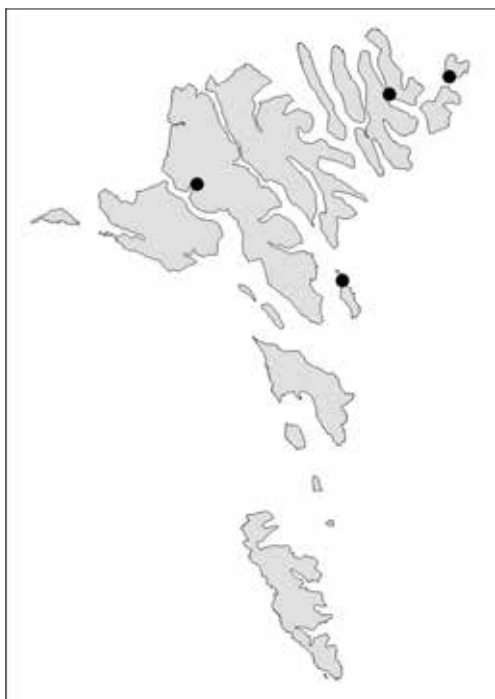
Syðrugøta

13.vi.2006. Photo Karl Thomsen, det. J-K.J.



Cepaea nemoralis (Linné
1758) (Fig. 2)

Figure 2. Cepaea nemoralis.



Map 2. Records of *Cepaea nemoralis* in the period May-August 1996-2012.

Vestmanna

1 specimen, 25.viii.1996. Leg. unknown, Faroese Museum of National History, det. J-K.J.

Hvannasund

1 specimen, 22.vii.2005. Photo Absalon Lydersen, det. J-K.J.

Kirkja

1 specimen (kept in terrarium), 23.v.2009. Photo Karin Fuglø á Húsamørk, det. Torstein Solhøy.

Nólsoy

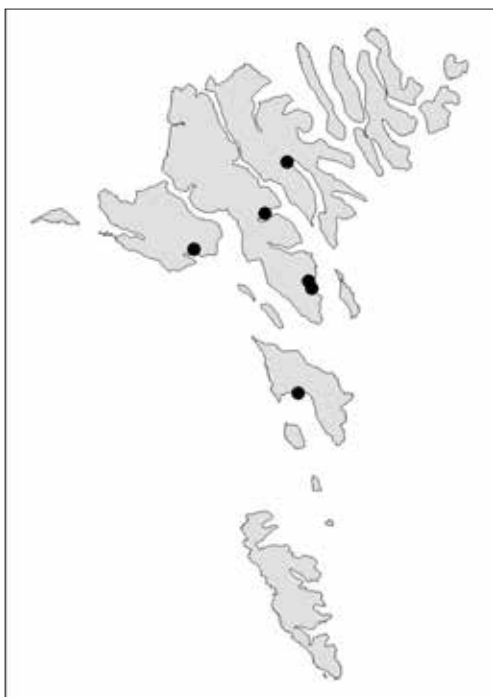
1 specimen, 24.viii.2010. Leg. Agnetha Thomsen, det. J-K.J. Photo taken, released on location.

3 specimens, 13.v.2011. Photo taken, released on location, J-K.J. det. J-K.J.



Cepaea hortensis (Müller 1774)
(Fig 3)

Figure 3. Cepaea hortensis.



Map 3. Records of Cepaea hortensis in the period May-November 2000-2012.

Kollafjørður

1 specimen, 25.ix.2000. Leg. Andras Reinert, det. J-K.J.

Skálabotnur

2 specimens, approx. 2005. Leg. Jógvan Fróði Garðshorn Hansen, det. J-K.J.

Tórshavn

1 specimen, 1.vii.2005. Photo Búgvi Róin, det. J-K.J.

1 specimen, 28.v.2008. Leg. Gunnbjørn Danielsen, det. J-K.J.

3 specimens, 8.ix.2008. Observer Gunnbjørn Danielsen, det Gunnbjørn Danielsen.

Sandavágur

1 specimen, 19.ix.2009. Photo Janus Hansen, det. J-K.J.

Tórshavn

1 specimen, 15.x.2009. Leg. Búgví Róin, det. J-K.J.

Argir

1 specimen, 5.x.2010. Leg. Hans Eli Sivertsen, det. Torstein Solhøy.

Sandur

1 specimen, 12.x.2011. Leg. Hanna Joensen (in private collection), det. J-K.J.

Tórshavn

1 specimen, 26.x.2011. Leg. Jógvan Hansen, det. J-K.J.

3 specimens, 1.xi.2012. Leg. Sólfinn Kjærbo and Bjarni Jacobsen, det. J-K.J.

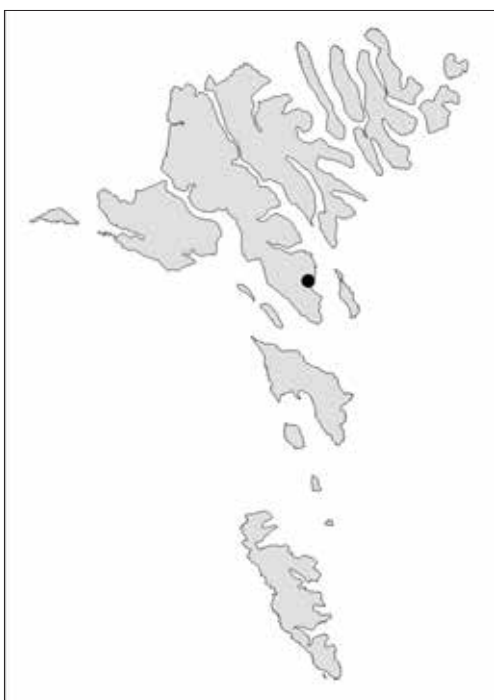
Additional 20+ specimens observed.



Trochulus cf. hispidus
(Linnaeus, 1758) (Fig. 4)

Synonym *Trichia hispida*
(Linnaeus, 1758)

Figure 4. *Trochulus cf.*
hispidus.



Map 4. The record of
Trochulus cf. hispidus.
November 2012.

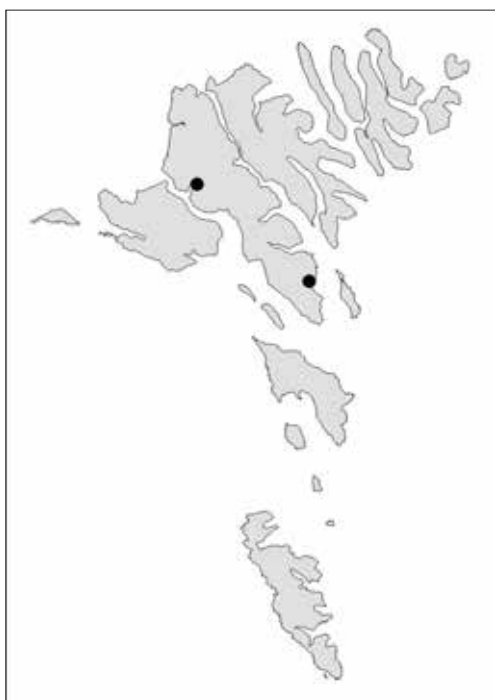
Tórshavn

1 specimen, 1.xi.2012. Leg. Sólfinn Kjærbo and Bjarni Jacobsen (numerous small specimens observed), det. J-K.J.



***Helix pomatia* (Linné 1758)**
(Fig. 5)

Figure 5. *Helix pomatia*.
(Photo Sámal J. Olsen).



Map 5. *Helix pomatia*.
Introduced 1989,
2004 and 2007.

Tórshavn

3000 specimens, Approx. 1989. Introduced to commercial farm (pers. com. Gunleif Danielsen).

3 specimens, 2004. Leg. Eilif Brimheim.

8 specimens, 2004. Leg. Eilif Brimheim (introduction to private garden).

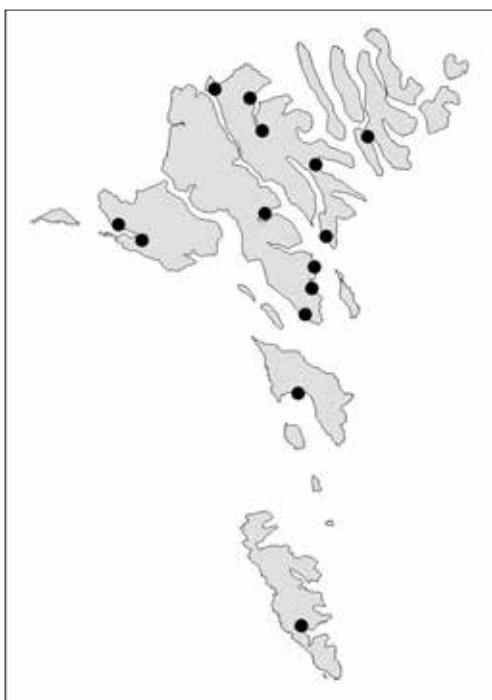
Vestmanna

15 specimens, 2007. Leg. Fróði Skúvadal (introduction to private garden).



Limax maximus (Linné
1758) (Fig. 6)

Figure 6. *Limax maximus*.



Map 6. Records of *Limax maximus* in the period June-October 2003-2012.

Toftir

1 specimen, 29.viii.2003. Leg. Dagfinn Højgaard, det. Torsten Solhøy.
[not collected] obs., 25.ix.2003. Leg. Preben Andersen.

Gøta

[not collected] obs., 25.ix.2003. Leg. Preben Andersen.

Eiði

[not collected] obs., 25.ix.2003. Leg. Hans Erland í Brekkunum.

Kirkjubøur

[not collected] obs., 24.ix.2003. Leg. Hjørdís Paturson.

Kollafjørður

[not collected] obs., vii.2003. Leg. Borgfríð Anthoniussen.

Argir

[not collected] obs., 1.x.2003. Leg. Margit Zachariasen.

Klaksvík

1 specimen observed. 22.vii.2004. Leg. Símun Akursmørk (photo taken), det. J-K.J.

Funningsfjørður

1 specimen observed, 21.vii.2004. Leg. Meinhard Hansen (photo taken), det J-K.J.

Funningur

[not collected], 4.vi.2004. Leg. Petur Magnus Bjarnastein, det J-K.J.

Klaksvík

[not collected], 22.vii.2004. Leg. Símun Akursmørk (photo taken), det J-K.J.

Hoyvík

1 specimen observed, 2.vii.2005. Leg. Hans Eli Sivertsen, det. Hans Eli Siversen.

Hoyvík

1 specimen, 31.viii.2007. Leg. Annleyg Patursson (among newly bought potatoes), det. J-K.J.

Klaksvík

1 specimen, 13.viii.2008. Leg. Michael Joensen (photo taken), det. J-K.J.

Vágur

1 specimen observed, 2009. Leg. Dennis Holm, det. Dennis Holm.

Bøur

2+ specimens observed, 2009. Leg. Rodmund á Kelduni.

Sørvágur

1 specimen observed, 21.x.2010. Leg. Rodmund á Kelduni.

Sandur

2 specimens observed, 22.ix.2011. Leg. Eyðun Mohr Viderø (photo taken),
det. J-K.J.

Klaksvík

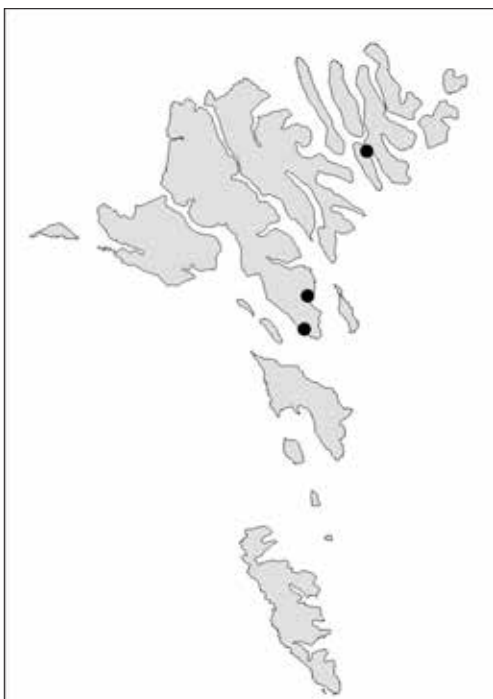
1 specimen observed, 30.x.2012. Leg. Tummas Lervig (photo taken), det. J-k.J.



Arion lusitanicus Mabilie

1868 (Fig. 7)

Figure 7. *Arion lusitanicus*.



Map 7. Records of *Arion lusitanicus* in the period 1996-2008.

Tórshavn

[no specimen], 1996. Faroese Museum of Natural History, in Bloch (2003).

Kirkjubøur

5100 specimens, 2003. Leg. Hjørdis Paturson, [det. Hjørdis Paturson].

Klaksvík

4280 specimens, 2008. Leg. Otto Joensen, det. Otto Joensen.

Not confirmed records: Vágur, Sørvágur, Sandur and Eiði (Jensen, 2003b).

Discussion

Since two new slugs, four large and one smaller snail species may be presented without implementing a search, a direct search for new slug species, will undoubtedly present numerous smaller and inconspicuous land slug species which recently are brought to the islands. This is, after all, not a unique and unknown phenomena, Waldén (1963) stated that man has historically introduced about 50 species to North America.

An additional significant factor, having direct influence on the health of domestic animals, is that snails are common intermediate hosts for various parasites (Pagh and Jensen, 2010), hence it would be of interest to locate the established slug species on the islands. Potential parasite species that may be introduced to the Faroes via land slug species are i.e. the lungworm species *Crenosoma vulpis* and *Aelurostrongylus abstrusus*. Another candidate is the French Heartworm *Angiostrongylus vasorum* since this species is currently spreading i.e. in Denmark (Conboy, 2000; Willesen, 2004), where from the largest part of the Faroese imports derives. The worms may be introduced to the Faroes, either with infested slugs being brought with plants or building material (Fig. 10) or by infested dogs and cats. The executive order no. 15, issued 7. April 2004 states regarding import of dogs, cats and other pets (§ 13), that dogs and cats must be treated against respective endoparasites not over a week before import. However the good intentions of these claims, they do not constitute a 100 percent guarantee against these parasites being introduced. In the period from 1st January to 31st December 2011, 84 local dogs and 19 cats were imported from abroad, whilst 58 dogs and 3 cats were given permission to go temporarily abroad (veterinarian Elspa Petersen pers. comm.).

Following is an account of each separate species:

Arianta arbustorum

Breeds in the Faroes. The species is originally described from the Faroes in Mörch (1869), in which he states: „*Helix (Arianta) arbustorum* L., i Hr. Hansens Have i Thorshavn (1 Espl.)“. Fog (1971) and Solhøy (1981) both agree on, that this represents an isolated record. Solhøy (1981) searched specifically for the species in Tórshavn in 1978 and 1979, without success. The first ascertained record of *A. arbustorum* is from 2003 in Eysturoy and the year after it was recorded in Tórshavn. Albeit not formally confirmed, the species was already observed in Hoyvík in 2003 (pers. comm. Rannvá Rasmussen), hence the species had seemingly established small breeding populations on both islands in 2003. As shown in Map 1, the species has spread fairly quickly and appear currently in considerable abundance in Tórshavn



Figure 8. *Arianta arbustorum*.
Pointed and truncate form.

and Toftir. *A. arbustorum* occurs in addition in Iceland and in most of the continental European countries (Mandahl-Barth, 1938; Einarsson, 1977). The shell measures 10-22mm x 14-28mm. The recent success of this species on the islands might reflect the combination of its boreoarctic distribution and the above-mentioned risk via import of building material and plants.

According to Solhøy (pers. comm.), the shape of *A. arbustorum* in Norway varies to a considerable extent; there is a form with a pointed shell, recorded in sandy dunes, whilst a smaller truncate form with no stripe is recorded from mountain areas. Both these variations are known from the Faroes (Fig. 8). In 2006 following specimens were collected for Dr. Angus Davison, University of Nottingham: Tórshavn 6, Hoyvík 46, Nólsoy 2, Toftir 3. These snails are implemented in a comprehensive DNA-study, showing, that the Faroese *A. arbustorum* is similar to populations in Scandinavia, North England, Scotland, Ireland, Shetland and Iceland (Grindon, 2010).

Cepaea nemoralis

Breeding is not confirmed in the Faroes. The first record from the Faroes is from 1996. The total records of seven adult specimens from four islands, point towards incidental introduction. The species is recorded in Central and Western Europe, and also in urban areas in Eastern Europe (Pagh and Jensen, 2010) and since 1991, there are 6 records from Iceland (Ólafsson, 2012).

Specimens frequently have dark brown to blackish colour bands, this does however vary. The shell measures 12-22mm. x 18-25mm. Apertural lip is brown (Kerney and Cameron, 1979).

Cepaea hortensis

Breeding is not confirmed in the Faroes. The species was recorded for the first time in 2000 and until 2013 the total number of observed specimens was only

twelve, recorded on three islands. Thus, the species seems not yet to have become established in the Faroes. It is known to inhabit most of Europe and has presumably inhabited Iceland since the Viking age (Einarsson, 1977; Ólafsson, 2012). The shell measures 10-17mm x 14-20mm, hence slightly smaller than *Cepaea nemoralis* and the apertural lip is almost invariably bright/light, whereas the lip of *C. nemoralis* is brown. Specimens frequently have dark brown to blackish colour bands, but do however vary considerable in colour (Fig. 9). The record of two specimens in Skálabotnur, was related to the import of a used truck. In autumn of 2012 in an area in the west of Tórshavn, at Hjaltarók, twelve pallets with concrete curbstones were imported from Jutland in Denmark, from which five specimens were collected. Additional 30+ specimens were also observed on the site, comprising the two species *C. hortensis* and *A. arbustorum*.



Figure 9. The two species *Cepaea hortensis* and *Cepaea nemoralis* vary considerable in colour and bands. This is an example of *C. hortensis* from Magleby in Denmark 2004.

Trochulus hispidus

Breeding is not confirmed in the Faroes. A specimen was found in Hansen's garden in Tórshavn 1867 (Fog, 1971) and Solhøy searched in vain specifically for this species in Tórshavn in 1978 and 1979. Fog (1971) and Solhøy (1981) both considered the presence of *T. hispidus* as occasional introductions and removed the species from the Faroese species list. The latest record is from 2012 in pallets containing curbstones imported from Denmark (Fig 10). On the same occasion, both collectors (Bjarni Jacobsen and Sólfinn Kjærbo) observed a number of other small snails, which were not collected. The distribution area covers the entire Europe (Kerney and Cameron, 1979). *T. hispidus* has bred in Reykjavík

on Iceland since 1956 (Einarsson, 1977), in a single garden (Pers. comm. Erling Ólafsson, 2012). *T. hispidus* is a member of the *T. hispidus* group, containing a number of very similar species, which make identification difficult. According to Kerney and Cameron (1979), the record from 2012 is most likely *T. hispidus*.



Figure 10. Bjarni Jacobsen by the two last of the twelve pallets with curbstones, where he and Sólfinn Kjörbo found 30+ snails in 2012.

Helix pomatia

The species does not reproduce in the Faroes. The species was introduced to initiate a snail farm around 1989 (Gaard, 2013). The farming was stopped after four years, since the grounds were used for other purposes (pers. comm. Gunleif Danielsen). With a shell-width measuring up to 50 mm, this is the largest species in Europe (Pfleger and Chatfield, 1988). *H. pomatia* is distributed in Southern, Central, and Eastern Europe and the southern parts of Scandinavia (Pagh and Jensen, 2010). It appears that *H. pomatia* cannot cope with the Faroese climate. It has not been observed in recent years, and is presumed extinct in the Faroes.

Limax maximus

The species breeds in the Faroes, and its distribution area is increasing. Immediately after the first record in the Faroes in 2003, J-K.J. had two articles, photo included, in a local newspaper (Jensen, 2003a, 2003b) instigating a search for the species, which resulted in six additional observations. Since then it has spread steadily. The species cannot be confused with other species in Faroes (Cameron et al., 1983). The observations are included despite no documentation being available. The species thrives and is currently recorded on the larger islands. Reaching 20 cm (Pfleger and Chatfield, 1988), makes it the largest slug on the islands. In the end of twentieth century, the species spread from Southern and Western to Northern Europe arriving in Norway in 1989 and in Iceland in 1997 (Ólafsson, 2012).

Arion lusitanicus

The species breeds in the Faroes and its distribution area increases. The first record from the Faroes is from 1996 (Bloch, 2003; Weidema, 2000). It is considered an average sized slug, reaching a maximum length of 10 to 15 cm. *A. lusitanicus* originates, as the name indicates, from the Iberian Peninsula, and has since the latter half of the twentieth century spread northwards, resulting in the first record from Reykjavik and Kópavagur in 2003 (Ólafsson, 2012). It is frequently confused with the large Faroese black slug *Arion ater* (von Proschwitz and Wing, 1994; Pagh and Jensen, 2010), which in the Faroes additionally is common in a grey form (Solhøy, 1981). Due to the risk of confusion, numerous records from most of the Faroes are omitted here, in spite of indications on *A. lusitanicus*. *A. lusitanicus* is exceedingly common in the area of Tórshavn and Kirkjubøur. A thorough registration of the distribution of the species will presumably show a large general distribution covering most of the Faroes.

Solhøy (1981) lists following twenty species recorded in addition to the seven species treated above:

Slugs: *Arion ater* L., *A. distinctus* Mabillen, *A. intermeclius* Normand, *A. silvaticus* Lohmander, *A. subfuscus* Draparnaud, *Deroceras agreste* L., *D. laeve* Müller, *D. reticulatum* Müller, *D. marginatus* Müller.

Snails: *Aegopinella nitidula* Draparnaud, *A. pura* Alder, *Cochlicopa lubrica* Müller, *Columella aspera* Waldén, *Lauria cylindracea* Da Costa, *Nesovitrea hammonis* Strøm, *Oxychilus alliarius* Miller, *O. cellarius* Müller, *Punctum pygmaem* Draparnaud, *Vitrea contracta* Westerlund, *Vitrina pellucida* Müller.

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