

Polycera faeroensis Lemche, 1929, and *Doto dunnei* Lemche, 1976, new for the Dutch fauna and the central North Sea (Gastropoda, Nudibranchia)

ADRIAAN GITTENBERGER

GiMaRIS, J.H. Oortweg 21, NL-2333 CH Leiden, The Netherlands; Gittenberger@GiMaRIS.com

NCB Naturalis, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands.

Institute of Biology Leiden (IBL) & Institute of Environmental Sciences (CML), Leiden University, P.O. Box 9516, NL-2300 RA Leiden, The Netherlands.

ANEMOON Foundation, P.O. Box 29, NL-2120 AA Bennebroek, The Netherlands. [Corresponding author]

NIELS SCHRIEKEN

BiOrganized, Grenadiersweg 8, NL-3902 JC Veenendaal, The Netherlands; nielsschrieken@biorganized.com.

ANEMOON Foundation, P.O. Box 29, NL-2120 AA Bennebroek, The Netherlands.

& WOUTER LENGKEEK

Bureau Waardenburg, Varkensmarkt 9, NL-4101 CK Culemborg, The Netherlands; W.Lengkeek@BuWa.nl.

Duik de Noordzee Schoon, Duyvenvoordestraat 35, NL-2681 HH Monster, The Netherlands.

111

INTRODUCTION

The nudibranchs *Polycera faeroensis* and *Doto dunnei* are reported for the first time from The Netherlands and the central North Sea. These two species were found during an expedition that focussed on identifying biodiversity in the Dutch part of North Sea, i.e. on the Cleaver Bank and the Dogger Bank. Directly after the expedition *Doto koenneckeri*, *Eubranthus tricolor* and *Tritonia hombergii* were mistakenly reported as being new to The Netherlands. The records of *D. koenneckeri* and *E. tricolor* concerned misidentifications whereas *Tritonia hombergii* was already known for The Netherlands. Additionally an updated list of the Dutch sea slugs, Sacoglossa and Nudibranchia (Gastropoda, Opisthobranchia) is given.

Key words: *Polycera*, *Doto*, Nudibranchia, Polyceridae, Dotidae, North Sea, Dutch fauna, Dogger Bank, Cleaver Bank.

In 2004, a review was published by Van Bragt, listing the 49 nudibranch species that had been recorded in The Netherlands to that date, adding 11 species to an earlier overview (Swennen & Dekker, 1987). This review missed *Doto mill-bayana* Lemche, 1976, which was found in 1997, washed ashore on Ameland together with its egg-capsules on the bryozoan *Plumularia setacea* (Linnaeus, 1758) and was deposited in the Natural History Museum of Rotterdam (Moe-likier, 1999). After 2004, one more record of a sea slug species new for The Netherlands was published (de Bruyne, 2007), i.e. *Doto hydrallmaniae* (Morrow, Thorpe & Picton, 1992). In June 2011 an expedition to the Dogger Bank and the Cleaver Bank took place, some results of which are reported here. This expedition concentrated on an understudied region of The Netherlands, i.e. the Dutch Continental Shelf, with a special focus on the Dogger Bank and the Cleaver Bank

(Schrieken et al., this issue: fig. 1). By scuba-diving, a rapid assessment was made of the species that live in hard substratum habitats, like wrecks and the rocky environment of the Cleaver Bank. Few prior studies focussed on these habitats (Van Moorsel, 2003) because scuba-diving, which is necessary to efficiently study hard substrata, is relatively difficult in the centre of the North Sea and can therefore only be done with a team of highly experienced divers and a well-equipped vessel.

Among the various species that were found to be new to The Netherlands, we here focus on only the nudibranchs. Directly after the expedition four nudibranch species were mentioned to the media as new to The Netherlands, i.e. *Polycera faeroensis*, *Doto koenneckeri*, *Eubranchus tricolor* and *Tritonia hombergii* (www.natuurbericht.nl/?id=6172&q=zeenaaktslak, June 23rd 2011). A more detailed study, however, showed that only *P. faeroensis* was correctly presented as such.

The specimens that were identified initially as *Doto koenneckeri* belong to *Doto dunnei*, which is also new to The Netherlands as is described below.

The specimen that was identified as *Eubranchus tricolor* appears to represent *E. farrani*, a species that was already recorded for The Netherlands in 2003 in both the Grevelingen en the Oosterschelde (Van Bragt, 2004). *Eubranchus tricolor* has many more cerata than *E. farrani*. This is a diagnostic character that can easily be used to distinguish the two species; it is clearly visible on the photographs of the specimen found during the Dogger Bank expedition (www.natuurbericht.nl/?id=6172&q=zeenaaktslak, June 23rd 2011). The misidentification of this specimen was based on the vague pigmentation of its rhinophores. In most specimens of *E. farrani* these rhinophores are strongly pigmented.

The fourth nudibranch species that was presented as new to The Netherlands immediately after the Dogger Bank expedition, i.e. *Tritonia hombergii*, was already observed along the Dutch coast in 1950, near IJmuiden, and in following years in limited populations in the southwestern part of The Netherlands (Van Bragt, 2004) and in the North Sea (Van Moorsel, 2003).

Here we describe the two species that are new for the Netherlands, especially their distribution and diagnostic characters. With these two, the total number of sea slug

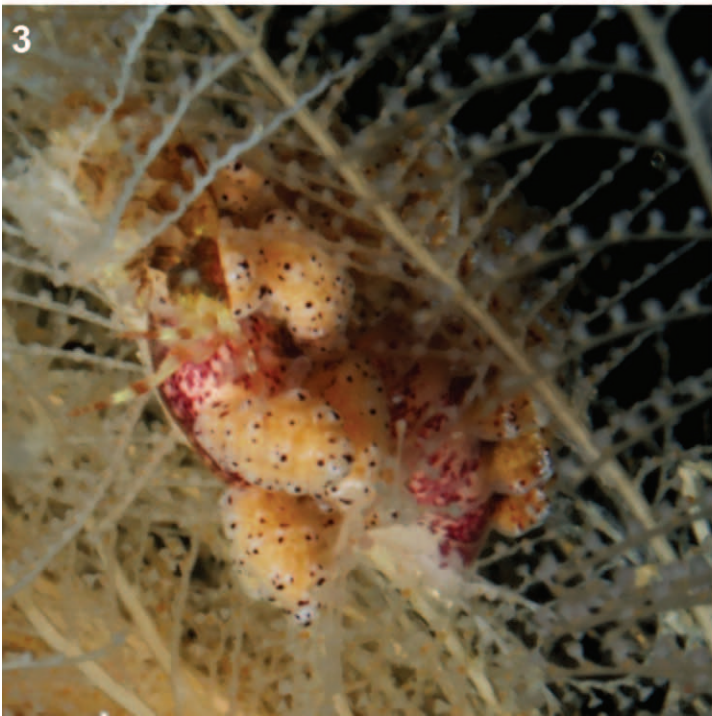
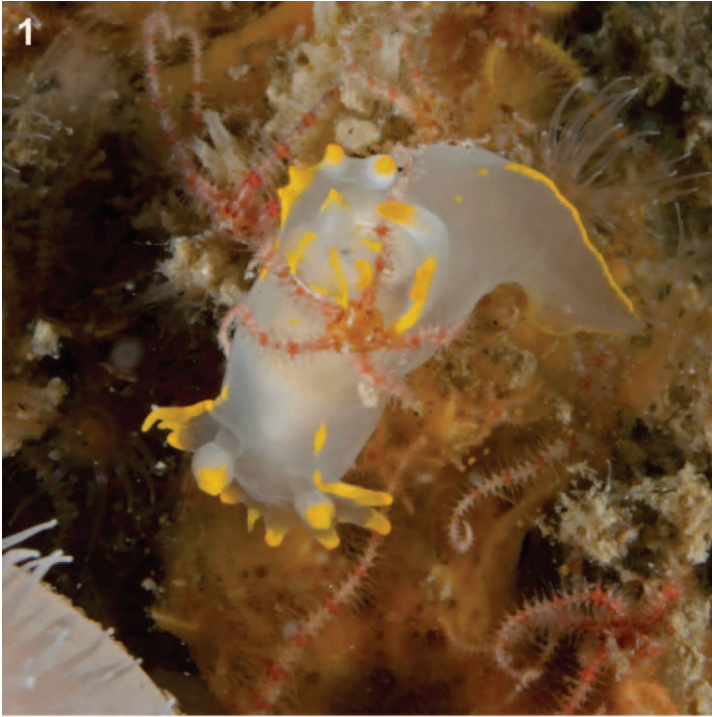
species recorded in the Netherlands has increased to 53. The most recent list of Dutch sea slug species (Gastropoda, Opisthobranchia, Sacoglossa and Nudibranchia) was presented almost 25 years ago by Swennen & Dekker (1987). More recently a review of all Dutch sea slugs was presented by Van Bragt (2004). Here we present an updated list of all the species recorded in the Netherlands (Table 1), indicating whether a particular species can or could occur autochthonously in The Netherlands. Some of the names in this list differ from the ones that are by Van Bragt (2004). Various names are synonymized (indicated in Table 1), following the world register of marine species (www.marinespecies.org) as the most recent source of accepted sea slug names.

SYSTEMATICS

Polycera faeroensis Lemche, 1929
NL: Breedkop harlekijnslak

Differentiation.— Only one specimen of *Polycera faeroensis* was encountered on the Dogger Bank (Fig. 1). It was identi-

Figs 1-4. New nudibranchs for the Dutch fauna and the central North Sea. 1. *Polycera faeroensis* Lemche, 1929, on the wreck Jeanette Kristina in the Dutch part of the Dogger Bank (55° 17.116'N / 3° 26.972'E), 14.vi.2011. The white arrow indicates a lateral process (alongside the gills), which is flattened and has developed a number of yellow-tipped points along its edge. 2. *Polycera quadrilineata* (O.F. Müller, 1776), Oosterschelde, near Zierikzee, 1.x.2011. The white arrow indicates a lateral process (alongside the gills), which is single instead of flattened with a number of yellow-tipped points along its edge, as in *P. faeroensis* (Fig. 1). *Polycera quadrilineata* usually has four pigmented tentacles, but this specimen has six. 3. Detail of the tubercles in *Doto dunnei* Lemche, 1976, found on the hydroid *Kirchenpaueria pinnata*, 14.vi.2011, in the Dutch part of the Dogger Bank (55° 17.116'N / 3° 26.972'E). Multiple spots are visible on the surfaces of the cerata, in addition to the terminal spots on the tubercles. This is a diagnostic, distinguishing *D. dunnei* from various other *Doto* species. 4. *Doto dunnei* Lemche, 1976, specimens with their egg-capsules, on the about 10 cm long 'feathers' of the hydroid *Kirchenpaueria pinnata*, 16.vi.2011, in the Dutch part of the Cleaver Bank (54° 02.475'N / 3° 16.979'E).



fied on the basis of its 10 yellow tentacles and the flattened lateral processes (alongside the gills), which had developed several yellow-tipped points along their edges. Most similar to *P. faeroensis* is the species *P. quadrilineata* (O.F. Müller, 1776) (Fig. 2), which was already known from The Netherlands. The latter species differs from *P. faeroensis* in having less than 8, usually 4, but sometimes 6, yellow tentacles, as in a specimen from the Oosterschelde (Fig. 2). Another character that supports our identification concerns the lateral processes alongside the gills. In *P. quadrilineata* each of these have a single yellow-tip (Fig. 2), while in *P. faeroensis* these processes often flatten out and develop a number of yellow-tipped points (Fig. 1; Rudman, 2006).

Distribution. — One specimen of *Polycera faeroensis* was observed 14.vi.2011 on the Dutch Dogger Bank (Fig. 3; 55° 17.116'N / 3° 26.972'E; Schrieken et al., this issue: loc. 1 in Fig. 1). This is the first published record of this species for The Netherlands, and probably for the central North Sea. *Polycera faeroensis* has previously been reported from Sweden, the Faeroe's and the western and southern coasts of the British Isles down to Spain (Picton & Morrow, 1994; Rudman, 2001a).

Habitat. — On the Dutch Dogger Bank *Polycera faeroensis* was seen on the wreck Jeanette Kristina at a depth of 30.2 meter. It was not found feeding. Picton & Morrow (1994) and Thompson & Brown (1984) indicate that this species feeds on erect bryozoans such as *Crisia denticulata*, *Cellepora pumicosa* and *Bugula plumosa*.

Doto dunnei Lemche, 1976

NL: Multistip kroonslak

Differentiation.- The specimens found on the Dogger Bank and Cleaver Bank were identified especially on the basis of their white body with red streaks of pigment, and the multiple spots on the surfaces of cerata in addition to the terminal spots on the tubercles, which are clearly visible in figure 3. This is diagnostic for the species according to Picton & Morrow (1994) although several other *Doto* species can have similar additional spots on the cerata. Also the fact that the specimens were found in June, on the hydroid *Kirchenpaueria pinnata* (Linnaeus, 1758), with their typical long concertina

of white ribbon formed egg-capsules, supports this identification. Picton & Morrow (1994) also describe this egg-capsule form, indicating that the species feeds exclusively on the hydroid *K. pinnata*, whereas it is usually abundant in late spring. *D. dunnei* looks most similar to *Doto millbayana* Lemche, 1976, which is known to feed mainly on the hydroid *Plumularia setacea*. *D. dunnei* has egg-capsules of about 9 double bends (5-10 bends in the Dutch material), while the egg-capsules of *D. millbayana* have only 3-5 double bends (Lemche, 1976). Another diagnostic character, typical for *D. dunnei* egg-capsules, is the presence of a longitudinal almost egg-free zone in the middle of the egg band, which makes the whole spawn seem to be formed by two parallel, narrow bands (Lemche, 1976). This is visible in the egg-capsule top left of the nudibranch in Fig. 4. Other diagnostic characters of *D. dunnei* are the ground colour of the tubercles, which is much lighter than the brown coloration caused by the digestive gland in the ceras proper (Fig. 3), and the pigmentation that extends over the entire body except for the margin of the foot, the tip of the tail and a hyaline oblong area around the base of each ceras (Fig. 4; Lemche, 1976).

Distribution. — *Doto dunnei* was abundantly found, with egg-capsules, during a dive on 14.vi.2011 on the Dutch Dogger Bank (Fig. 3; 55° 17.116'N / 3° 26.972'E; Schrieken et al., this issue: loc. 1 in Fig. 1) and 16.vi.2011, during a dive on the Dutch Cleaver Bank (Fig. 4; 54° 02.475'N / 3° 16.979'E; Schrieken et al., this issue: loc. 3 in fig. 1). The maximum size of the individuals was about 13 mm. Six specimens were collected and preserved in ethanol, together with their host hydroids and numerous egg-capsules. The material will be deposited in the NCB Naturalis collection. These are the first published records of this species for The Netherlands, and probably for the central North Sea. *Doto dunnei* has previously been reported from the western seaboard of the British Isles, from Shetland and the Faeroes, west Scotland and Ireland, southwards to the English Channel. Outside of Britain it was only known from off Galicia in Spain (Picton & Morrow, 1994; Rudman, 2001b) and from the coast of Portugal (Calado et al., 2003).

Habitat. — On the Dutch Dogger Bank and the Cleaver Bank, *D. dunnei* was found at depths of 30.8 and 33.8 meter. At both sites they were found together with their egg-cap-

#	Accepted species names	Dutch common name	Autochthonous
1	<i>Acanthodoris pilosa</i> (Abildgaard in Müller, 1789)	egelslak	Yes
2	<i>Aeolidia papillosa</i> (Linnaeus, 1761)	grote vlokslak	Yes
3	<i>Aeolidiella glauca</i> (Alder & Hancock, 1845)	kleine vlokslak	Yes
4	<i>Alderia modesta</i> (Lovén, 1844)	gewone kwelderslak	Yes
5	<i>Ancula gibbosa</i> (Risso, 1818)	oranje plooislak	Yes
6	<i>Cadlina laevis</i> (Linnaeus, 1767)	gewone kaalslak	Probable
7	<i>Corambe obscura</i> (A. E. Verrill, 1870)	Zuiderzee-schijfslak	Yes
8	<i>Cuthona amoena</i> (Alder & Hancock, 1845) * Van Bragt (2004): <i>Trinchesia amoena</i>	gestippelde knotsslak	Yes
9	<i>Cuthona concinna</i> (Alder & Hancock, 1843) * Van Bragt (2004): <i>Trinchesia concinna</i>	zilverblauwe knotsslak	Yes
10	<i>Cuthona foliata</i> (Forbes & Goodsir, 1839) * Van Bragt (2004): <i>Trinchesia foliata</i>	gestreepte knotsslak	Yes
11	<i>Cuthona gymnota</i> (Couthouy, 1838) * Van Bragt (2004): <i>Trinchesia gymnota</i>	gorgelpijp knotsslak	Yes
12	<i>Cuthona nana</i> (Alder & Hancock, 1842)	zeerasp knotsslak	Yes
13	<i>Cuthona rubescens</i> Pictou & Brown, 1978 * Van Bragt (2004): <i>Trinchesia rubescens</i>	karmozijnrode knotsslak	Yes
14	<i>Dendronotus frondosus</i> (Ascanius, 1774)	boompjesslak	Yes
15	<i>Doris pseudoargus</i> Rapp, 1827 * Van Bragt (2004): <i>Acanthodoris pseudoargus</i>	citroenslak	Yes
16	<i>Doto coronata</i> (Gmelin, 1791)	roodgevekte kroonslak	Yes
17	<i>Doto dunnei</i> Lemche, 1976	multistip kroonslak	Yes
18	<i>Doto fragilis</i> (Forbes, 1838)	trage kroonslak	Yes
19	<i>Doto hydrallmaniae</i> (Morrow, Thorpe & Picton, 1992)	zeeborstel kroonslak	Yes
20	<i>Doto cf. maculata</i> (Montagu, 1804)	kleine kroonslak	Unknown
21	<i>Doto millbayana</i> Lemche, 1976	millbayana kroonslak	Unknown
22	<i>Doto cf. sarsiae</i> Morrow, Thorpe & Picton, 1992	sarsia kroonslak	Unknown
23	<i>Elysia viridis</i> (Montagu, 1804)	groene wierslak	Yes
24	<i>Eubranchus exiguus</i> (Alder & Hancock, 1848)	plompe knuppelslak	Yes
25	<i>Eubranchus farrani</i> (Alder & Hancock, 1844)	gezwollen knuppelslak	Probable
26	<i>Eubranchus pallidus</i> (Alder & Hancock, 1842)	bleke knuppelslak	Yes
27	<i>Eubranchus rupium</i> (Møller, 1842)	noordelijke knuppelslak	Yes
28	<i>Facelina auriculata</i> (Müller, 1776)	gekroonde ringsprietslak	Yes
29	<i>Facelina bostoniensis</i> (Couthouy, 1838)	brede ringsprietslak	Yes
30	<i>Flabellina gracilis</i> (Alder & Hancock, 1844)	slanke waaierslak	Yes
31	<i>Flabellina lineata</i> (Lovén, 1846)	witgestreepte waaierslak	Unknown
32	<i>Flabellina pedata</i> (Montagu, 1815)	paarse waaierslak	Probable
33	<i>Geitodoris planata</i> (Alder & Hancock, 1846)	millennium wratslak	Yes
34	<i>Goniodoris castanea</i> Alder & Hancock, 1845	bruine plooislak	Yes
35	<i>Goniodoris nodosa</i> (Montagu, 1808)	bleke plooislak	Yes
36	<i>Hermaea bifida</i> (Montagu, 1815)	slanke rolsprietslak	Yes
37	<i>Janolus cristatus</i> (delle Chiaje, 1841)	blauwtipje	Yes
38	<i>Janolus hyalinus</i> (Alder & Hancock, 1854)	wrattig tipje	Yes
39	<i>Jorunna tomentosa</i> (Cuvier, 1804)	(gewone) satijnslak	Yes
40	<i>Limacia clavigera</i> (O.F. Müller, 1776)	wrattige mosdierslak	Yes
41	<i>Limapontia capitata</i> (O.F. Müller, 1774)	gewone schorreslak	Unknown
42	<i>Limapontia depressa</i> Alder & Hancock, 1862	kleine schorreslak	Yes
43	<i>Onchidoris bilamellata</i> (Linnaeus, 1767)	rosse sterslak	Yes
44	<i>Onchidoris muricata</i> (O. F. Müller, 1776)	wrattige sterslak	Yes
45	<i>Palio nothus</i> (Johnston, 1838)	groene mosdierslak	Yes
46	<i>Placida dendritica</i> (Alder & Hancock, 1843)	groene rolsprietslak	Yes
47	<i>Polycera faeroensis</i> Lemche, 1929	breedkop harlekijnslak	Unknown
48	<i>Polycera quadrilineata</i> (O.F. Müller, 1776)	harlekijnslak	Yes
49	<i>Tenellia adspersa</i> (Nordmann, 1845)	brakwater knotsslak	Yes
50	<i>Tergipes tergipes</i> (Forskäl, 1775)	slanke knotsslak	Yes
51	<i>Thecatera pennigera</i> (Montagu, 1815)	gestippelde mosdierslak	Yes
52	<i>Tritonia hombergii</i> Cuvier, 1803 * Van Bragt (2004): <i>Tritonia hombergii</i>	grote tritonia	Yes
53	<i>Tritonia plebeia</i> Johnston, 1828	kleine tritonia	Yes

Table 1. Sea slug species (Gastropoda, Opisthobranchia, Sacoglossa and Nudibranchia) reported for the Netherlands, with their Dutch common name. The prior list presented by Swennen & Dekker (1987) and the review presented by Van Bragt (2004) were used as a baseline for this table. The world register of marine species (www.marinespecies.org) is used as the source of the accepted names. In the column “Autochthonous” : “Yes” means that the species was found reproducing in the Dutch marine environment (e.g. spawn has been found); “Probable” refers to species of which specimens are repeatedly found, but no spawn was detected; “Unknown” stands for species that have only been found washed ashore and/or as single occurrences without spawn.

sules, in high numbers on clumps of about 10 cm long 'feathers' of the hydroid species *Kirchenpaueria pinnata* (Fig. 4). Picton & Morrow (1994) and Lemche (1976) indicate that *D. dunnei* feeds exclusively on this hydroid.

Dutch common name etymology.— We here propose the Dutch common name "multistip kroonslak", which refers to the relatively high number of spots that this species has on its cerata in addition to the terminal spots on the tubercles.

ACKNOWLEDGEMENTS

We thank Ben Stiefelhagen who initiated the organisation of the Dogger Bank expedition. Most cordially we thank the crew of the vessel cdt Fourcault, and all the scuba-divers participating in the expedition. Without their professional support at all levels, such an expedition in the centre of the North Sea would have been impossible. We also thank "Duik de Noordzee Schoon", the primary organising party, and "Get Wet Maritiem" for their support. For financial support, we are very grateful to the Nationale Postcode Loterij, the Vereniging Kust & Zee (part of the Coastal & Marine Union EUCC), de North Sea Foundation (Stichting De Noordzee) en de Save our Seas Foundation.

REFERENCES

- BRACKT, P.H. VAN, 2004. The sea slugs, Sacoglossa and Nudibranchia (Gastropoda, Opisthobranchia), of the Netherlands. — *Vita Malacologica* 2: 3-32.
- CALADO, G., MALAQUIAS, M.A.E., GAVAIÁ, C., CERVERA, J.L., MEGINA, C., DAYRAT, B., CAMACHO, Y., POLA, M. & GRANDE, C., 2003. New data on opisthobranchs (Mollusca: Gastropoda) from the southwestern coast of Portugal. — *Boletín Instituto Español de Oceanografía* 19(1-4): 199-204.
- DE BRUYNE, R.H., 2007. Zeenaaktslakken bereiken Abraham: duikers ontdekken 50e soort. — *Voelspriet* 6(1): 1.
- LEMICHE, H., 1976. New British species of *Doto* Oken, 1815 (Mollusca: Opisthobranchia). — *Journal of the Marine Biological Association of the United Kingdom* 56: 691-706.
- MOELIKER, K., 1999. Uit het aanwinstenboek: januari t/m december 1998. — *Straatgras* 11(1): 5-7.
- MOORSEL, G.W.N.M. VAN, 2003. Ecologie van de Klaverbank, Biotasurvey 2002: 1-154, Ecosub, Doorn.
- PICTON, B.E. & MORROW, C.C., 1994. A field guide to the nudibranchs of the British Isles: 1-143. London.
- RUDMAN, W.B., 2001b (February 4) *Polycera faeroensis* Lemche, 1929. [In] Sea Slug Forum. Australian Museum, Sydney. Available from <http://www.seaslugforum.net/factsheet/polyfa>.
- RUDMAN, W.B., 2001a (December 3) *Doto dunnei* Lemche, 1976. [In] Sea Slug Forum. Australian Museum, Sydney. Available from <http://www.seaslugforum.net/factsheet/dotodunn>.
- RUDMAN, W.B., 2006 (Jul 7). Comment on *Polycera faeroensis*, from Belle-isle, Brittany, France by Stephane Ores. [Message in] Sea Slug Forum. Australian Museum, Sydney. Available from <http://www.seaslugforum.net/find/16984>.
- SWENNEN, C. & DEKKER, R., 1987. De Nederlandse zeenaaktslakken (Gastropoda Opisthobranchia: Sacoglossa en Nudibranchia). — *Wetenschappelijke Mededelingen KNNV* 183: 1-52.
- THOMPSON, T.E. & BROWN, G.H., 1984. Biology of Opisthobranch Molluscs 2: 1-229. Ray Society, London.