Molluscs World

March 2020 • Issue 52

North Sea molluscs
Tusk shells in archaeology
Identifying limpets

The Conchological Society of Great Britain & Ireland

Helping to understand, identify, record and conserve molluscs

From the Hon. Editor

I hope you enjoy reading this issue, which includes an English translation of an article by Dutch naturalists on molluscs in the North Sea (thanks to Ian Smith for suggesting this). An article by Janet Ridout-Sharpe looks at tusk shells in Copper Age burials in Cyprus, and there is another with some great help for identifying limpets!

Please consider attending at least one of our field meetings this summer (see back cover). One of these during 2019 paid a second visit to the 're-wilded' Knepp estate in West Sussex (see also *Mollusc World* issue 48). Graham Long points out the following, included in *Wilding* (pub. Picador, 2018), Isabella Tree's book about the project: '…one of the old *(Tamworth)* sows broke the surface, a giant freshwater swan mussel in her jaws. Paddling to the bank she expertly prised it open with her trotters and teased out the flesh with her teeth. Her companion surfacing beside her was less picky and scrunched down the delicacy, shell and all…they are now a favourite part of their foraging repertoire.'

In the news recently, invertebrates haven't had as much coverage as koalas in reporting of the Australian fires, but there was news of around 60 individuals of the fluorescent pink endemic Kapatur mountain slug (*Triboniophorus* aff. *graeffei*) surviving the fire on the mountain in 'cracks and crevices'. (image below). Thanks go to Alan Outen and others for forwarding this account.

(from https://parody.fandom.com/wiki/Pink_Slug (CC-BY-SA))

A news item about the CITES listed Queen conch (*Lobatus gigas*) (BBC, 2nd Feb.) highlighted their plight in the Turks and Caicos Islands. Their harvesting has been banned in nearby Florida for many years but now overfishing for food has led to the near collapse of the species in the British territory, which features the queen conch on its coat of arms. Lastly, Mags Cousins highlights a report that University of Michigan ecologists have conducted recent work in Puerto Rico showing that the widespread invasive 'Asian tramp snail' *Bradybaena similaris*, normally a plant-eater, has shifted its diet to consume the fungal pathogen that causes coffee leaf rust, which has ravaged coffee plantations across Latin America in recent years. The problems associated with using an introduced species as a biological control are well known, but this is the first time that any gastropod has been described as consuming this pathogen (see https://phys.org/news/2020-01-tiny-invasive-snail-latin-american.html).

Peter Topley

The Conchological Society of Great Britain & Ireland

Mollusc World

This magazine is intended as a medium for communication between Conchological Society members (and subscribers) on all aspects of molluscs, in addition to the material found on our web site where a number of back copies are available for viewing. Mollusc World will also be of interest to all those enquiring about this subject or the work of the Society. We welcome all contributions in whatever form they arrive (see page 31 for further details).

Contents

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No representation is made about the accuracy of information included in any articles, which solely constitute the authors' personal views on the subjects covered, and are not necessarily those of the Hon. Editor or the Conchological Society.

Front Cover: Scaphopod shells recovered from a tomb at Souskiou Laona, Cyprus (see page 4). (photo: Janet Ridout-Sharpe)

Hon. Treasurer – could you fill this role and help your Society?

The Conchological Society cannot run without the essential and valuable work of a treasurer.
If you are concerned about our future and might be interested in supporting us by taking up this voluntary role to become part of the heart of our work, please contact us. Our current Hon. Treasurer, Nick Light has provided a summary below of what is involved. He is happy to provide any further information and also to offer initial support to make any handover go smoothly (for contact details see page 31).

The Treasurer's role.

There are three main aspects to the treasurer's role.
(1) To maintain the books and produce the annual accounts.
(2) Advise Council members on the financial implications of the decisions they consider.
(3) To manage the Society investments and keep them secure.

Bookkeeping is undertaken for the Society by a professional accountant who maintains the books, prepares annual accounts and ensures subscription receipts are notified to CIRCA who maintain our membership records The treasurer pays the bills and controls all outgoings e.g. grants. This involves about 50 payments a year. In January each year it takes a couple of days to review the accounts, notes and a report and to prepare documents for the examiner to review and to prepare and submit a Gift Aid Tax repayment claim.

Advice to Council requires you to attend occasional meetings in London during the winter months. Most issues can also be dealt with by e-mail and it is not essential to attend every meeting. If required, the treasurer (as is the case with other officers and council members of the Society) may claim reasonable travel expenses for meetings attendance (max. £100/meeting).

The investments require very little work. I do a quarterly valuation to ensure I know how the value is changing.

It can appear a bit daunting at first but if you can deal with things as they come in, it quickly becomes a routine.
You can keep up to date anywhere, where you have your computer and an internet connection. Very little paper is involved!

Nick Light *Honorary Treasurer*

Conchological Society Workshops

For many years, Judith Nelson has kindly hosted a CS workshop every November in her house in Woking. Sadly, she has decided that she can no longer continue to do this. We are most grateful to her for this contribution to the Society. Her workshops will be missed, particularly by the group of regular participants (figures 1 and 2).

figure 1: Judith Nelson, long-time workshop host. (photo: Jan Light)

figure 2: Conchological Society workshop at Judith's home, 2009. (photo: Peter Topley)

Workshops have an important part to play in Societies like ours – they help members to learn, to share skills, experience and information, to discuss all kinds of conchological problems and issues, and to build relationships.

The main purpose therefore of this note is to encourage other members to offer to run or host workshops. These can be of almost any kind – they might be intended to help members and others learn particular skills, like the workshops run some years ago on shell sand and small marine molluscs (figure 3); they might bring members and material together to look in detail at problems of identification in particular groups; they might be more field-based, looking, for instance, at the molluscan ecology of a particular area or habitat. They could last for an afternoon, for a whole day, or for a weekend.

To encourage workshops, the Society is very willing to contribute to the costs of setting them up and running them, including the hire of a suitable venue, and food and refreshment.

If any member is willing to consider running a workshop, please would they contact the Programme Secretary, bas.payne@gmail .com, or the Secretary or President (see p.31 for contact details).

figure 3: Shellsand workshop, Reading. (photo: Jan Light)

Riches, ritual or simply bling? Scaphopod shells in prehistoric Cyprus

Janet Ridout-Sharpe

Introduction

The shells of many Scaphopoda resemble ready-made tubular beads which can be strung on a thread to form a 'necklace'. In Cyprus and the Levant and in many other parts of the world at different times and in different places scaphopod shells have frequently been found in archaeological contexts, where they are usually referred to generically as 'dentalia' (reflecting a time when nearly all such scaphopods were included in the genus *Dentalium*; taxonomy has moved on but the term persists) and are almost invariably interpreted as necklace beads. The results from an excavation at Souskiou in south-west Cyprus suggest that this is not necessarily the case.

The shells

I was asked to examine the shells recovered from two Chalcolithic (Copper Age, c. 3000 BC) cemeteries and an associated settlement at Souskiou, 17.5km south-east of Paphos (Ridout-Sharpe 2006, 2019). The cemeteries consisted of shaft or pit graves (referred to as 'tombs') cut into the limestone of a ridge (Souskiou Laona) and adjacent plateau (Souskiou Vathyrkakas) separated by the ravine of the Vathyrkakas river (figure 1). Souskiou now lies about 5km inland but was half this distance from the coast during the Chalcolithic period. Between them, these sites yielded 5122 dentalia, of which 98% came from the cemeteries: 1361 of them came from a single tomb (see front cover). The vast majority were recent *Antalis* spp. but 98 (2%) were bead-like segments from a large fossil scaphopod.

figure 1: Excavation underway at the Souskiou Laona cemetery in 2003.

The worn and broken condition of the *Antalis* spp., many of which had been severely damaged by the parasitic sponge *Cliona celata* while others carried the neat bevelled holes of a naticid predator, showed that they had been collected from a beach regardless of their condition suggesting that quantity came before quality. Their beachworn appearance coupled with some 5000 years of burial rendered their identification no mean task. None was complete.

According to sources concerning present-day (Tornaritis 1987, Orr 2000, Delamotte and Vardala-Theodorou 2001, Öztürk *et al.* 2003) and archaeological (Kurzawska *et al.* 2013) Scaphopoda from the eastern Mediterranean, the most likely species to occur among the Souskiou assemblage were *Fustiaria rubescens*, *Antalis vulgaris*, *Antalis dentalis*, *Antalis panorma*, *Antalis inaequicostata* and *Antalis rossati*. An identification key (see below) was constructed from published descriptions and internet images, omitting details of the narrow apex that are usually not visible in beachworn specimens. Allowing for the extremely poor condition of some of the shells, it appears that the majority (99.4%) were most likely the ribbed *Antalis inaequicostata* with *Antalis vulgaris* very much in the minority and just one or two shells of *Antalis panorma* and *Antalis rossati* (figure 2).

figure 2: Identify with reasons! The *Antalis vulgaris* second up from the bottom shows growth interruptions that have sometimes been misinterpreted as cut marks (scale in mm).

All these species occur offshore on sandy or muddy substrates around the coast of Cyprus. As a rule they are not frequent on beaches, although large numbers can be cast ashore after a storm. Garrad (1968) reported 'piled drifts of *Conus mediterraneus* [now *Conus ventricosus*], *Columbella rustica* and *Dentalium*' at Salamis on the east coast of Cyprus. In 2014, about two weeks after severe storms had littered the beaches with masses of bleached seagrass (*Posidonia oceanica*), 30 minutes of beachcombing south-east of Paphos yielded 117 shells representing 22 species of which 11 (9.4%) were scaphopods. Unlike the ribbed *Antalis inaequicostata* from Souskiou, these were all the relatively smooth *Antalis vulgaris*. As Garrad had found, the most frequent species was *Columbella rustica* (37 shells, 31.6%) followed by baby *Conus ventricosus* (23 shells, 19.7%): *Episcomitra cornicula* and scaphopods tied for third place. In terms of wear and breakage, the scaphopods were similar to those recovered at Souskiou.

Dentalium sexangulum is a Pliocene fossil, much larger than recent *Antalis* spp. (figure 3). All the examples from

Souskiou occurred as short segments up to 27.4mm long with a maximum diameter of 10.5mm. The nearest Pliocene deposits some 15km to the south-east are not fossiliferous and so these scaphopods must have been imported from further afield. Similar 'beads' have been recovered from the famous Neolithic settlement of Çatalhöyük in Turkey and these have been sourced to the Hatay region in the extreme north-east corner of the Mediterranean (Bar-Yosef Mayer *et al*. 2010). It is possible that the shells from Souskiou were also obtained from there, possibly as ready-made beads (one has traces of a cut mark) by trade or exchange, and they may have passed through many different hands before they fetched up in the south-west corner of Cyprus.

figure 3: Segments of fossil *Dentalium sexangulum* (above) and recent *Antalis inaequicostata* (below) from Souskiou (scale in mm).

The archaeology

Scaphopods were found in 63 of 142 (44.4%) tombs at Souskiou Laona and in 42 of 107 (32%) tombs at Souskiou Vathyrkakas, showing that they were not evenly distributed throughout the cemeteries. About half the tombs with scaphopods contained one to five shells, not enough for a necklace. Most contained less than 50 despite the presence of multiple burials of up to ten individuals per tomb. Just eight tombs contained more than 100 shells and two of these contained more than 1000: 1180 at Souskiou Vathykakas and 1361 at Souskiou Laona.

The *Antalis* shells were all beachworn fragments (segments) with a length range of 3.0–48.7mm and a maximum diameter of 4.0mm; most were 10–20mm long. There was no evidence to show the shells had been cut. Most of the segment ends appeared worn and those that appeared freshly broken could be matched by modern beach specimens. The overall impression is that the shells were not subjected to manipulation but simply used as found.

Scaphopods with an apical opening of less than 1.0mm diameter are commonly assumed not to have been strung as beads, being too narrow for the passage of thread (Kurzawska *et al.* 2013). In the Souskiou Laona cemetery, 766 of 2509 (30.5%) *Antalis* spp. fell into this 'non-threadable' category. In several cases two shells had become telescoped together suggesting that they had been strung, and in one pair the inner shell had an apical opening of 0.7mm, indicating that some narrow-holed shells could indeed have functioned as beads. Finely-drilled perforations in some tiny fan mussel (*Pinna nobilis*) mother-of-pearl pendant figurines (figure 4) from two of the tombs showed that shells with apical holes as small as 0.4-0.8 mm could theoretically have been threaded. However, none of the scaphopod segments from the cemeteries showed any evidence of thread wear, suggesting that if they had been made into necklaces then these were necklaces intended for the dead. There remained a substantial number of shells with apical holes as small as 0.2mm diameter which are unlikely to have functioned as beads.

figure 4: Fan mussel mother-of-pearl pendants with tiny holes drilled for suspension (scale in mm).

Eighty-seven of the 89 *Dentalium sexangulum* segments recovered from the Souskiou Vathyrkakas cemetery were present in a single tomb together with 93 *Antalis inaequicostata*, 48 large, beachworn and deliberately holed *Patella caerulea*, 14 *Cerithium vulgatum*, all beachworn and holed in the body whorl so they could have hung apex downwards as pendants, 13 *Tricolia* spp. holed as beads, and the only *Naria spurca* cowry from Souskiou with the dorsum removed to form a flat apertural bead. This tomb was exceptionally rich in seashells other than scaphopods, which were virtually absent elsewhere. The tomb with 1180 *Antalis* contained no other seashells but included a rare twist of copper. At Souskiou Laona, all six fossil scaphopods from this cemetery were found together in one tomb with seven *Antalis* and four (of five overall) mother-of-pearl figurines. The exceptional tomb with 1361 *Antalis* also contained 13 stylised cruciform figurines, similar in shape to the fan mussel pendants but larger and carved from picrolite (similar to serpentine) – and 13 freshwater crab (*Potamon potamias*) claws which superficially resemble *Antalis* in shape and size.

In contrast, relatively few scaphopods were recovered from the Souskoiu Laona settlement: 88 *Antalis* spp. and three fossil *Dentalium sexangulum*. Two *Antalis inaequicostata* had become telescoped together and six others showed possible traces of thread wear, suggesting that these had functioned as beads.

Scaphopods first appeared as necklace beads in the early Neolithic in Cyprus: a mixture of *Antalis* shells and red carnelian beads were found on the skeletons of two women buried beneath dwellings at Khirokitia (c. 7000-5500 BC) near the south coast, but their arrangement if strung is

uncertain. The masses of shells found at Chalcolithic Souskiou appear (so far) to be unique. At the contemporary site of Lemba Lakkous (c. 3400-2400 BC) on the west coast, the dead were buried singly within the settlement and scaphopods were associated with child burials. These shells persist in the archaeological record in Cyprus well into the succeeding Bronze Age but become fewer over time. By the Late Bronze Age, the coastal site of Hala Sultan Tekke (c. 1450-115 BC) in south-east Cyprus yielded only seven *Antalis* sp. among 964 marine shells. They are rarely found after the Bronze Age.

What does it all mean?

Not all the burials at Souskiou were entitled to scaphopods and in those that were the numbers ranged from just one to 1361. This indicates some form of social division that is not expressed elsewhere. The fossil scaphopods appear to have been rare exotics and were virtually confined to single tombs in both cemeteries. In both cases other grave goods suggested special status: the seashells at Souskiou Vathyrkakas and the mother-of-pearl pendant figurines at Souskiou Laona. Neither of these tombs contained exceptional numbers of *Antalis* scaphopods and the two tombs that did contained no fossils. Does this represent two different forms of status, religious and secular, and if so which was which?

Scaphopod shells were very common at pre-agricultural Natufian (c. 12,000 BC) sites in the Levant but became less frequent thereafter. These people were the first settlers at Jericho, famously excavated by Kathleen Kenyon in the 1950s, who entrusted the shells she found to the scrutiny of the Revd H.E.J. Biggs (1963). He commented on the resemblance of the in-turned slit-like apertures of cowries and *Columbella rustica* to female genitalia and wondered if the scaphopods provided the male counterpart. This interpretation is not currently in vogue but at Souskiou Vathyrkakas the tomb containing 87 fossil scaphopods also contained 12 'phallic' (officially 'bar and disc') picrolite pendants, and the tomb with 1180 *Antalis* spp. also contained a stone phallus. Such objects were not recorded in the other tombs, again suggesting these two were special in some way.

The seashell beads and pendants found with the 87 fossil scaphopods were not rare or precious objects in themselves but their absence from other tombs suggests they had some intrinsic quality that might be shared by the accumulations of *Antalis* spp. in other tombs. Theodoropoulou (2014) suggested that shells might have been valued as symbolic offerings from the sea, raising the question whether there was some special connection between the occupants of these tombs and the sea, perhaps on a spiritual level.

Another possible interpretation is that the shells represent the wealth and status of the individuals interred. In other parts of the world strings of scaphopod shells were used as currency, although this was hardly likely to have been a concern in the pre-market economy of Chalcolithic Cyprus. The condition of the shells shows they were all beach-collected and not fished offshore as pristine specimens. Their relative infrequency on beaches even after storms suggests that the large caches of scaphopods in some of the tombs had been collected over considerable periods of time, perhaps over several generations. The inclusion of apical segments that could not have been threaded as beads and the addition of look-alike crab claws does suggest that quantity was more important than quality and the primary reason for their inclusion in some graves at least was not as personal ornaments.

Nevertheless, the Scaphopoda from archaeological sites in Cyprus have usually been interpreted as beads for necklaces. Visitors to the Cyprus Museum in Nicosia will have seen some of the scaphopods from Souskiou Vathyrkakas used to reconstruct necklaces, usually in the form of 'spacer' beads in clusters of up to three between several picrolite pendants. There is no archaeological evidence to suggest the shells were used in this way. Pendants and scaphopods do not always occur together in convincing proportions: one tomb yielded 11 bone pendants but only three scaphopods. The only contemporary *in situ* evidence we have is from a child's grave at Lemba Lakkous (Peltenburg 1990) where a strand of opposed and aligned pairs of shells (probably *Antalis vulgaris*) was found beneath the skull in association with a single pendant (figure 5).

figure 5: Modern *Antalis vulgaris* (collected on Herm, Channel Islands in 1968) arranged as in the necklace of opposed pairs found in a child's grave at Lemba Lakkous (scale in cm).

The telescoping of some of the shells from Souskiou does indicate their use as beads, but this cannot have been their only use. How many necklaces would accommodate 1361 shells – or just one? The disturbed nature of the looted tombs at Souskiou has not preserved the relationship of the shells to the bodies: it is possible that they were sewn onto clothing, for example, although this would not account for the shells that could not have been threaded.

What singled out the tombs that contained such vast numbers of scaphopods? Why did some tombs contain only a broken segment and others none at all? Why were beachworn shells in poor condition combined with rare imported exotics? Why were unthreadable segments retained? These and other questions suggest that there is much more to the scaphopods from prehistoric Cyprus than merely necklaces.

Acknowledgement

I am grateful to the late Phil Palmer for his assistance in identifying the Scaphopoda from Souskiou.

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Key for the identification of some eastern Mediterranean Scaphopoda

1 Shell not ribbed or striated, completely smooth throughout, 35mm max ..... *Fustiaria rubescens*
Shell ribbed or striated at apex (can be difficult to see in beachworn specimens) 2

2 Apex with about 30 fine ribs or striae, obliterating towards the aperture, 60mm max ..... *Antalis vulgaris*
Apex with fewer, stronger ribs 3

3 Shell ribbed throughout its length, about 10 ribs at apex and 20 at aperture, narrow and sharp in relief, 24mm max .... *Antalis dentalis*
Shell not strongly ribbed throughout its length 4

4 Apex with 11-14 sharp narrow ribs which multiply and change into striae, still visible at the aperture, 70mm max..... *Antalis panorma*
Ribs obliterated towards the aperture 5

5 Apex with 9-12 strong primary ribs, secondary and tertiary ribs also present, narrow intercostals (spaces between ribs), all become obsolete towards aperture, 60mm max .....*Antalis inaequicostata*
Apex with 10-11 primary ribs at apex, no secondaries, wide intercostals, fading towards aperture, 50mm max..... *Antalis rossati*

Membership update

Please note that to be included here members must sign a data protection consent form. If you have not been included and now wish to be please contact CIRCA subscriptions (details on page 31).

The Conchological Society of Great Britain & Ireland

We welcome the following as members of the Conchological Society

Mr K. Anderson [redacted]
Mr A. Morton [redacted]
Mr D. Alder [redacted]
Ms G. Nimmo [redacted]
Mr H. Powell [redacted]

The codes in italics indicate the member's interests: C– Conservation; E – Ecology and pollution; F – Fossils; G – General malacology including genetics/physiology; Mb – British marine; Mf – Foreign marine; Nb – British non-marine; Nf – Foreign non-marine; P– Photography.

British Shell Collectors' Club

Saturday 25th April 2020 Shell Convention **Saturday 24th October 2020** Shell Show
both held at Theydon Bois Community Centre, Coppice Row, Theydon Bois, CM16 7ER

Saturday 15th August 2020
Chatsworth Shell Fayre Cavendish Hall, Chatsworth House, Derbyshire, DE45 1PJ
All events open from 9am to 5pm. Admission free.
Please check web site for up to date and further information: www.britishshellclub.org

Field Meeting on Wenlock Edge, Shropshire, 11th August 2019 *Mags Cousins*

A field meeting was organised to explore Wenlock Edge, a distinctive ridge of Silurian limestone in Shropshire. It is a Site of Special Scientific Interest for the geological exposures of the Wenlock Series, and for the species rich Ash woodland and limestone grassland. Much of the woodland and some of the disused quarries are owned or managed by the National Trust but have not been recorded for molluscs for some years. A small band of enthusiasts met at Presthope car park to begin exploring the woods, including two guests from as far away as Anglesey who managed to combine this field trip with their ongoing journey to the Bird Fair in Rutland afterwards. The interests of the group were diverse so no aspect of natural history or paleogeology was left un-investigated, which of course meant that progress was slow but was super interesting. Fortunately we were only recording in monad SO5897 so keeping track of records was slightly easier than it might have been.

It soon became apparent that the woods were rich in molluscs, with the group discovering plentiful *Cochlicopa* cf *lubrica* and also pleasingly, some specimens of *Cochlicopa* cf *lubricella* enabling a comparison of the subtle difference in shell proportions between the two species (figure 1).

figure 1: *Cochlicopa cf lubricella* (left) and *Cochlicopa cf lubrica* (right).

It was exciting to find a really strong population of *Azeca goodalli* (figure 2) very soon after starting out. This species is not at all common in Shropshire, restricted to the Silurian limestone here on Wenlock Edge, and to the carboniferous limestone of the Oswestry Hills and Benthall Edge.

Several specimens of the tiny but intricately structured *Acanthinula aculeata* were discovered in the leaf litter and the garlic smell of *Oxychilus alliarius* created much discussion and elicited further sniffing of other *Oxychilus* species. It wasn't long before the first pseudoscorpion was spotted when sifting leaf litter and this one turned out to be the fiendishly named *Chthonius ischnocheles*, common Chthonid (figure 3).

figure 2: *Azeca goodalli*.

figure 3: *Chthonius ischnocheles*, common Chthonid.

Interest soon diverged to fungi with the discovery of a tall *Xerula radicata*, Rooting Shank. This is a robust early fruiting species with a crinkly surface to the cap and a stipe that extends far underground. The woods also yielded the bright turquoise of *Chlorociboria aeruginascens*, Green Elf Cup, a much smaller but equally striking fungi with attendant beautifully marked *Discus rotundatus* on a rotting log (figure 4).

figure 4: *Chlorociboria aeruginascens*, Green Elf Cup (upper left) with *Discus rotundatus*.

On descending into Knowle Quarry (figure 5), we added several other species to the list including *Lauria cyclindracea*, *Clausilia bidentata* and *Merdigera obscura* (figure 6). We crossed paths with other visitors who had come to admire the spectacular exposures of 420 million year old Silurian coral reefs and were also interested in our finds, unlike their dog which was highly suspicious of our activities.

figure 5: Exploring Knowle quarry rock face, 420 million-year-old Silurian limestone ancient coral reefs.

figure 6: *Merdigera obscura*.

As the woods opened out into rides, glades and quarry edge the suite of species changed to include those of shrubby herbage *Columella edentula* and *Monacha cantiana* and dry open, rocky areas *Candidula intersecta* and *Vallonia excentrica*. The appearance of a Wall Brown butterfly and a stunning green eyed *Chrysops relictus* Twin-lobed deerfly (figure 7) provided further distractions. Eventually we did continue with mollusc recording at a damp, shady, north facing exposure, where we found exquisite little brachiopods, an ancient relative of molluscs, next to the tiny *Carychium tridentatum* (figure 8) which we encountered at several different locations.

Rosemary Hill recorded 8 species of slugs, and overall there were 34 species of molluscs providing a considerable improvement on the six species for this monad in the past. Perhaps the most interesting species of the day was a purple juvenile harvestman, found by Susan Loose, which is a member of the Trogulidae (figure 9). There are only two species in this family in the UK, both are localised and associated with calcareous substrates, and are specialist, though not obligate, predators of molluscs. However, we were unable to definitively determine the harvestman to species because juveniles are rather difficult, especially when only photos are available. It is hoped that we will find adult specimens on a return to Wenlock Edge later in July this year when we will be exploring limestone grassland further along the ridge.

figure 7: *Chrysops relictus* Twin-lobed deerfly.

figure 8: Fossil Brachiopod next to *Carychium tridentatum* (left).

figure 9: Juvenile harvestman of the Trogulidae family.
(photo: Susan Loose)

Olympic rings in the dew

Clive Craik

For many years I have operated a Robinson moth-trap in my garden near Oban in west Scotland. The trap consists of a circular drum of tough black plastic (figure 1) on which rests an 80-watt mercury-vapour bulb (not shown). Moths attracted by the light are trapped when they enter the drum. The trap is operated almost nightly except in winter and was run throughout the night of 14–15th October 2019. At dawn (about 7 am) when, as usual, I brought the trap into an outhouse, I noticed an extraordinary pattern in the dew on the outside of the drum, an apparently continuous trail forming a series of interlocking rings (figure 1). Two tracks can be seen that connect to the ground, evidently marking the entry and exit of whatever made the rings.

In figure 2 a small slug, 7–9 mm long, is visible leaving the drum and making a similar but more linear trail c. 3 mm wide. Although there is some ambiguity in the change of direction at far right, this trail appears to connect with the exit trail, suggesting that this slug made the pattern in figure 1. It may have been feeding on a thin film of algae, invisible to our eyes, growing where the nocturnal light was scattered off the mowed lawn and onto the sides of the drum. Probably the rings formed as it changed direction to stay within the zone of strongest algal growth. In 2018, feeding tracks of unidentified snails on a flat garage roof showed that they also changed direction for that reason. The snails left a more complex feeding pattern because of side-to-side movements of head and radula (Craik and Anderson, 2018 and references therein). Not all snails behave like that, however, and the possibility can't be excluded that a snail made the pattern in figure 1.

figure 1: Dew on moth-trap drum showing complex pattern of interlocking rings, believed to have been made by a feeding slug. Note entry and exit trails, lower centre and lower right. The black drum is 25 cm high and ruler shows 15 cm. The small filamentous white organism at left is thought to be a nematode; see figure 3 for change in its position.

The entry and exit trails are c 2 mm and 3 mm wide, suggesting that the animal grew in girth as it grazed, ingesting both dew and algae. The number of interlocking rings is difficult to count directly as some junctions are indistinct and trails sometimes merge or overlap. It is easier to count the number of distinctly visible left and right arcs or semi-circles. This gives 33 left and about 30 right, implying that there are about 33 rings. If we assume a mean ring diameter of 35 mm and treat all rings as circles, this gives the pattern a total path length of c 3.6 m.

The purpose of the trapping was to record all the moth species caught inside the trap or settled outside it. The whole of the trap exterior was carefully checked every morning so it is unlikely that I missed anything as striking as this in the past, suggesting that the phenomenon is unusual. While it is common for molluscs to graze on surfaces where algae grow, an unusual factor in this case might have been the deposition of dew of suitable thickness and structure on this near-vertical, slightly downward-facing surface. It perhaps required particular meteorological conditions. For the record, air temperature fell steadily from over 10˚C at dusk to 5˚C at dawn. The night was free of rain and only 6 mm of rain had been recorded in the previous 48 hours, so this was a relatively dry period in an area of usually high rainfall. As can be seen in figure 2, the dew comprised many small discontinuous droplets and, along two trails, these have combined into larger drops. The dew evaporated quickly after the trap was brought into the unheated outhouse. Parts of the pattern had disappeared after 20 minutes and by about 45 minutes all the dew had gone, leaving no permanent marks.

A very different kind of animal was also present on the drum. It was mostly translucent with dense white reflective patches at its head, abdomen and tail tip. A sequence of nine photographs taken after the trap had been brought inside showed it moving diagonally downwards left to right. Two of these photos are shown (figures 1 and 3). It left a trail thinner than those above and showed no sign of circling movements. I am most grateful to Carl Farmer for provisionally identifying this as a nematode.

Working in the dim dawn light and concentrating on taking photos before the dew evaporated, I didn't notice either the slug or the nematode until I viewed the images much later. So, regrettably, I wasn't able to identify either more closely.

Reference

Craik, C. & Anderson, P. (2018) Fine art on a flat roof. *Mollusc World* **48**: 26-27.

figure 2: A small slug (c. 5–6 mm long) at lower centre has left a trail 3 mm wide. The exit trail from the rings pattern, also 3 mm wide, enters at left and crosses this trail before disappearing down to the right. In other photos it then appears to connect with the slug's trail, suggesting that this slug made the pattern of rings. Small discontinuous droplets that form the dew are visible at upper centre. They have coalesced into larger drops along two trails of unknown origin.

figure 3: The white nematode in figure 1 has reached the ring pattern. It is c. 12 mm long, 0.8 mm thick, and moved at c. 5 cm/min, leaving a thin trail in the dew.

Freshwater Pearl Mussels *Margaritifera magaritifera*: Conservation news from Scotland

Martin Willing

Illegal damage

The Freshwater Pearl Mussel (FPM) *Margaritifera margaritifera* is a long-lived species that was once widespread in fast-flowing soft-water, mostly upland streams chiefly in western and northern Britain from Dartmoor in the south to the far north of Scotland. The species is now fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is also listed on Annex II of the EUHSD. The non-marine molluscan status review for Britain (Seddon *et al* 2014) assessed the FPM as Critically Endangered. Populations of the mussel have been hugely reduced throughout England and Wales for many reasons (river siltation, pollution and low water flows, illegal pearl fishing, and a decline in the salmonid fish required for the mussel glochidial larval stage). Remaining FPM strongholds are now chiefly found in Scotland where some rivers still support many of the best remaining populations in Europe (figure 1).

figure 1: A typical freshwater pearl mussel river in the Scottish Highlands with a mussel survey in progress. (photo:Peter Cosgrove)

In spite of the mussel's robust legal protection, illegal fishing is still regularly harming populations. Thus, in July 2019, BBC news (www.bbc.co/news/uk-scotland-highlands-islands-48936208) reported the discovery on 4th July 2019 of a kill of more than 100 mussels in the upper River Oykel in Sutherland, an incident which police estimated to have occurred about two months before. Unfortunately, the BBC gave fairly precise location details, these obviously being of great assistance to prospective pearl-fishers. The Conchological Society and NBN treat FPMs as one of a small group of 'sensitive species' where location details of records are intentionally 'blurred'.

Disappointingly, the River Oykel poaching incident was not an isolated recent event. In early October 2019, further poaching activity was discovered (but not widely reported) from another Highland river catchment situated well away from the Oykel. Here a team of three scientists undertaking an FPM monitoring survey (under licence to Scottish Natural Heritage) discovered evidence of yet more illegal mussel fishing. They found about 150 dead mussels along a stretch of river and so a larger kill than that reported from the Oykel (figure 2).

figure 2: Freshwater pearl mussel poaching-kills discovered in October 2019 in the Scottish Highlands. (photos: Peter Cosgrove)

From the state of the shells (all fresh with little or no erosion of the internal lustrous pearly pinkish-white and with no rotting flesh) it was estimated that they had all died at about the same time in late spring/early summer 2019 (coincidentally at a similar time to the mussel deaths reported from the Oykel). The possibility of natural mortality was discounted as the recently dead shells were all found on only one bank of the river (not in the river itself) and aggregated into 'pockets' on grassy open-areas where a person could comfortably sit on the river margins. Additionally, none of the dead shells were damaged in a manner consistent of natural predation by, for example, otters, oystercatchers, gulls or crows. Instead they appeared to have been opened by a human, the left valve being prised open at approximately the same point, or cut with a knife incision to severe the adductor mussels (after which the valves spring open like a butterfly). A full case report of this destructive illegal activity has been submitted to the local police, together with photographic and dead shell evidence. Very unfortunately these and other poaching losses followed a prolonged drought-year in Scotland in 2018 when much lowered water levels in many Scottish rivers resulted in significant natural mussel mortality in some river catchments.

Some good news

Despite these depressing wildlife crime incidents, it is not all doom and gloom for freshwater pearl mussels in Scotland. In January 2020 a survey team from Alba Ecology discovered a new to science freshwater pearl mussel population in the North Highlands. Of particular note is the small size of the watercourse ca. 1-1.5m wide and 0.4m deep (figure 3). How many more, small, remote Highland Burns have such unknown and undescribed pearl mussel populations?

figure 3 A licensed freshwater pearl mussel surveyor in the burn supporting the newly discovered population in the northern Highlands and some mussels from this population. (photos:Peter Cosgrove)

Acknowledgements

Parts of this article were first reported in *British Wildlife* **31**: 136–137, December 2019, www.britishwildlife.com) and they are thanked for allowing an edited version of that report to appear in Mollusc World. Thanks are also due to Peter Cosgrove for the supply of news information reported in this piece together with associated images.

Reference:

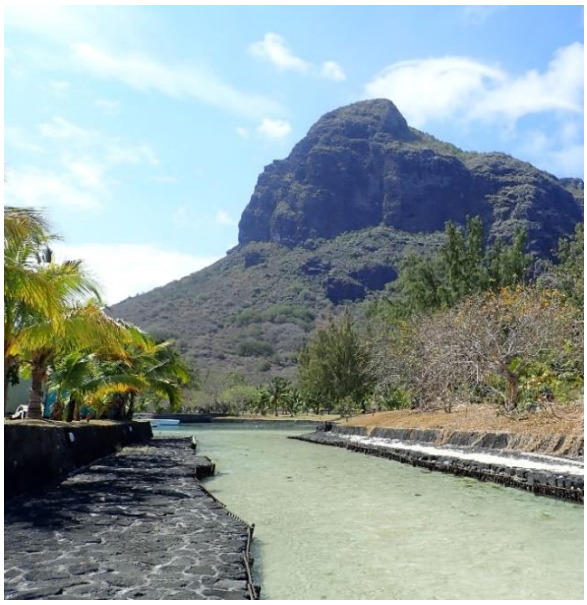
Seddon, M.B., Killeen, I.J. & Fowles, A.P. (2014) A Review of the Non-Marine Mollusca of Great Britain: Species Status No. **17**. *NRW Evidence Report No: **14**, 84pp. Natural Resources Wales, Bangor.*

Some living marine molluscs in Mauritius

Peter Topley

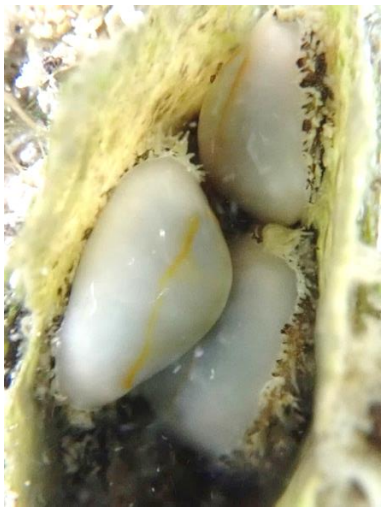
The following photographs were taken on a recent holiday based on Le Morne Peninsula, Mauritius of some marine molluscs that were easily viewable (for a non-swimmer!) by wading at low tide in shallow water inside the reef, or (in the case of *Tridacna squamosa*) viewing from a glass-bottomed boat. Large numbers of pen shells (*Pinna muricata*) were living in sediment amongst *Zostera*, some dead ones occupied by money cowries (*Monetaria annulus*). As with many marine species, some (such as *Tectus mauritianus*) were heavily disguised by growths of algae. Other habitats included boulders, mangroves, jetties and a small harbour.

Le Morne Peninsula, Mauritius, October 2018.



Small harbour near hotel, home to various mollusc species.

Mauritia mauritiana (L.,1758) almost out of the water on the vertical wall of harbour (length c. 75 mm).



Monetaria annulus (L.,1758) in a dead *Pinna* shell and covered with the mantle (right) (l. c. 22 mm).

Living *Pinna muricata* (L.,1758) in sediment and shell on the shore (length c. 100 mm).

Tectus mauritianus (Gmelin, 1791) (height c. 60 mm) on harbour wall.

Gibberulus gibberulus (L.,1758) on coral sand (h. c.50 mm). Note the eyes protruding from the stromboid notch and the siphonal canal.

Gymnodoris cf. *subflava* nudibranch (c. 2.5 cm) amongst Zostera. Note the yellow-orange gills arranged in a horseshoe shape.

Nassarius albescens gemmuliferus (A. Adams, 1852) (h. c. 18 mm).

Littoraria pintado (Wood, 1828) (h. c. 15 mm) on mangrove stem.

Nerita albicilla (L. 1758) (l. c. 28 mm).

Nerita plicata L., 1758 on dead coral/rocks (h. 18 mm).

Mammilla melanostoma (Gmelin, 1791) (l. c.35 mm).

Nassarius horridus (Dunker, 1847) (h. c.11 mm).

Gutturnium muricinum (Röding, 1798) shell with hermit crab (h. c.55 mm).

Conus textile L., 1758. on sand near coral boulder (h. c.50 mm).

Tridacna squamosa Lamarck, 1819. On reef.

On the identification of limpets (*Patella* species) on British shores

Bas Payne

Four species of limpet in the genus *Patella* occur in Britain:

- *Patella vulgata*, the 'common limpet', widespread,
- *Patella ulyssiponensis* (called *Patella aspera* in older books), the 'china limpet', widespread,
- *Patella depressa* (called *Patella intermedia* in older books), the 'black-footed limpet', only in SW England and Wales,
- [*Patella pellucida*, the blue-rayed limpet, widespread and easily identified from its smooth shell, which will not be further considered here].

Though they are all frequently common intertidally, there is quite a lot of uncertainty and hesitation about distinguishing common, china and black-footed limpets – they are often regarded as difficult. The purpose of this note is to make identification easier and records more reliable.

There are three main reasons why identification can cause problems. The first is that **in order to be able to identify limpets with any reliability, you need to take them off the rock and look underneath, at their soft parts**. This is reasonably easily done with a thin-bladed and round-ended dinner knife, with a single confident push with the end of the knife under the edge of the limpet. If that fails, don't go on trying the same limpet – it will have clamped down, and you will inevitably damage it; for the same reason, don't use a sharp-ended knife, and don't try to lever a limpet off the rock. Avoid using excessive force – almost inevitably, you will end up with bloody knuckles; my own preferred method is to hold the knife in the left hand, rather like a chisel, and hit the handle of the knife fairly gently with my right hand – this gives more control; with practice, you learn how to do this without warning the limpet in advance by touching it before you hit the knife-handle. If you replace limpets carefully after you lift them, most will clampdown again and survive. But some may not – so it's important only to lift limpets if there are plenty around, to lift them as carefully as you can, and not to lift more than necessary.

The second reason is that **limpets are variable**. There are usually some individuals in any population which appear to some extent intermediate (which have given rise to the suggestion that they may be hybrids; it seems unlikely that this is the case, but DNA studies would be needed to test this properly). If you simply want to know which species are present at a site, and roughly in what relative abundance, the practical course of action is simply to ignore any intermediates – you don't need to be able to identify every limpet in order to record which species are there.

The third reason is that **juveniles can be confusing.** They are smaller, so there is less to look at, foot colour is often paler, and internal shell characters are less developed. If you simply want to know which species are present at a site, the practical course of action is simply to ignore limpets less than ca. 20 mm long. In very young limpets, the foot may be somewhat transparent, so that dark gut contents may make the centre of the foot look dark.

The main features to look at are the colour of the pallial tentacles (hand lens needed, as these are only a millimetre or two long), the colour of the foot, and the colour of the inside shell margin (i.e. the part that is visible round the main mass of the animal) (see the table at the bottom of this page).

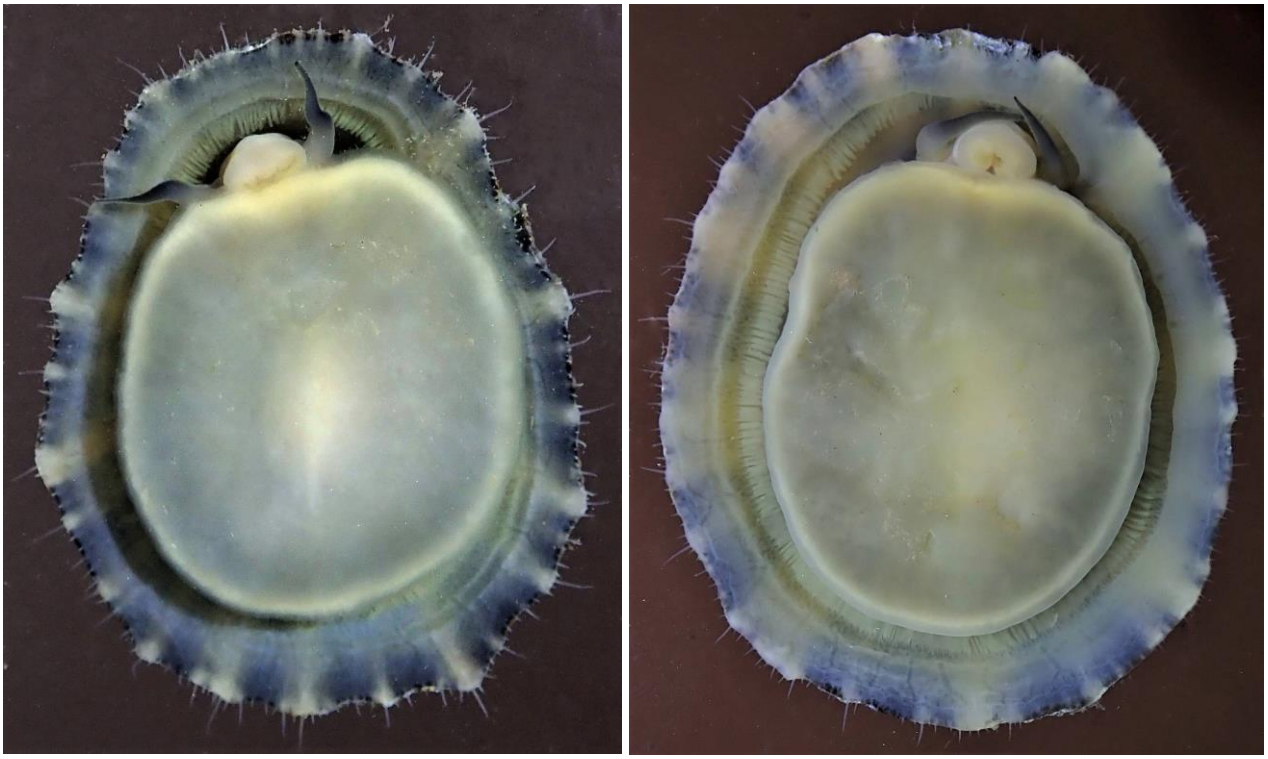
Figures 1,3 and 5 show groups of each species viewed from below, in the hope that this illustrates the distinguishing characters of the three species and also some of the variation encountered. Figures 2,4 and 6 show close-ups of each species, particularly to illustrate the differences in the pallial tentacles.

Three characters are described and illustrated for each species; if you find more than one individual with all three characters, you can safely record the presence of that species. If you find individuals with only two characters, the best course is to look at more limpets rather than agonising over particular individuals. The least satisfactory character here is the use of foot colour. While the apricot colour of the foot in *Patella ulyssiponensis* is often very clear, there is often considerable little difference in foot colour between *Patella vulgata* and *Patella depressa*; however the colour of their pallial tentacles is very different.

Patella ulyssiponensis is more often found further down the shore and in exposed positions, but also in rock pools even close to high water. It is often rather narrow, especially when younger, with a very rough surface, and often with lots of algae and barnacles growing on the shell. *Patella depressa* is most commonly found in the lower mid-shore, and in damp positions, e.g. round rock pools or on the north sides of rocks; it is often notably irregular in outline, with a low apex, and often broad at the front. *Patella vulgata* is found almost everywhere on most shores – even in the upper shore; it is often rounder and higher, and seems to tolerate more fresh water and more sediment in the water. These characters should not be used by themselves to identify limpets, but can be used to decide which limpets to remove from the rock to look at more closely. Identifying dead limpet shells is problematic; sometimes it is possible for very fresh dead shells, but it should not be used as the basis for recording presence at a site.

	Pallial tentacles: **hand lens needed**	Foot	Inside shell margin
P. vulgata	Pallial tentacles translucent (see figure 2).	Foot usually grey-brown ('khaki'), but may be yellowish or fairly dark (see figure 1)	Inside shell margin generally with alternating yellowish and darker rays, gives a generally pale impression (see figure 1).
P. ulyssiponensis	Pallial tentacles white (see figure 4): these are sometimes hard to see against the whiteish shell.	Foot colour 'apricot' – *i.e.* bright orangish (beware – for some reason this colour often doesn't reproduce accurately in photos); but often pale in smaller individuals (see figure 3).	Inside shell margin white or whiteish in shells over 25 mm (see figure 3). (The inside margin in smaller shells is variable, often with alternating fairly narrow pale and brown rays).
P. depressa	Pallial tentacles bright white and more numerous (see figure 6).	Foot blackish grey, often paler in the centre (see figure 5).	Inside shell margin appears rather dark, with alternating dark brown and whiteish rays which often have narrow bright white centres (see figures 5 and 6).

figure 1: Underside view of group of *Patella vulgata* from Limpet Rocks, Torcross, Devon.



figures 2a,b: Underside close-ups of two *Patella vulgata* from Limpet Rocks, Torcross, Devon.

figure 3: Underside view of group of *Patella ulyssiponensis* from Limpet Rocks, Torcross, Devon.

figure 4a,b: Underside close-ups of two *Patella ulyssiponensis* from Limpet Rocks, Torcross, Devon.

figure 5: Underside view of group of *Patella depressa* from Limpet Rocks, Torcross, Devon.

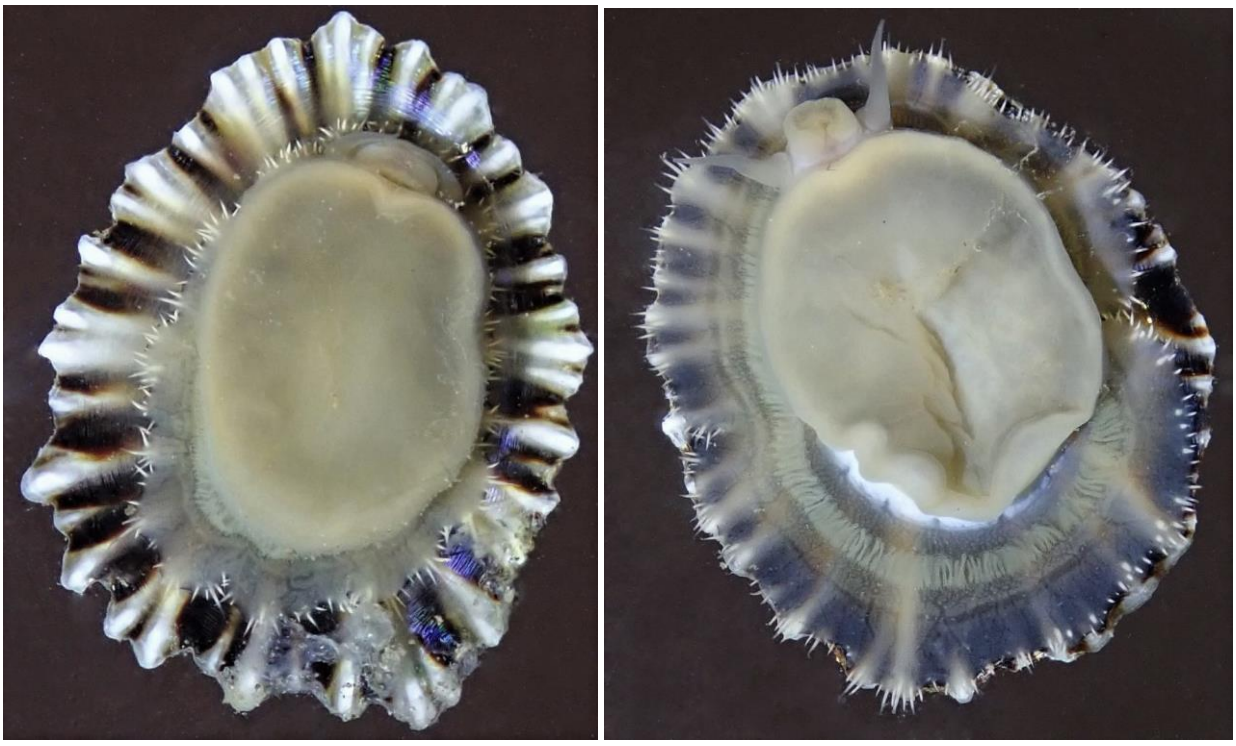


figure 6a,b: Underside close-ups of two *Patella depressa* from Limpet Rocks, Torcross, Devon.

Note on the figures

All the limpets in these figures are of medium size, between 22 mm and 46 mm long; and the limpets were underwater. The individual images were taken through a glass tray from below, with the underneath of the limpet lit against a dark background. This makes their feet look relatively pale. The group images were taken from above, with the limpets under water but upside down and against a pale background, which makes their feet look darker.

Acknowledgements

Many thanks to Terry O'Connor, Rupert Honnor and Simon Taylor for helpful discussion and for comments on drafts of this note.

Any comments welcomed: bas.payne@gmail.com.

Molluscs from fishing nets retrieved from the North Sea, June 2018

Han Raven and Sylvia van Leeuwen

This paper is a translation of Raven, J.G.M. & S. van Leeuwen (2019) Mollusken uit opgedoken visnetten. Duik de Noordzee Schoon juni 2018 (Molluscs from fishing nets retrieved from the North Sea, June 2018). *Spirula*, **418**: 44 – 54. Between square brackets a few sentences have been added to explain the campaign to our new audience, and to mention some recent developments.

Summary.
Every year, a dive team recovers lost fishing nets and other materials from ship wrecks in the North Sea – coordinated by 'Stichting Duik de Noordzee Schoon' (Foundation DDNZS, or 'Dive to Clean the North Sea'). Unlike on previous occasions, this time material from the British part of the North Sea was collected and only one locality in Dutch waters was sampled. Data about the mollusc fauna of the wrecks was gathered via inspection of the retrieved fishing nets and via soil samples taken by the divers. Most samples were small, but relatively rich in species (in total at least 106). As a result of the different sampling area, this included quite a few that had not been seen during earlier DDNZS expeditions. *Modiolula phaseolina* (Philippi, 1844) was recorded for the first time from several localities in the British part of the southern North Sea.

Introduction
Each year since 2007 Foundation 'Duik de Noordzee Schoon' (DDNZS, or 'Dive to Clean the North Sea') has organised an expedition to study animals and seaweed on ship wrecks. [This foundation aims to further the protection and the sustainable use of the North Sea. One of its activities is to organise dive expeditions with voluntary divers to clean, investigate and protect ship wrecks in a sustainable way.] A group of divers, including biologists, record species observed and remove lost fishing nets and other [artificial] materials from wrecks. This trash is brought to port and since 2015 it has been studied by another group of people to record all kinds of organisms. Reports of earlier activities and specific finds of molluscs have been described in Gittenberger et al. (2013), Bartelink et al. (2016), Driessen (2016), Van Leeuwen et al. (2016 and 2017) and Van Leeuwen (2018). In separate papers other organisms have also been reported.

Sampling at sea
In June 2018 wrecks in both the British and the Dutch parts of the southern North Sea were to be visited. Because of bad weather, the second part had to be cancelled (although there was one big bag from a *Sabellaria* reef on the 'Friese Fronten' in the Netherlands). An overview of the localities visited is given in table 1 and figure 1. As a result, the 2018 activity of sifting through the retrieved nets relates almost entirely to the British part of the North Sea. Also, during the 2015 expedition, wrecks in the British part of the North Sea were visited, but because the research then focused primarily on Dutch fauna, the nets were not kept separate and no locality data were available (Van Leeuwen et al., 2016). In 2018 Floor Driessen ensured that all recovered nets were preserved with locality data. Some of the wrecks are Dutch ships, sometimes with a turbulent history, such as the 'Koningin Regentes', a hospital ship that sank during the First World War after being torpedoed by a German submarine. More information about the wrecks can be found in the archaeological report of the expedition (Van den Berg & Mulder, 2018).

Also new is that Dick Hoeksema (DH) received sediment samples from two participants of Dive Team Zeeland [who participated in the expedition of DDNZS]. These samples (5 samples of approximately 150 ml each) were found to contain a rich mollusc fauna; some samples are from wrecks from which no other material was collected, and others from wrecks from which retrieved nets were studied. Biologists who participated in the DDNZS expedition also recorded species during their dives. After each dive they noted their observations on standard forms. As these records have not yet been validated, they could not be included in this paper.

Sifting through the nets
Sylvia van Leeuwen coordinated the participation of members of the Netherlands Malacological Society (Nederlandse Malacologische Vereniging or NMV) and Lilian Schoonderwoerd of members of the Biological Working Group (Biologische Werkgroep or BW) of the Dutch Underwater Sports Association (Nederlandse Onderwatersport Bond). This year they [the volunteers who investigated the nets in the harbour] were Hannco Bakker (HB), Bob Bruins, Bart van Heugten, Dennis Leeuw (DL), Sylvia van Leeuwen (SL), Han Raven (HR), Erick Staal, Fred Vervaet (FV), Anne Lamers and Hans Spierenburg.

Dive	Date (June 2018)	Locality	Longitude	Latitude	Diving depth in metres (Floor)	Nets	Sedi-ment
1	15	U31	N52° 47.351'	E03° 03.170'	32.5	x	
2	15	Koningin Regentes (paddle steamer)	N53° 00.008'	E02° 52.582'	NA	x	x
3	16	Tropic Shore	N53° 24.922'	E02° 18.925'	26.6		
4	16	UK6744	N54° 13.033'	E01° 46.200'	32.3	x	
7	18	UK57037	N55° 00.035'	W01° 22.786'	19.8		x
5, 6	17	70500	N55° 02.239'	E01° 42.016'	31.3; NA	x	x
8	18	Mars	N55° 03.814'	W01° 24.095'	29.1		x
9, 13	19, 20	Somali	N55° 34.089'	W01° 36.025'	29.5; 13.3	x	x
10, 12	19, 20	Farne (eco dive, without wrecks)	N55° 38.212'	W01° 36.988'	12.1; 13.3		
11	20	Chris Christonson (wreck not found)	N55° 38.400'	W01° 36.500'	-		

table 1: Dive localities, arranged from south to north.

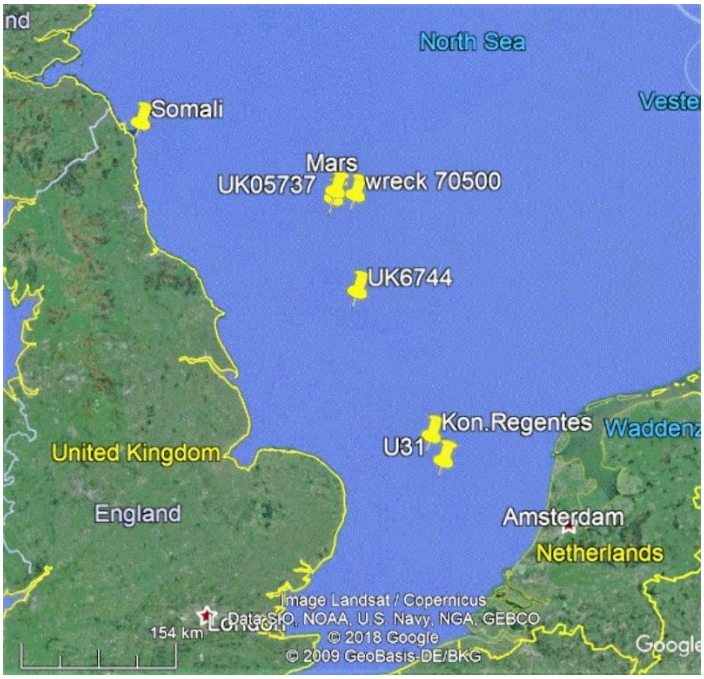


figure 1: Dive localities (Google Earth).

On previous occasions the nets were delivered at Scheveningen. Due to the bad weather not only was the second part of the dive trip cancelled, but also at the last minute there were changes to both location and arrival time. The ship moved to the port of Antwerp and the nets were eventually transported to the port of Stellendam, where we could inspect them on Saturday 23rd June 2018. Some participants had to cancel their participation, but the remaining group was still quite big.

For a while we were threatened to be sent away by the harbour master who, due to a misunderstanding, was not informed about our arrival. Fortunately, that could be solved on the spot. Unlike previous years, the 'big bags' with nets were not placed on the quay, but in a container with ship's waste (figure. 2). Therefore, the workspace was cramped and awkward and we had to search and drag big bags around to find and sample the right bags. Most nets had been in the big bags for days, which was obvious from their smell. Good cooperation ensured that different nets could be sampled at the same time (figure 3). Part of the sifting through material was done on site. Under the guidance of Dennis Leeuw, a lobster trap (figure 4) from the Somali was completely disassembled: animals were found on the trap and in all kinds of cavities. In addition, pieces of net, rope and animal debris from the bags were collected, as well as material that fell to the bottom of the big bags. After returning home it became clear that a good method was to wash the samples in fresh water, put all the material in containers with alcohol, after a few days rinse it through a fine strainer and then dry it. Earlier we had already learned to also retain the finest fraction (that passes through a sieve with mesh <0.5 mm) because it might contain very small species, as indeed was now the case.

What was found in the nets and sediment samples?
An overview of the species of molluscs found is given in table 2 [see note below (Ed.)]. This is a simplified version. The complete database with records per participant (including other species groups) has been compiled by Sylvia van Leeuwen. This is available on request and has also been made available to the DDNZS and ANEMOON foundations, who will record the data in their databases [after publication the database has also been shared for inclusion in the National Biodiversity Network (NBN) atlas]. From a few wrecks there are no observations from the nets because there was not always interesting growth on them. Some big bags were positioned so deep within the container that they were not easily accessible. In total almost 500 records of molluscs were collected, but the same species was often reported several times from the same wreck: by different collectors or on different substrates.


figure 2: The nets have been placed in a container (left to right: Dennis Leeuw, Hannco Bakker, Fred Vervaet). (photo: Han Raven)


figure 3: Sifting through the nets (left to right: Sylvia van Leeuwen, Bob Bruins and Fred Vervaet). (photo: Han Raven)

Most specimens collected were fresh, presumably many animals were taken alive. These are animals that lived on the substrate of nets, ropes or traps: attached (mussels, *Heteranomia squamula*), in cavities (*Hiatella arctica*, *Sphenia binghami*, *Kellia suborbicularis*, *Talochlamys*

pusio) or freely mobile (*Emarginula fissura, Trivia arctica*). Of some species only old specimens were found, as indicated in the table. Likely these species also live at the same locality, but most are species that live in soft sediment and very little sediment has been sampled.

The species were identified by the participants themselves, but several troublesome species and deviating identifications were then checked by other participants and specialists, helped by the mutual sharing of lists of records and photos.

figure 4: The lobster trap from the Somali is being disassembled. At first sight holding little promise, but eventually many interesting species were found on this object. (photo: Han Raven)

Some special finds

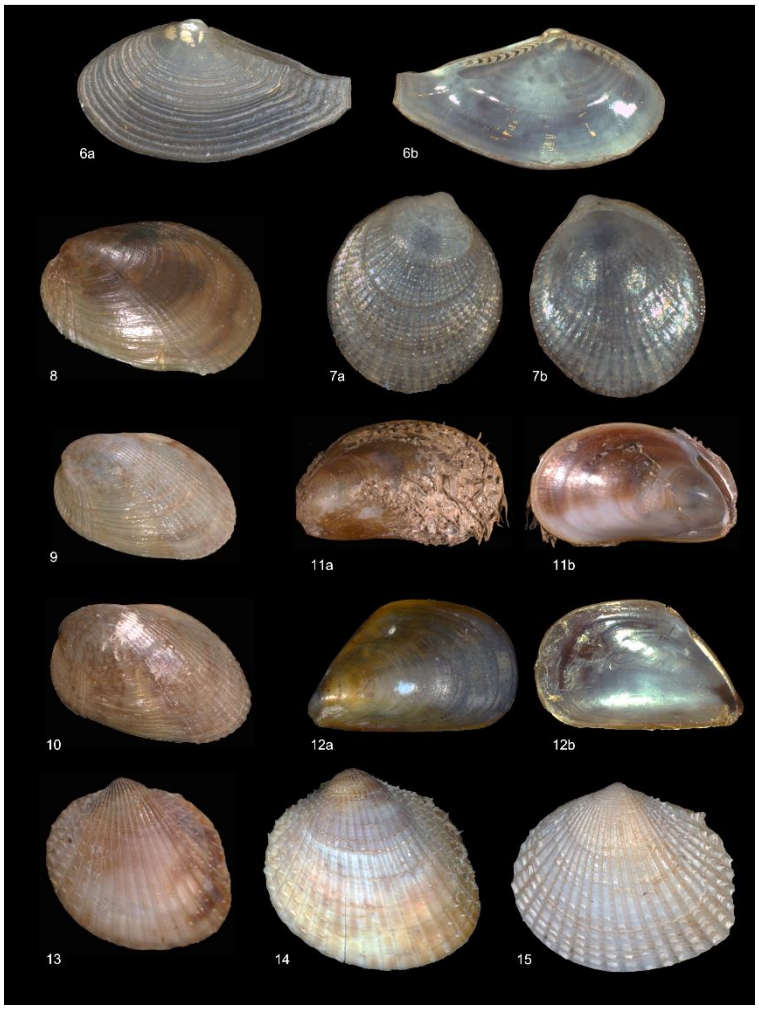
● *Modiolula phaseolina* (Philippi, 1844)**.** Many samples contain large numbers of hairy mussels (figure 11). We thought we were dealing with juvenile *Modiolus modiolus* (Linnaeus, 1758). But after cleaning at home, shape (relatively narrow and pinched, not triangular), periostracum with coarse hairs, a curved rib on the inside bordering the anterior muscle scar and a small field with nodules / grooves near the dorsal edge near the umbo confirmed that this is *M. phaseolina*. The differences between the two taxa are very clear in the figures in Oliver et al. (2016). *Modiolula phaseolina* is widespread around the British Isles but according to the website of Natural History Museum of Wales (Oliver et al., 2016) it is not present in the southern North Sea. Our findings show that the species occurs on the British side, the species is widespread (table 2) and numerous. Van Leeuwen et al. (2016: fig. 5e-5f) image specimens that closely resemble it (from the Dogger Bank; DDNZS 2015 campaign in the Dutch North Sea), but which are clearly larger than our specimens. These shells lacked the characteristic grooves near the dorsal edge that are characteristic of *Modiolula* and are therefore identified as juvenile *Modiolus modiolus* [post script: recently *Modiolula phaseolina* has been confirmed to also occur on the Dutch side of the southern North Sea, see Van Leeuwen, 2019].

● According to Oliver et al. (2016) the small cockles *Parvicardium pinnulatum* (Conrad, 1831) and *P. scabrum* (Philippi, 1844) are widespread in muddy sand and gravel in the shallow littoral and the continental shelf of the United Kingdom. On their distribution cards, Oliver et al. (2016) colour the entire southern North Sea, but on the Dutch side *P. pinnulatum* has only once been found (De Graaf et al., 2017). *Parvicardium pinnulatum* (figures 13-14) differs from *P. scabrum* (figure 15) in the more convex shape, the more forward placed umbo and therefore more sloping posterior, rounder ribs, narrower grooves between the ribs and spines on the rear ribs (instead of scales). The specimens from the Somali wreck show an interesting variation: in the specimen in figure 14 towards the ventral side the ribs split into two or three parts separated by shallow grooves. The growth lines are clearly more inclined on the central part.

● A broken valve (figure 18) from the Mars sediment sample gave headaches: it is quite round, surface with fine pits, a striking umbo formed by the prodissoconch, and a sturdy hinge. It is the hinge that caused confusion: at the front a short, striking lateral tooth and at the back a long lateral tooth and further inwards a shorter one. Several people looked at it and suggested various families, but the Lasaeidae remained as only serious candidate. Ultimately, from the website of the Natural History Museum Wales (Oliver et al., 2016: photo MO11772) it became clear this is *Hemilepton nitidum* (Turton, 1822), of which the shorter ‘tooth’ at the rear is in reality the edge of the ligament. The anterior lateral tooth is half broken and the cardinal tooth is worn. Incidentally, in the same sample also complete specimens of this species were found [but these were not shown to us].

● *Gari tellinella* (Lamarck, 1818). The identification of a few juvenile valves (figure 19) turned out to be quite a challenge. Shape, hinge and pallial sinus indicate it is a tellinid, but which one? The weak colour bands (at the edges) did not fit anywhere. In the end we found the solution for this species on the website of the Natural History Museum Wales (Oliver et al., 2016) on which a growth series of *Gari tellinella* is shown. The species is not known from the Netherlands but occurs around the British Isles, except in the southern North Sea. We indeed found the species only at northern localities (Somali and 70500).

● *Abra prismatica* (Montagu, 1808). A juvenile valve (figure 21) is clearly an *Abra*, but is it *Abra nitida* (Müller, 1776) or *A. prismatica*? Because the valve is not fully grown a comparison with the outline of adult specimens does not provide a definite answer. Also here, Oliver et al. (2016) provided the solution, again through photos of growth series. Moreover: in our valve a tiny pearl is visible to the left of the middle.



figures 6–15:

(6) *Nuculana minuta* (O.F. Müller, 1776), Mars, sediment sample, L 5.1 mm (DH);
(7) *Crenella decusata* (Montagu, 1808), Somali, sediment sample, L 2.5 mm (DH);
(**8)** *Musculus discors* (Linn., 1767), Somali, lobster trap, L 7.9 mm (HR);
(9–10) *Musculus subpictus* (Cantraine, 1835), Somali, rope (HR): (9) L 6.2 mm. (10) L 7.2 mm;
(11) *Modiolula phaseolina* (Philippi, 1844), Somali, rope, L 11.2 mm (HR);
(12) *Mytilus galloprovincialis* Lamarck, 1819. Somali, rope, L 10.6 mm (HR);
(13-14) *Parvicardium pinnulatum* (Conrad, 1831), Somali, lobster trap: (13) L 5.5 mm (HR), (14) L 5.6 mm (FV);
(15) *Parvicardium scabrum* (Philippi, 1844), Somali, L 3.6 mm (FV).

(photos: Han Raven)

Abbreviations used in all figures of shells:
L = length, H = height

figures 16–26:

(16) *Kellia suborbicularis* (Montagu, 1803), Somali, rope, L 5.0 mm (HR);
(17) *Kurtiella bidentata* (Montagu, 1803), Somali, lobster trap, L 1.8 mm (HR);
(18) *Hemilepton nitidum* (Turton, 1822), Mars, sediment sample, L 2.1 mm (DH);
(19) *Gari tellinella* (Lamarck, 1818), Somali, lobster trap, L 3.2 mm (HR);
(20) *Abra alba* (W. Wood, 1802), 70500, L 10.5 mm (HR);
(21) *Abra prismatica* (Montagu, 1808), Somali, lobster trap, L 4.6 mm (HR);
(22) *Asbjornsenia pygmaea* (Lovén, 1846), Somali, lobster trap, L 3.8 mm (HR);
(23) *Venus casina* Linn.,1758, UK57037, sediment sample, L 3.0 mm (DH);
(24) *Thracia villosiuscula* (MacGillivray, 1827), Koningin Regentes, L 3.9 mm (FV);
(25) *Sphenia binghami* W. Turton, 1822, Somali, lobster trap, L 11 mm (HR);
(26) *Hiatella arctica* (Linn., 1767), Somali, lobster trap, L 13 mm (HR).

(photos: Han Raven)

● *Emarginula fissura* (Linnaeus, 1758) was found alive on the lobster trap from the Somali wreck (figure 5). An old specimen was found among nets of the UK6744 wreck.

● *Dikoleps nitens* (Philippi, 1844) has no sculpture, with the exception of a few spiral lines in the umbilicus (figure 29). It is a very small species that lives between seaweed in the tidal zone (own observation HR) but occurs to a depth of 100 m (Graham, 1988: 136). The species has not been found alive in Dutch waters (De Bruyne et al., 2013), although fairly fresh specimens are known from the Holocene '*Angulus pygmaeus* Fauna' (e.g. De Bruyne et al., 1987; Hoeksema et al., 2018). According to Graham (1988: 136) the species does not occur in the British part of the southern North Sea. It was only found in the northernmost locality (Somali), being most numerous in the sediment sample.

figure 5: Emarginula fissura (Linnaeus, 1758) in living position on the lobster trap from the Somali (DL). (photo: Han Raven)

● *Pusillina inconspicua* (Alder, 1844) turned out to be widespread and common. The identification of these shells cost us quite a few headaches and our identification is not entirely satisfactory. Some specimens have the typical appearance of the species, with red protoconch, rapidly increasing width and with axial ribs. However, we also found numerous tall specimens without sculpture or with ribs only on an intermediate whorl, with extremely elongated brown spots on the upper side of the whorls and not always with the characteristic red protoconch (figures 35–37). Also, the shell is somewhat slimmer than usual, with slightly less convex whorls. Initially, some participants identified these as *Setia pulcherrima* (Jeffreys, 1848) but none of the specimens have the characteristic colour pattern of that species: spiral bands of speckles, while the species has not (yet) been recorded from the North Sea (Graham, 1988: 228; NBN atlas, 2018). However, due to climate change it is not inconceivable that *Setia pulcherrima* will expand into the North Sea. Based on the relatively large aperture, also the smooth form of *Rissoa parva* (Da Costa, 1778) has been considered. However, the brown comma-shaped spot on the peristome characteristic for that species is missing, and the whorls of our shells are wider and more convex than in that species. At several localities both species (*Pusillina inconspicua* and *Rissoa parva*) occur syntopically.

● *Caecum glabrum* (Montagu, 1803). Several specimens of this species were found (figures 39–41). DH also found a few protoconchs, one of which is depicted, a specimen with a small piece of teleoconch (figure 41). Sometimes the protoconchs are mistaken for *Omalogyra atomus* (Philippi, 1841), but that species has a brown shell with all whorls in a plane. The specimen in figure 40 may be confusing because it still has a small piece of protoconch attached to the teleoconch.

● Seven specimens of *Trivia arctica* (Pulteney, 1799) were found on the Somali lobster trap (figure 43). The juvenile animal of figure 42 also is a *Trivia*. Because only *T. arctica* was found on the trap, this is probably the same species.

● *Tritia incrassata* (Strøm, 1768). This species was found at quite a number of localities (table 2; figures 47–49) and thus appears to be more common in the British part of the North Sea than in the Dutch part, although in recent years this species has been observed there several times (Vanagt & Faasse, 2014; Van Moorsel et al., 2015; Van Moorsel, 2016; Van Leeuwen et al., 2016 and 2017). Two specimens from the Somali are different (figure 47): the shells are smaller, slimmer, thinner, and especially the upper whorls are much more convex than in the typical form (figure 49) – compared with juvenile specimens (figure 48) the difference is striking. Because the shells are otherwise similar - especially the characteristic black spot in the siphonal canal - we have attributed these deviating specimens to the same species. We would like to be notified if similar specimens have been found elsewhere.

Discussion

Compared with previous DDNZS results this is a very varied fauna (at least 106 species recorded). 35 species were only recorded in sediment samples, 25 only in nets and 46 in both the sediment samples and the nets. From the data it is evident that the combination of both methods gives a more complete impression of the fauna than just the study of the nets. The number of species recorded from fishing nets (71) is also larger than for the expeditions of 2015 and 2016 (Van Leeuwen et al., 2016: 61 species; Van Leeuwen et al., 2017: 66 species). The higher frequency of hard substrate in the British part of the North Sea may play a role, as it provides stepping stones to the wrecks. Several species have not been recorded previously from DDNZS activities.

The sediment samples also contain species that live in the sediment. Nothing indicates this material to be older than Holocene, and we expect these species to still occur on location. Old specimens from the sediment were also found in nets, ropes and lobster trap, because often some sediment was caught in these materials. Thus, there is no sharp biotope separation between the species from both sampling methods. Nets, ropes and lobster trap provided relatively more fresh material than the sediment samples.

figures 27–43: **(27)** *Emarginula fissura* (Linnaeus, 1758), UK6744, H 9.2 mm (FV); **(28)** *Gibbula tumida* (Montagu, 1803). Koningin Regentes, H 4.5 mm (FV); **(29)** *Dikoleps nitens* (Philippi, 1844), Somali, lobster trap, H 0.6 mm (HR); **(30)** *Obtusella intersecta*, Somali, lobster trap, H 0.8 mm (HR); **(31)** *Alvania punctura* (Montagu, 1803), Somali, lobster trap, H 2.2 mm (HR); **(32)** *Crisilla semistriata* (Montagu, 1808), Somali, lobster trap, H 2.3 mm (HR); **(33–34)** *Onoba semicostata* (Montagu, 1803), Somali, lobster trap (HR): (33) H 2.0 mm, (34**)** H 3.1 mm; **(35–37)** *Pusillina inconspicua* (Alder, 1844): (35) 70500, H 2.2 mm (HR), (36-37) U31 (SL): (36) H 2.1 mm, (37) H 2.1 mm; **(38)** *Rissoa parva* (da Costa, 1778). Somali lobster trap, H 2.1 mm (HR); **(39–41)** *Caecum glabrum* (Montagu, 1803): (39–40) Somali (HR): (39) L 1.2 mm, (40) L 1.0 mm, (41) Protoconch, Somali, sediment sample, L 0.4 mm (DH); **(42)** *Trivia* cf. *arctica* (Pulteney, 1799), juvenile, Somali, lobster trap, H 3.9 mm (FV); **(43)** *Trivia arctica* (Pulteney, 1799), Somali, lobster trap, H 7.5 mm (HR); **(44)** *Eulima glabra* da Costa, 1778, Koningin Regentes, H 5.3 mm (FV). (photos: Han Raven)

figures 45–60: **(45–46)** *Buccinum undatum* Linnaeus,1758, juvenile, Somali rope (HR), (45) H 2.7 mm, (46) H 4.2 mm; **(47–49)** *Tritia incrassata* (Strøm, 1768) Somali, lobster trap (HR), (47) Small form with globose whorls, adult, H 5.0 mm, (48–49) Typical form: (48) Juvenile, H 4.9 mm, (49) Adult, H 7.4 mm; **(50)** *Raphitoma linearis* (Montagu, 1803), 70500, nets/rope, H 5.0 mm (HR); **(51**) *Propebela turricula* (Montagu, 1803), Somali, H 10.2 mm (FV); **(52)** *Parthenina interstincta* (J. Adams, 1797), 70500, sediment sample, H 2.2 mm (DH); **(53)** *Parthenina* cf. *suturalis* (Philippi, 1844), Somali, lobster trap, H 1.3 mm (HR); **(54)** *Odostomia turrita* Hanley, 1844, 70500, sediment sample, H 1.6 mm (DH); **(55)** *Odostomia unidentata* (Montagu, 1803), Somali, lobster trap, H 2.0 mm (HR); **(56–57)** *Philine punctata* (J. Adams, 1800): (56) Somali, H 1.7 mm (FV), (57) Koningin Regentes, H 1.8 mm (FV). **(58–59)** *Retusa truncatula* (Brugière, 1792): (58) Somali, lobster trap, H 4.0 mm (FV), (59) Somali, sediment sample, H 4.9 mm (DH); **(60)** *Retusa umbilicata* (Montagu,1803), Koningin Regentes, H 4.4 mm (FV). (photos: Han Raven)

Acknowledgements

Floor Driessen coordinated the labelling of the nets and acted as contact person on board for those who came to sift through the nets. Willem Heijdeman maintained contact with the waste remover Beck & Verburg and ensured that the nets were transported to the port of Stellendam. DDNZS and the participating divers are thanked for organising the diving trip and making the material available, Betty van den Berg and Roel van der Mast (Dive Team Zeeland) also collected sediment samples. Lilian Schoonderwoerd for her help in coordinating our sampling event and Frank Wesselingh (Naturalis) for making the microscope available with which the photos were taken. Hannco Bakker, Bob Bruins, Bart van Heugten, Dick Hoeksema, Dennis Leeuw, Erick Staal and Fred Vervaet collected and identified material and submitted their species lists. Dick and Fred made interesting finds available for photos. Dick also helped with the identification of a few species of bivalves. Jan Johan ten Poorten identified the small cockles (*Parvicardium*), Joop Eikenboom and Guus Gulden contributed their thoughts on the identity of the snails that have now been reported as *Pusillina inconspicua*. Several of the aforementioned colleagues commented on the manuscript, which was thereby improved.

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Table 2 [*Note from the Editor*]

Table 2, the list of the species of molluscs recorded for each sampling location, is not reproduced here but is available to download at: https://www.duikdenoordzeeschoon.nl/wp-content/uploads/2019/03/Spirula-418-Raven-van-Leeuwen-44-54.pdf (accessed 02/2020).

The species recorded from the British part of the North Sea (extracted from Table 2)

Acanthochitona crinita, Callochiton septemvalvis, Hanleya hanleyi, Leptochiton asellus, Heteranomia squamula, Astarte borealis, Astarte sulcata, Goodallia triangularis, Cerastoderma edule, Parvicardium pinnulatum, Parvicardium scabrum, Corbula gibba, Donax vittatus, Hiatella arctica, Bornia sebetia, Hemilepton nitidum, Kurtiella bidentata, Lucinoma borealis, Spisula elliptica, Spisula subtruncata, Sphenia binghami, Crenella decussata, Modiolula phaseolina, Modiolus barbatus, Modiolus modiolus, Modiolus sp., *Musculus subpictus, Mytilus galloprovincialis, Nuculana minuta, Nucula nucleus, Ostrea edulis, Aequipecten opercularis, Mimachlamys varia, Palliolum tigerinum, Talochlamys pusio, Ensis siliqua, Ensis* sp., *Phaxas pellucidus, Barnea candida, Zirfaea crispata, Gari fervensis, Gari tellinella, Abra alba, Abra* cf. *alba, Abra prismatica, Arcopagia crassa, Asbjornsenia pygmaea, Asbjornsenia* cf. *pygmaea, Fabulina fabula, Macomangulus tenuis, Thracia phaseolina, Thracia villosiuscula, Chamelea striatula, Clausinella fasciata, Dosinia exoleta, Dosinia lupinus, Dosinia* sp., *Timoclea ovata, Venerupis corrugata, Venerupis* sp., *Venus casina, Venus verrucosa, Venus* sp., *Buccinum undatum, Caecum glabrum, Capulus ungaricus, Bittium reticulatum, Doto hydrallmaniae, Epitonium clathratulum, Eulima glabra, Emarginula fissura, Lacuna* cf. *crassior, Littorina saxatilis, Bela nebula, Propebela rufa, Propebela turricula, Boreotrophon truncatus, Trophonopsis muricata, Tritia incrassata, Tritia* cf. *incrassata, Euspira nitida, Euspira* sp., *Philine punctata, Brachystomia eulimoides, Eulimella /Turbonilla*?, *Odostomia turrita, Odostomia unidentata, Odostomia* cf. *unidentata, Odostomia* sp,. *Ondina* sp., *Parthenina indistincta, Parthenina interstincta, Parthenina* cf. *interstincta, Parthenina* cf. *suturalis, Spiralinella spiralis, Turbonilla lactea, Raphitoma linearis, Retusa mammillata, Retusa truncatula, Retusa umbilicata, Alvania punctura, Crisilla semistriata, Manzonia crassa, Obtusella intersecta, Onoba* cf. *aculeus, Onoba semicostata, Pusillina inconspicua, Rissoa parva, Dikoleps nitens, Trivia arctica, Trivia* cf. *arctica, Gibbula tumida, Steromphala cineraria, Turritella communis, Antalis* sp.

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Limax cinereoniger in a copper mine

Mark Cubitt, Katty Baird and Adrian T. Sumner

Limax cinereoniger is our largest slug, and is widely regarded as an ancient woodland species (Rowson *et al.*, 2014). It is 'intolerant of civilisation' (Boycott, 1921), and 'a good judge of natural scenery' (Boycott, 1929). Although it is a widespread, it is local and rarely found in quantity.

In October 2018, MC and KB were searching in the Scottish Borders for likely over-wintering sites of the Herald Moth (*Scoliopteryx libatrix*) (figure 1). At one such site, as well as the moths, they spotted a few slugs, identified as *L. cinereoniger* (figure 2).

figure 1: The herald moth, *Scoliopteryx libatrix.*
(photo: Katty Baird)

figure 2: A specimen of *Limax cinereoniger* in the Elba copper mine. (photo: Adrian Sumner)

As well as *L. cinereoniger*, a specimen of *Discus rotundatus*, and an unidentified juvenile *Arion* slug were present. The site is known as Elba copper mine (grid reference NT78656037). One must not imagine a vast hole in the ground; instead, the mine is an abandoned adit, just wide and high enough for one person to enter with care (figure 3). A tree growing in the entrance makes access more difficult than it would have been when the mine was in operation. The mine runs about 30 metres into the rock, and is reasonably dry, and maintains a fairly steady temperature of about 7ºC. The slugs were all near the entrance, however. No algae or anything else to eat is visible on the walls of the adit, and the slugs appeared motionless. The entrance to the mine is high up on a steep wooded slope above the Whiteadder Water, a short distance from the tiny village of Abbey St Bathans, where *L. cinereoniger* has also been recorded. At the top of the slope, above the mine entrance, is a woodland, part of the Abbey St Bathans Woodlands SSSI. Two other adits adjacent to the first one contained no slugs, but on the adjacent hillside were *Arion ater* agg., *Arion circumscriptus, Arion owenii* (now widespread in south-east Scotland), *Arion intermedius, Aegopinella nitidula* and *Lehmannia marginata.* Evidently the discovery of *L. cinereoniger* in the Elba copper mine in 2018 was not unusual, as it was found here again in the autumn of 2019.

figure 3: The entrance to the Elba copper mine.
(photo: Adrian Sumner)

A few weeks later, KB was investigating a culvert at Hopes Reservoir in East Lothian (NT551620) for the presence of moths, and found another specimen of *L. cinereoniger*. This was about 100m into the culvert, but could have gained access through cracks between the masonry of the ceiling. Although it was very damp in the culvert, it appeared again that there was nothing on the walls of the culvert for the slug to eat. Above ground, the habitat is hardly the ancient woodland where one usually expects to find *L. cinereoniger* (figure 4), although this species has occasionally been reported from moorland. During a visit to the culvert in autumn 2019, *L. cinereoniger* was once again discovered, as at Elba.

Most recently, in October 2019, MC found *L. cinereoniger* in a limestone mine at Bowden Hill, West Lothian (NS97707456) (figure 5). This is an underground cave, about 3m in height, and 2m wide, accessed through a hole in the ground. The trees in the immediate vicinity of the cave are largely sycamore, although there is ancient woodland nearby.

figure 4: The external surface of the culvert at Hopes Reservoir.
(photo: Katty Baird)

figure 5: Inside the limestone mine at Bowden Hill, West Lothian. (photo: Mark Cubitt)

Thus it seems that the occurrence of *L. cinereoniger* in underground sites is not unusual, although we are not aware of any references to this habit in the literature. Until the lepidopterists started searching for over-wintering Herald Moths, records of this moth in south-east Scotland were scarce, whereas now it has been found to be much more numerous. In the same way, perhaps searching for *L. cinereoniger* in similar underground habitats would show that it is more widespread and commoner than previously thought. (But make sure that any abandoned mine or culvert is safe, and not liable to rock falls, before you enter!)

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The snail and the snake

Graham Long

Saturday, 6th July 2019 began like any other high summer day in this secluded garden on the edge of the New Forest. There was nothing to suggest that it would become a day of high drama staging a life and death struggle between a snake and a snail. The large garden has two ponds configured like a figure eight. One has fish, the other is kept free of them to benefit wildlife. Over the years, grass snakes *(Natrix natrix)* have been seen in the garden on four occasions, once when a mature adult was observed eating a frog. The wild-life pond has a healthy population of the ramshorn snail *(Planobarius corneus)*.

In the early afternoon of this Saturday, my friends noticed a grass snake swimming in the wildlife pond.
Some 30 – 40 cm in length, it was still quite a young snake. A little later the snake seemed to be thrashing around and closer inspection revealed that it had a ramshorn snail on its head. By 3.35pm the snake was barely moving and was removed from the pond. Its head was stuck in the shell, with the lower jaw outside. As it was still alive, it was placed in shallow water on the margin of the pond and left. In the evening it was still there, with no apparent movement, and by the following morning it was clearly dead and the snail had gone.

None of the reptile manuals I have suggest that grass snakes take molluscs as part of their diet, so what was this snake doing with the snail? And, how did the snail free itself – if that was the actual outcome – and escape its impalement on the snake's teeth? Was the finale of this day's wild-life drama really victory to the snail? Or did the snail itself become victim to some early morning predator, so both were losers in this conflict? The fancy headline, though, will surely be 'snail kills snake!'

(photo: name supplied)

A little bit of the Pacific in South Devon

Adrian Brokenshire

Whilst on holiday at Shaldon near Teignmouth, south Devon I carried out my usual holiday pastime of collecting and recording marine molluscs of the local area on the Teign estuary and adjacent coasts of Sheldon and Teignmouth, also as far as Exmouth, Dawlish and down to the west of Torquay (records were forwarded to the Marine Recorder, Simon Taylor).

On an afternoon outgoing tide on 20th June 2019 I was working my way along the shore at Shaldon seafront towards the road bridge that connects to Teignmouth (Grid Ref. SX935723) when from some distance I could see a spread of fresh bivalve shells over about a square metre. From that distance I thought they were *Polititapes aureus* as they do occur in the area but not usually in great numbers. As I got nearer, I could see they were not, as the shells were larger, more triangular, dirty white with a wide brown band on the anterior end which showed up on the white interior of the shells. There were several dozen of them, all fresh, still joined by the ligament but all open in the 'butterfly' position. It was very obvious these were nothing local and not a British native. I collected and bagged up a good number to research and identify later.

Once home I searched my limited publications on worldwide shells and could not get an answer as to what they were or where from. So I sent some to Simon for his help. The answer came back that they are an Asiatic venerid shell called *Meritrix lyrata* (Sowerby, 1857)* (figure 1), and that they could be found in some British supermarkets, one such being Morrisons. It just so happens that there is one just off the end of the road bridge in Teignmouth. Shells are imported for the seafood trade (not known if sold live or frozen).

I am often in contact with David McKay and mentioned these shells to him, upon which he asked for some to go with the ones he has from Portugal and the Canary Islands, as British found examples. He also mentioned that while on holidays in the USA he has attended meetings of the Pacific and Northwest Shell Club who say they are also appearing on shores in the USA and Canada. I can only assume they are discarded shells after cooking and being eaten. Ones in these areas are known to be imported from Vietnam, and again I have no idea whether imported live or frozen. These days with so much fresh food products travelling by air it wouldn't surprise me if they were live over the counter. Could live shells survive at the places mentioned? One can only hope that any cases of dumped shells are ones that have been cooked. Any live dispersal might well lead to a situation where around the world we find another 'alien' alive and well on the shore. I hope not.

figure 1: *Metetrix lyrata* shells from Shaldon, Devon (length c. 46 mm).

*The 'lyrate Asiatic hard clam' – a species that occurs along the coasts of Vietnam, Taiwan, the Philippines and South China.

Erratum: *Mollusc World* **51**:16, in "***Steromphala umbilicalis*** *… Ian F. Smith"*

The images for figures 19 and 20 were inadvertently repeated in figures 21 and 22. The intended figures are printed below. If wished they may be cut out and glued over the figures in issue 51 (The reverse of this section is blank). [Ed.]

figure 21. Three epipodial tentacles have jagged basal sheath. The operculum rests on the epipodium.

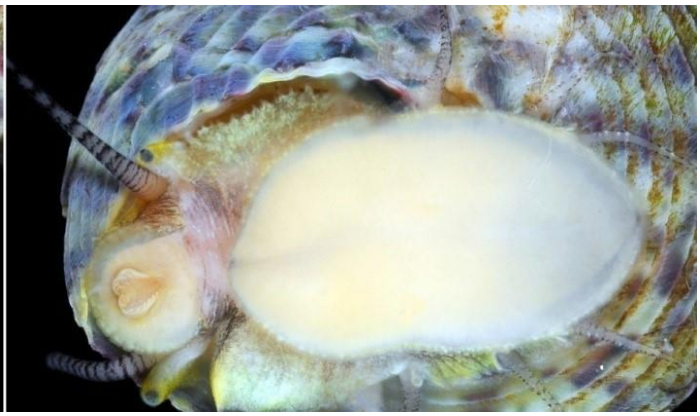

figure 22. The sole is tawny white, short, approximately oval. A slight medial furrow divides the food

50 years ago: from *The Conchologists' Newsletter* (no. 32, March 1970)

The *Conchologists' Newsletter* was this publication's predecessor and ran from January 1961 to December 2002.

Cornu aspersum[1] used for food

R. H. Lowe

Several nineteenth century conchological writers drew their readers' attention to the statement in Gray's *Manual* (1840)[2] that 'the glassmen at Newcastle once a year have a snail feast; they generally collect the snails themselves in the fields and hedges, the Sunday before the feast day.'

The glassmen no longer carry out this practice but *Cornu aspersum* is still collected and used as food in the shipyard areas of the Tyne and Wear.

Cooked snails found a fairly ready market during the 1940's, when food was scarce, but by about 1948 very few, if any, were on sale in the shipyards.

Then, late in 1969, while I was passing a limestone cutting which had a strong colony of snails, I saw two men and a boy skilfully and systematically denuding the whole rock face of its population. They told me that they cooked and sold the snails, and added that if they were properly prepared, they were very tasty.

Since then I have made further enquiries. It appears that every quarry and limestone exposure is scoured for snails, and as there are many in the northeast of Durham there is at present a thriving market in some working men's clubs, public houses and shipyards.

I asked one collector to give me a recipe and this is what he wrote: 'When you find snails they will be in clusters and bunched together. The first thing to do is to separate them. You then break the cap (epiphragm) of every one with a pin. When this is done give them a thorough washing but mind that you do not break the shells, which are very thin. Next comes the boiling of the snails. Fill a pan with salted water, then place the snails in the pan and leave them to boil. You will notice that slime comes up to the surface of the water. Remove this slime and repeat this until no more comes to the surface. Boil the snails to your taste by taking one out every so often. Repeat this till you are satisfied. It should take about one hour. When they are boiled, drain them and lay them out to dry; then sprinkle some salt on them and then they are ready to eat. If you do not want to eat them with salt you can pick them out with a pin and pickle them in vinegar. Leave them in vinegar overnight then they are ready to eat.'

The snails sell at two to three shillings [the equivalent of £1.30 to £2.00 today] a hundred. It is only within the last year or two that they have been on sale again, after a lapse of about twenty years, and it is doubtful that those concerned will be able to keep it up. They take every snail they can find and the colonies are already considerably reduced; so much so that very few are left in each colony.

This is not the only area where snails are eaten. Mr John Holness, in an interview with the Daily Mail (18/06/1963), said: 'And then there's the problem of snails. No decent snails round here (Hyde, Cheshire) but I'm keen on walking and I often bring back a 2 lb jarful from the limestone of Derbyshire. You can eat pretty well any snail you are likely to find. There is one reputedly poisonous snail – but it's very small and obscure. Snails have a flavour rather reminiscent of pork. But Mary has to shut her eyes if she eats them. About half the youth hostellers to whom I demonstrate try them. One boy went a bundle on them.'

The interview concludes with this recipe: 'Cookery hint – feed snails on bran for 24 hours as a cleansing process, boil for 20 minutes, then treat as a winkle. After boiling, fry in butter and serve on toast flavoured with basil and fennel seeds. Or make snail soup.'

[1] The currently accepted name, *Cornu aspersum*, is substituted here for *Helix aspersa*, the name in use at the time. Ed.

[2] Actually 'Turton W. (1840 ed. J.E. Gray) *A manual of the land and fresh-water shells of the British Islands*. Longman, London.' William Turton died in 1835 and Gray produced two updated and expanded 'versions' based on his book in 1840 and 1857. Ed.

About the Conchological Society

The Conchological Society of Great Britain and Ireland is one of the oldest societies devoted to the study of molluscs. It was founded in 1876 and has around 300 members and subscribers worldwide. Members receive two publications: Journal of Conchology which specialises in Molluscan Biogeography, Taxonomy and Conservation and this magazine. New members are always welcome to attend field meetings and indoor meetings before joining.

Some key contacts (see web site [http://www.conchsoc.org/pages/contacts.php] and 2016 membership list for additional contact details)

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How to become a member

Subscriptions are payable in January each year, and run for the period 1st January to 31st December. Members joining later in the year will receive all publications issued during the relevant calendar year. • Ordinary membership £33 • Family/Joint membership £35 • Under 18 (receiving Mollusc World only) £5 • Student membership £15 • Institutional subscriptions £47
In view of the high cost of postage for distribution from the UK, members living in the Republic of Ireland and Europe will be asked to pay an additional postage charge of £8, and members living in the Rest of the World an additional postage charge of £17.
See website for further details. Payments in sterling only, to Carolyn Postgate, CIRCA Subscriptions, 14 St Barnabas Court, Cambridge CB1 2BZ, (shellmember@gmail.com).
For UK residents we suggest payment by standing order, and if a UK tax payer, please sign a short statement indicating that you wish the subscription to be treated as Gift Aid. Another simple and secure way of paying for both UK and overseas members is by credit card online via PayPal from http://www.conchsoc.org/join. Overseas members may also pay using Western Union, but a named person has to be nominated, so please use the Hon Treasurer's name, Nick Light.

How to submit articles to Mollusc World

Copy (via e mail, typed or handwritten) should be sent to the Hon. Magazine Editor (contact details above). If sending copy using e-mail please include a subject line 'Mollusc World submission'. When emailing several large file attachments, such as photos, please divide your submission up into separate emails referencing the original article to ensure receipt. Electronic submission is preferred in Microsoft Word. Images and Artwork may be digitised, but we recommend that a digital image size 200Kb- 1Mb (JPEG preferred) be sent with your submission. All originals will be treated with care and returned by post if requested. Authors should note that issues of the magazine may be posted retrospectively on the Conchological Society's web site. **Copy intended for the July 2020 issue should be with the Hon. Editor prior to 30th April 2020**; inclusion in a particular issue is at the Hon. Editor's discretion and depends upon the space available but contributions are always welcome at any time.

Advertisements in Mollusc World

We are pleased to invite advertisements, provided they are in line with the Conchological Society's charitable objectives and responsibilities. Advertisements of shells for sale from commercial shell dealers will generally not be accepted. Please contact the magazine Editor for further details.

Conchological Society of Great Britain and Ireland
Diary of Meetings

Please check website (www.conchsoc.org) for further details/updates, including other meetings arranged at shorter notice.

Saturday 28th March 2020: ANNUAL GENERAL MEETING AND ADDRESS.
Guest speaker: Robert Cameron: 'At a snail's pace: how a New Naturalist got written'.
14:00 – 17:30: Angela Marmont Centre, Natural History Museum, Cromwell Rd., London SW7 5BD.
(Council members please note that there will be a Council meeting before this meeting.)

Saturday 16th May 2020– FIELD MEETING (non-marine): Langford Lakes, Wiltshire.
Leader: Mike Allen [redacted]. Wiltshire Wildlife Trust reserve; under-recorded meadow, marsh and lake habitats. Possible presence of *Vertigo moulinsiana*. Meet at 10:00 in reserve car park, at SP3 4PA; NGR SU 037370.

Saturday 13th June 2020: FIELD MEETING (non-marine): Carmel National Nature Reserve, Carmarthenshire.
Leaders: Ben Rowson [redacted]) and Dai Herbert [redacted]).
Reserve in karst limestone area with dramatic disused quarries, ancient woodland and "the only seasonal lake" in Britain.
Meet at 10:00 in layby /car park (brown Nature Reserve sign) at SN590157, S of Carmel on the A476 (Crosshands to Llandeilo).
Permissions not yet granted; booking essential – please contact leaders if interested.

Saturday 20th June 2020: FIELD MEETING (non-marine): Mendip area, Somerset.
Leader: Keith Alexander [redacted]). Focus on *Ena montana* in ancient woodlands on limestone. Meet at 10:30; site details not yet available so please contact leader nearer the time for meeting point.

Saturday 4th July 2020: YCS and YNU FIELD MEETING (non-marine): Central Dearne Valley, SW Yorkshire (VC 63).
Leader: Joyce Simmons ([redacted] Meet at 10:30 at NGR SE 372 064; please contact leader to confirm.

Sunday 5th July 2020: FIELD MEETING (non-marine): Wenlock Edge, Shropshire.
Leader: Mags Cousins ([redacted]). Continuing the exploration of National Trust Silurian limestone grassland and disused quarries. Meet at 10.30 at Much Wenlock car park, SO 61287 99644.

probably mid-August 2020: FIELD MEETING (marine): Medmerry managed coastal retreat area, nr. Selsey, West Sussex.
Leader: Martin Willing [redacted]). Opportunity to monitor colonisation by marine molluscs of this large coastal retreat site. Date tbc. Please see website closer to time. This a challenging site – intending participants must contact Martin in advance.

Saturday 12th September 2020: FIELD MEETING (non-marine): Devil's Punch Bowl, Hindhead, Surrey.
Leader: June Chatfield [redacted])
Classic Surrey heath habitats. Meet at 11:00 at National Trust car park/visitor centre, NGR SU 891357.

Saturday 19th September 2020: FIELD MEETING (marine): Bembridge Ledges, Isle of Wight.
Leader: Bas Payne [redacted]). Hard limestone ledges, softer mudstone and lagoon habitats; fairly low spring tide (+0.3m, 14:00). Meet at 11:30 at IOW Council car park, NGR SZ657 879, near lifeboat station.

Saturday 3rd October 2020: FIELD MEETING (non-marine): RHS Gardens, Wisley, Surrey.
Leaders: Imogen Cavadino and Hayley Jones [redacted]).
Native and introduced species in the gardens, glasshouses and woodland; help create a reference collection for the site.
Meet at 10:30 at the Laboratory Building. Participants must contact leader in advance, for free access to the gardens, and because places are limited and members of other Societies have also been invited.

Wednesday 7th October 2020: FIELD MEETING (non-marine): Wyre Forest, Worcs.
Leaders: Rosemary Winnall and Rosemary Hill (secretary@conchsoc.org). Joint meeting with Wyre Forest Study Group. It is planned to survey new areas and if possible look into how close to the woodland edge *Malacolimax tenellus* can be found. Meet at 10:00 at Forestry Commission's Wyre Forest Visitor Centre car park (DY14 9XQ; NGR SO 750740) to walk or share cars to access the woodland. Please notify leaders if you intend to come.

Wednesday 14th October – Wednesday 21st October 2020: FIELD MEETING (marine and non-marine): N. Pembrokeshire Coast. Leader: Simon Taylor (marine@conchsoc.org, [redacted]). Area with a good variety of rocky and sandy shores, relatively under-recorded. Based at Dale Fort Field Study Centre, where laboratory facilities are available.
Those interested please contact Simon, who will coordinate the accommodation booking with Dale Fort.

Date depends on weather: FIELD MEETING (marine): Rafting bivalves, South Wales.
Leader: Anna Holmes (Anna.Holmes@museumwales.ac.uk). There is a lot of interest in exotic rafting bivalves; there may be an opportunity to join Anna on the hunt for them if the weather is right. If you are interested, please contact Anna so that she can contact you if there is a suitable opportunity; information may also be posted on the website.

Please note the following provisional dates in autumn 2020 for your diary (please check web site or July magazine for final dates):
Saturday 26th September 2020 (to be confirmed): INDOOR MEETING 14:00 (preceded by Council meeting)
Saturday 14th or 21st November 2020: REGIONAL INDOOR MEETING
Saturday 12th December 2020: INDOOR MEETING 14:00 (preceded by Council meeting)

Indoor meetings at the Natural History Museum take place in the Angela Marmont Centre for UK Biodiversity, Darwin Building. ***Please bring plenty of exhibits and demonstration material.***

We are always happy to receive any suggestions for speakers for indoor meetings, or offers to lead field meetings, and also any suggestions about Society participation in the meetings of local and other societies.

Programme Secretary: *Bas Payne,* [redacted], programme@conchsoc.org.