

An Appeal

THE DISTRIBUTION AND HABITAT PREFERENCES OF BRITISH MARINE ISOPODS: A SURVEY SCHEME

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INTRODUCTION

THE distribution and habitat preferences of one of the commonest orders of crustaceans, the Isopoda, are poorly known. In 1968 the Isopod Survey Scheme was started to determine, among other things, whether species are resident or immigrant, which species are rare and in need of conservation, which habitats are occupied by which species, and to provide sufficient understanding of distribution for future changes to be detected (Sutton, 1972). The marine have recently been separated from the terrestrial and freshwater species and are being surveyed independently.

As with the non-marine survey (Sutton, 1972; also see *Crustaceana*, 18 (3), 1970), this scheme makes use of a special data card, so designed that information entered on it can be coded for transfer to an 80-column punch-card which is then available for mechanical sorting or can be used to feed data into a computer file for storage and analysis. When enough information has been collected the locality data will be used to produce individual distribution maps and perhaps an isopod "atlas". Analysis of the habitat data should help to identify some of the factors determining the habitat preferences and geographic ranges of the commoner species at least.

Initially, the aim of the marine survey is to sample all the major littoral habitats in each of the "50 × 50 km. squares" of the National Grid. While the authors hope to do some of this work themselves, the success of the scheme relies heavily on others submitting distributional and habitat data obtained when collecting in the field. This applies especially to the offshore and parasitic species. Record cards will be supplied free on request. Some members of the Isopod Study Group (the parent body of the Isopod Survey Scheme) are already helping with the marine survey and we hope that others interested will contact us, especially those organizing or participating in marine field courses for Schools, Polytechnics and Universities, as well as specialists studying in detail a particular habitat or locality. At present much potentially valuable information obtained during field courses is lost. We hope that some organizations will take advantage of the Survey Scheme to collect and identify isopods and to examine their habitat range. The scheme essentially depends on the correct identification of species and so all participants are asked to send in specimens for checking with the completed cards. Material will be returned on request so that personal reference collections can be built up. Identification problems have been greatly lessened by the recent publication of a key to British Marine Isopods (Naylor, 1972).

THE HABITAT CARD AND SPECIES LIST

Reproduced on p. 102 is a copy of the recording card supplied to collectors, filled in to show a sample of *Dynamene bidentata* (Adams) found in empty *Balanus perforatus* Bruguière tests in the middle eulittoral at St. Bride's Haven, Pembrokeshire.

INSTRUCTIONS TO COLLECTORS

The instructions on pp. 99–101 are those sent to each collector with the initial supply of cards.

PRESENT STATE OF KNOWLEDGE

Our knowledge of the distribution of the majority of British marine isopods is scanty (Naylor, 1972), although rather more is known about their habitat preferences. Very few species are recorded so far all around our coasts, although where suitable habitats are present in southern and western England, Wales and Scotland such species as *Sphaeroma rugicauda* Leach, *Idotea granulosa* Rathke, *Eurydice pulchra* Leach, *Jaera nordmanni* (Rathke) and some species of the *Jaera albifrons* Leach-group are usually found (Harvey, 1969; Holdich and Lincoln, unpublished observations). It has yet to be seen whether these species are ubiquitous as few survey records are available for Ireland and the eastern coast of England.

The distribution of few British species has been examined in detail. *Dynamene bidentata* appears to be restricted to the coasts of Ireland, south-west England, Wales and western Scotland, living mainly in large, empty barnacle tests and crevices in winter months, and, in summer, on eulittoral seaweeds (Holdich, 1968, 1970, 1971). In the past it may have had a wider distribution (Omer-Cooper and Rawson, 1934) with records from the east coast of Scotland (Edward, 1876; Scott, 1899) and from south-eastern England (Butler, 1878). Unfortunately, these early collections are lost and detailed examination of the localities has failed to find this isopod living there now. The early records may have been of immigrants from the southern European coasts (i.e. France and Spain) which had managed to gain a temporary foothold. Similarly, in the Netherlands *Dynamene bidentata* is not a native species, although it is often found with material cast up on the shore (Holthuis, personal communication).

Temperature seems to be important in determining the distribution of *D. bidentata*. The severe winter of 1962–1963 had a drastic effect on its distribution in South Wales (Holdich, 1970). Low temperatures probably affect the ovigerous females and young more than the males; viable broods are not produced in the laboratory by females kept at 5 °C. The present distribution closely follows the 6–7 °C. winter isotherm for surface waters in southern and south-western Britain (Lewis, 1964) and although this isotherm also extends into Scotland it seems likely that air temperature may be the limiting factor on the northern and eastern coasts.

Fig. 1 shows the distribution of *Dynamene bidentata* based on "50 × 50 km. squares" for all known records, and also the distribution derived from recent material collected or examined by the authors. To complete the map for this species, records are still required for parts of Ireland, Orkney, Shetland, the western isles of Scotland, south-west Scotland, north-east England and the Isle of Wight. In addition, it would be interesting to know more about the geographical range of the epicaridian isopod, *Ancyromiscus bonnieri* Caullery & Mesnil, which parasitizes more southerly populations of *D. bidentata* (Holdich, 1974).

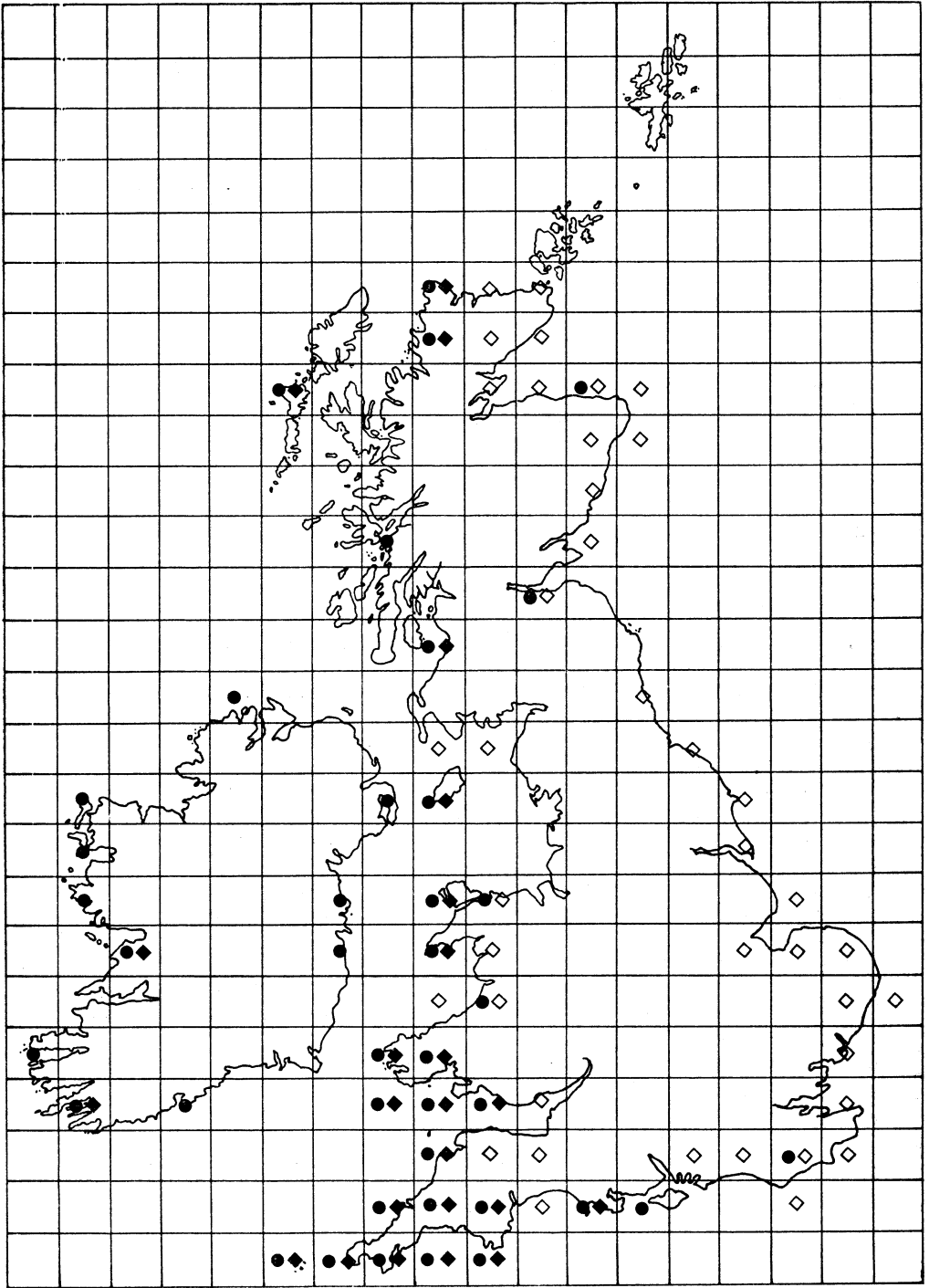


FIG. 1

The distribution of *Dynamene bidentata* (Adams) in the British Isles on a 50 × 50 km square grid.

Symbols:

- all known records (collections and literature).
- ◆—localities from which material has been collected or examined by the authors.
- ◇—localities examined during the last 10 years where no specimens were found.

THE ISOPOD STUDY GROUP

This group was established in 1969 to act as the parent body of the Isopod Survey Scheme. Newsletters are sent to members whether or not they are active in the Survey. The Newsletter gives details of survey work being done, information about particular species, methods of collecting in particular habitats, as well as reporting on recent developments in the isopod research field.

Further details of the Group can be obtained from Mr. P. T. Harding, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

SUMMARY

A Scheme for recording the distribution and habitat preferences of British marine isopods is outlined. A recording card containing a species list and habitat data is reproduced along with instructions for collectors wishing to participate in the scheme. Details are given of the present state of knowledge with particular reference to one of the better known species, *Dynamene bidentata*.

ACKNOWLEDGEMENTS

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Isopod Survey Scheme

SURVEY OF MARINE ISOPODS INSTRUCTIONS TO COLLECTORS

METHODS OF COLLECTING

1. Care should be taken to sample a wide variety of microhabitats, especially with regard to rocky shores. Care should also be taken, in the interests of conservation, to keep disturbance and damage to the environment to the absolute minimum, in particular to leave large stones, boulders, etc., as you find them. At the same time, no more specimens should be taken than are needed to allow identification (but see 3 below).
2. Specimens should be as intact as possible. Any parts that are shed should be kept with the specimen.
3. Where possible adult males should be included in collections as these are essential for the identification of some specimens (eg. *Jaera*).
4. When a parasitic species is collected the host should also be retained. If the host is too large, however, a positive identification should be included with the parasite.
5. For collecting on rocky shores a small crowbar, a pair of strong pointed forceps, a small knife, and a skewer (for opening barnacle tests) are essential equipment. In addition, for collecting in rock pools a small hand net and a wide-mouthed pipette are useful. A number of genera, eg. *Jaera*, *Janiropsis* and *Munna*, are often found associated with sponges, hydroids, bryozoans, and coralline algae. In order to sample these microhabitats successfully samples of the microhabitat should be brought back to the laboratory in a plastic bag and thoroughly examined under a dissecting microscope. For collecting delicate species from the underside of stones (*Jaera* and *Janira*) either the tip of the finger or a small paint brush should be used.
6. Collecting from macro-seaweeds should be done either by running the hands through the weed, or by rinsing the weed in a bowl of clean seawater (a net and pipette are then needed to catch the isopods). Where possible a correct identification of the weed should be included with the specimen, or a piece of the weed can alternatively be put in the same tube.
7. Useful implements for sampling in sand and mud are a small hand net and a wide-mouthed pipette. Depressions made with the foot at the edge of the incoming tide can be used to trap genera such as *Eurydice*. This genus is also often found trapped in rock pools and estuaries.
8. Details of collecting in the main habitats, including lists of common species, will appear in the Newsletter.

IDENTIFICATION

In view of the difficulty of identifying many specimens without experience or a reference collection, and because the scheme stands or falls on the reliability of identifications, recorders are asked, initially at least, to send in specimens of all species so that the identifications can be checked. We hope that recorders will appreciate that this is a necessary precaution at this stage of the project. Identified specimens will be returned on request so that the recorder can establish a personal reference collection. We shall be pleased to help individuals or establishments wishing only to have material identified, provided that reasonable data are supplied. This offer applies to non-British material as well and the organisers would be particularly interested in specimens from the Atlantic coasts of Europe, and the Mediterranean and adjacent seas.

Keys and notes for the identification of British species are contained in Naylor (1972).

METHODS OF PRESERVATION

Isopods are best preserved in 70% alcohol with a little glycerine added, or in 5 – 10% commercial formalin, or 10% aqueous Dowicil. A relatively new fixative, Dowicil 100, comes in powdered form, can be readily dissolved in seawater or freshwater as appropriate, and is thus useful for taking on expeditions. Its action is reported to depend on its releasing formaldehyde only in the presence of protein. Details are available on request. Data labels written in pencil or indian ink should be placed inside each tube of specimens.

SENDING SPECIMENS BY POST

Specimens may be sent in preservative in plastic tubes well wrapped in cotton wool and boxed. In all cases it is essential that each tube of specimens is clearly labelled in such a way that it can be identified with the correct record card. PLEASE DO NOT FOLD CARDS FOR POSTING.

NOTES ON FILLING IN THE RECORD CARD

Please note that a NEW card should be used for *each* locality, *each* microhabitat and *each* date of collecting. If two or more species occur in the same microhabitat they should appear on the *same* card. The numbers printed on the cards are for computer purposes – PLEASE DO NOT OBSCURE THEM.

N.B. An alternative general marine record card has been produced by the Marine Biological Association and the Nature Conservancy. This is an easier card to fill in than the Habitat card of the Isopod Survey Scheme and requires less information, but is primarily concerned with obtaining distribution records. If this card is used then specimens should still be sent in the usual manner.

GENERAL:

Grid references – these should be given in the form 12/802/112 rather than SM/802/112; ie. the 100 km. grid numbers rather than letters should be used. These numbers can be calculated from the diagram of the British Isles divided into 100 km. squares which appears on the inside cover of each 1" Ordnance Survey map; the westerly margin of each square gives the first figures and the southerly margin the second eg. SM = 100/200, in practice only the first number of each set of figures is used eg. SM = 12. Details of how to give the rest of the grid reference are given at the base of the Ordnance Survey maps.

Latitude and Longitude – if specimens are collected offshore then the latitude and longitude of the site can be given as an alternative to a grid reference.

Locality – as precise as possible.

Recorder – name, not initials.

Date – day, month, year.

Marine Census Area and Number – The coastal waters of the British Isles have been subdivided into a number of well defined areas. Details of these areas will be given in the Newsletter. As long as a precise reference to the locality is given then the boxes dealing with these areas can be left blank and will be completed by the organisers.

SPECIES LIST

Ring the computer number pertaining to the species that have been collected from one microhabitat, but leave the number clear. A number of names listed on the card may not be in general use yet due to recent changes (eg. *Naesa* is now *Dynamene*). Synonyms will be supplied upon request or can be found in Naylor (1972).

HABITAT DATA

Work systematically through the card filling in each part using a single tick as instructed on the card (DO NOT double tick). If in doubt leave a section blank.

SECTION A

There are two major subdivisions of the marine environment – the Pelagic (the whole body of water forming the seas and oceans), and the Benthic (the entire sea bottom, including the intertidal zone). The shallow water over the continental shelf is termed the Neritic, whilst the deep water beyond the shelf is termed the Oceanic – both these regions have pelagic and benthic divisions.

SECTION B

a. Much confusion exists over the names used to subdivide the shore. A good review is given in Newell (1970). A very simple division is used on the card with the term eulittoral corresponding to the intertidal zone which is exposed on an average tide. The splash zone has been included under Intertidal due to fact that the part which is likely to contain isopods (excluding *Ligia*) overlaps somewhat with the upper eulittoral. The infra-littoral fringe has been included under Sub-tidal because it tends only to be uncovered during the Spring tides when there are favourable weather conditions (ie. offshore winds).

Biologically, the upper limit of the eulittoral is taken as corresponding with the upper limit of the barnacles, and the lower limit with the upper limit of the *Laminaria* zone. The upper limit of the splash zone corresponds to the upper limit of marine life (ie. *Ligia*, *Melaraphe* [= *Littorina*] *neritoides*, black lichens).

b. Large bays and headlands of smaller bays should be ticked as – open coast

c. Some species of *Jaera*, *Sphaeroma*, and *Idotea* may be found in brackish water habitats, and in some cases even in freshwater (eg. when the tide has drained out of estuaries).

d. This section should only be filled in if the collector is sure of the rock type.

SECTION C

'Associated with a fixed substratum' – an isopod under this heading is benthic. 'In' should be ticked if the specimen is buried (eg. sand or mud), or burrowing, or in a burrow (own or not), or in a crevice in the substrate (an empty barnacle test or *Laminaria* holdfast can be taken as a crevice for this section). 'Under' should be ticked if the specimen is associated with the underside of a stone or boulder etc., and 'on' when it is found on the surface of the substratum (eg. sand, mud, rock, or a piece of seaweed).

SECTION D

This applies to the dominant type of substratum on the shore. In the case of sand the particle size is often the determining factor as to whether a species eg. *Eurydice pulchra* is present or not. Details of the average particle size (ie. coarse, medium, fine) can be entered in the space at the end of the card.

SECTION F

This is the place where the isopod is actually found.

e. Stones should be ticked under 'boulder'.

SECTION H

a. This is the light level experienced by the collector.

SECTION I

A tick should be placed in the appropriate box if you have any information on the points listed. Details should then be entered at the end of the card. Any other information (eg. sex ratios, colour, etc) should also be entered at the end of the card.

LOCALITY	MARINE ISOPODS	
	6587	(1-4)
	DATE: (60-64) Marine Census Area No. 21	
	10.1.73 (33-35)	
RECORDER	DETERMINATION (77-79) Marine Census Area	
	D. M. HOLDICH	
	Depth (73-76) Code No. (65-68)	
	0'	
	MUNICIPALITY	
	BRISTOL CANAL	
	LOCALITY	
	R. J. LINCOLN	
Grd Ref: (25-32)	(5-10)	(5-10)

20001	Aega bicarinata	(5-10)	Eurydice grimaldii	(5-10)	Munna kroeyeri
20002	stromi	29003	inermis	35002	limicola
20003	Agoplia socialis	29004	puclinea	35003	minuta
20004	Agoplia socialis	29005	truncata	35004	Nereocila neopolitana
21001	Aulicora physodes	29007	truncata	36601	Paramunna bilobata
21601	Anthura gracilis	29201	Gnathia dentata	37001	Paramunna oceanica
22001	Acteocella damonensis	29202	maxillaris	37401	Physus abdominalis
22002	Acteocella dilatata	29203	vortex	37402	phionota
22003	Aspidosiphon petraeus	29801	Gyge brucei	37801	Platysquilla formosa
22401	Aspidosiphon petraeus	29802	intermedia	37802	Pleurocystia galathea
23002	intermedia	30601	Heterosiphon appendiculatus	37802	longibranchiata
23003	longicornis	30801	idotea	37803	microbranchiata
23202	Althelega bilobatus	30802	cheirpa	37804	porcellanæ
23203	prideauxi	30803	granulata	37805	porcellanæ
23204	tenuicaudis	30804	linearis	38001	Pleurocystia galathea
23801	Bathypocopa typhlops	30805	metallica	38201	Pleurogonium rubundum
23802	Bopyridia ocellata	30806	neglecta	38401	Portunon maenadis
24001	Bopyridia hippolytes	30807	elastica	38601	Procladius ostendensis
24201	Bopyrus squillarum	31201	Jona albifrons	39401	Pseudosquilla hirsuta
25201	Canclepon elegans	32002	forsmani	39402	Pseudosquilla confusa
25401	Crotalaria borisii	32003	hopana	39403	crenulata
25402	Crotalaria borisii	32004	ichthioseta	39404	hyndmanni
26201	Conilera cylindracea	32005	præhensilis	39601	Rocinella damonensis
26801	Cyathura carinata	32006	Jaeopropis brevicornis	40201	Scyraemon tuberculosa
27001	Cymodoce truncata	32401	Janira maculosa	40401	Sphaeroma hookeri
27201	Desmomea filipes	32601	Janirops brevitarsis	40402	monodi
27801	Diosida	32801	Limnoria quadricornata	40603	rugicauda
28201	Eutopella monasta	33002	Limnoria quadricornata	40801	Serriatum
28801	Euryope murrayi	33201	Liriopeis pygmaea	40802	Synisomma lanceifer
29001	Euryope mutica	34201	Microgaster antopoda	41601	Urocystella diogeni
29601	Euryope affinis			41801	Zenobiana prismatica

Other species:

HABITAT DATA	
A MAJOR ZONES (1 tick obligatory):	11-12
Coastal zone	01
pelagic	02
Neritic:	11
pelagic	12
neritic	13
sub-littoral	
infra-littoral fringe	
sub-littoral	
intra-littoral	
C POSITION AT WHICH FOUND (1 tick obligatory):	15
free swimming/floating:	1
depth, 0-1m:	2
10-50m:	3
50-100m:	4
over 100m:	5
associated with floating obj.:	6
associated with fixed substratum:	7
under	8
in	9

HABITAT DATA	
B ONLY IF NERITIC (1 tick obligatory):	13-14
a. Minor Zones (1 tick obligatory):	01
intertidal:	02
splash zone	03
upper eulittoral	04
middle eulittoral	
Sub-littoral	
infra-littoral fringe	
intra-littoral	
b. Coast Type (1 tick obligatory):	21
open coast	22
small bays	23
locks	24
harbour	25
estuary	
c. Salinity (1 tick obligatory):	31
salt	32
brackish	33
fresh	
d. Rock Type (1 tick obligatory):	41
granitic	42
metamorphic	43
metamorphic	45

HABITAT DATA

D GENERAL NATURE OF SUBSTRATUM/SHORE (1 tick only) or FOR AND	16
mud/clay	1
sand	2
shingle	3
pebble	4
stones	5
boulder	6
solid rock	7
other	8
	9
E IF INTERTIDAL ONLY (1 tick per section only)	37-38
a. Shore Type:	01
full light	02
half light	
dark	
b. Exposure:	11
semi-exposed	12
sheltered	13
c. Slope of Shore:	21
overhang	22
mud-bank	23
beach	24
d. State of Tide:	31
high	32
medium	33
low	
e. Phase of Tide:	41
neap	42
spring	
F DETAIL OF MICRO-HABITAT (1 tick per section where applicable)	39-40
a. Rock zone:	01
inner zone	02
middle zone	03
outer zone	04
Barrow:	11
open	12
animal	13
Rock pool	21
Stream over shore	22
31	
b. Associated with plants:	41
holdfast	2
algae	3
either	4
c. Associated with other animals:	42
epibiotic	1
endoparasitic	2
emmental	3
other	4
d. Animal Associates:	43
dead fish	1
harmful sea	2
Polysora	3
Coelenterata	4
Spongia	5
other	6
e. Associated with substratum:	44-45
mud	01
sand	02
shingle	03
boulder	04
solid rock	05
concrete	06
wood	07
plastic	08
plastic up drift wood	09
other	10

G DETAIL OF PLANT ASSOCIATION	46-47
Algae:	01
Zostera	02
other	11
Brown:	21
Laminaria type	22
Fucoid type	23
other	31
Red: erecting	32
erect	33
Lichen	41
42	
H FURTHER DETAILS (1 tick per section only)	48-49
a. Frequency of occurrence:	01
single	02
many < 10	03
numerous 10-100	11
many > 100	12
13	
14	
b. Frequency of occurrence:	21
single	22
many < 10	23
numerous 10-100	24
many > 100	25
c. Collection technique:	31
hand/diving	32
grab	33
dredge	34
light trap	35
36	
37	
38	
I OTHER INFORMATION E.G.	50
Host of parasite	51
Salinity	52
pH	53
oxygen tension	54
Temperature	55
Depth	56
Abundance (nos. collected/units/limp.)	57
Algal/Lichen type if known	

AIR TEMP: 4°C.

ABUNDANCE: 60/30 MIN.

SEX RATIO: 6♂/2♀ : 54♀♀.

COLOUR: 99 STAGE 7-14 GREEN.

REPRODUCTIVE STATE:
40♀♀ IN Oviparous CONDITION.BARNACLE: BALANUS
PERFORATUS.