

# BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS  
INSTITUTE OF TAXONOMIC ZOOLOGY (ZOOLOGICAL MUSEUM)  
UNIVERSITY OF AMSTERDAM

No. 316

Vol. 24

June 30, 1976

First European record of *Haliclona loosanoffi* Hartman, 1958  
(Porifera, Haplosclerida), a species hitherto known only from  
the New England coast (U.S.A.).

R. W. M. VAN SOEST

## ABSTRACT

An encrusting gemmuliferous haliclonid species is described from the Oosterschelde (S.W.-part of the Netherlands), which is demonstrated to be conspecific with *Haliclona loosanoffi* Hartman, 1958. This species was hitherto only known from the New England coast (U.S.A.). The species is compared with other encrusting haliclonids occurring in Western Europe.

## INTRODUCTION

During a study of the marine sponges from the Netherlands incorporated in the collections of the Zoölogisch Museum of Amsterdam and the Rijksmuseum van Natuurlijke Historie at Leiden (a paper on the results of this study is in preparation), the author came across some encrusting haliclonid specimens, labeled „*Haliclona limbata*”, which appeared to possess gemmules. Subsequent attempts to obtain fresh material of this species from the S.W.-parts of the Netherlands proved successful. The species is interesting enough to justify a separate treatment.

Vosmaer (1882) mentioned some sponge species occurring on oyster beds in the Oosterschelde: *Sycandra ciliata* Fabricius, 1780, *Halichondria panicea* (Pallas, 1766) and remarkably enough *Chalinula fertilis* Keller, (1879). Arndt (1935: 100, footnote) suspected Vosmaer's identification to be wrong and suggested — without consulting Vosmaer's material — it could be *Haliclona limbata* (Montagu, 1818). Korringa (1954) took over this suggestion, and called the species he found growing on oyster shells „*Haliclone limbata*”. Korringa (loc.cit.) made a very important observation regarding this species, as he described quite accurately the occurrence of large

Received: December 23, 1975

[177]

numbers of gemmules associated with this sponge. No doubt due to the fact, that Korringa was not a professional spongologist and that his observations were published in a general paper on oyster shell epifauna, his statements never yielded any comment from sponge specialists. It is almost certain that Hartman (1958), in describing his new *Haliclona loosanoffi* from the New England coast, was not aware of Korringa's observations, as *H. loosanoffi* possesses gemmules as one of its main distinguishing characters among encrusting haliclonids.

*Haliclona limbata* has never been reported to produce gemmules, a fact which was pointed out to the present author by Dr. O. S. Tendal (Zoologisk Laboratorium, Copenhagen). It is a well known species in Denmark and it differs quite distinctly both from Korringa's "*H. limbata*" and from the freshly collected material, as will be demonstrated below. Sufficient evidence will be produced to show the gemmuliferous encrusting haliclonid from the S.W.-part of the Netherlands is conspecific with *Haliclona loosanoffi* Hartman, 1958.

#### MATERIAL AND METHODS

The following material from the collections of the Zoölogisch Museum, Amsterdam (ZMA), the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), and the British Museum (Natural History) (BMNH) has been used for the present study:

##### *Haliclona loosanoffi* from the Netherlands:

- Bergen op Zoom, undated, coll. G. C. J. Vosmaer, no. 216 (RMNH reg.no. 880; in the same jar with *Mycale contareni* (von Martens)).
- Buitenpost bij "Kijkuit", Yerseke, 1940—41, coll. P. Korringa (RMNH reg.no. 1150; labeled: *Haliclona limbata*).
- Oosterschelde, VIII—1887, coll. G. C. J. Vosmaer (RMNH reg.no. 1149, labeled: *Haliclona limbata*).
- Zijpe, Schouwen, 10—VIII—1956, coll. J. A. W. Lucas (RMNH, not yet registered).
- Zierikzee, outer harbour, 19—VIII—1975, 0—1 m, coll. J. Vermeulen & R. W. M. van Soest (ZMA POR. reg.no. 3552).
- Kattendijke, 20—VIII—1975, 7—9 m, coll. S. Weinberg (ZMA POR. reg.no. 3551).

##### *Haliclona loosanoffi* from New England:

- Milford Harbour, Connecticut (U.S.A.), 1-XI-1949, coll. W. D. Hartman (BMNH reg.no. 1965.7.31.4) (paratype).
- Double Beach, Connecticut (U.S.A.), 13-IX-1949, coll. W. D. Hartman (BMNH reg.no. 1965.7.31.8).

##### *Haliclona limbata* (studied for comparison):

- Grönsund, Vordingborgbugt, Denmark, 1886, coll. Hansen (don. & det. O. S. Tendal).

*Haliclona permollis* (studied for comparison):

— Isefjord, Denmark, 10-IX-1975, coll. & det. O. S. Tendal.

*Haliclona indistincta* (studied for comparison):

— Chenal d'Île Verte, Roscoff, France, 29-II-1965, coll. J. H. Stock, det. C. Lévi (ZMA POR. reg.no. 2699).

*Haliclona viscosa* (studied for comparison):

— Chateau du Taureau, Baie de Morlaix, France, 16-VII-1964, coll. & det. G. Graat-Kleeton (ZMA POR. reg.no. 261).

Prof. Dr. W. Vervoort (Rijksmuseum van Natuurlijke Historie at Leiden) and Miss. S. M. Stone (British Museum (Natural History)) are thanked for their permission to study material under their care. The present author is greatly in debt to Dr. O. S. Tendal, who, next to pointing out the problem, helped and advised in many ways. Mr. J. Vermeulen (ZMA) assisted during the collecting and sorting of the material and the preparation of slides.

Microscopic slides of the specimens were made in two different ways. In order to study and measure the spicules, a piece of sponge tissue was cooked in a strong solution of sodiumhypochloride; the residue was washed in aqua destillata, put on a microscopic slide, dried, and mounted in Canada balsam. In order to study the skeleton, thin sections of the sponge were cut, which were put on a slide, dried and mounted in Canada balsam as well.

#### DESCRIPTION OF THE ENCRUSTING, GEMMULIFEROUS SPONGE SPECIES FROM THE NETHERLANDS

##### Plate I A-F, text-figures 1—3

*Shape and size:* The shape of the material from the Netherlands shows great variation, so much so that one might possibly speak of different growth forms. In some cases there is only a thin sheet enveloping an oyster shell; parts of this sheet may be raised into low mounds (RMNH. 1150). In another case there are definitely rounded oscular tubes (RMNH. 1149). In most of the freshly collected specimens, however, the sponge consists of tapering tubules. Next to single tubules rising from a flat crust, there are also interconnected or anastomosing, even branched, groups of tubules, rising from a more or less massive base. Maximal height of the tubules is 35 mm, maximal diameter 10 mm; most of them are smaller.

*Colour:* Thinly encrusting specimens are greyish-yellow (cf. also Korrynga, 1954); tubular specimens are light brown. In alcohol the specimens vary from light brown to grey in colour.

*Consistency:* Soft; older, preserved material show collapsed tubules and lobes.

*Surface:* Softly hispid, encrusting sheets less so than tubules.

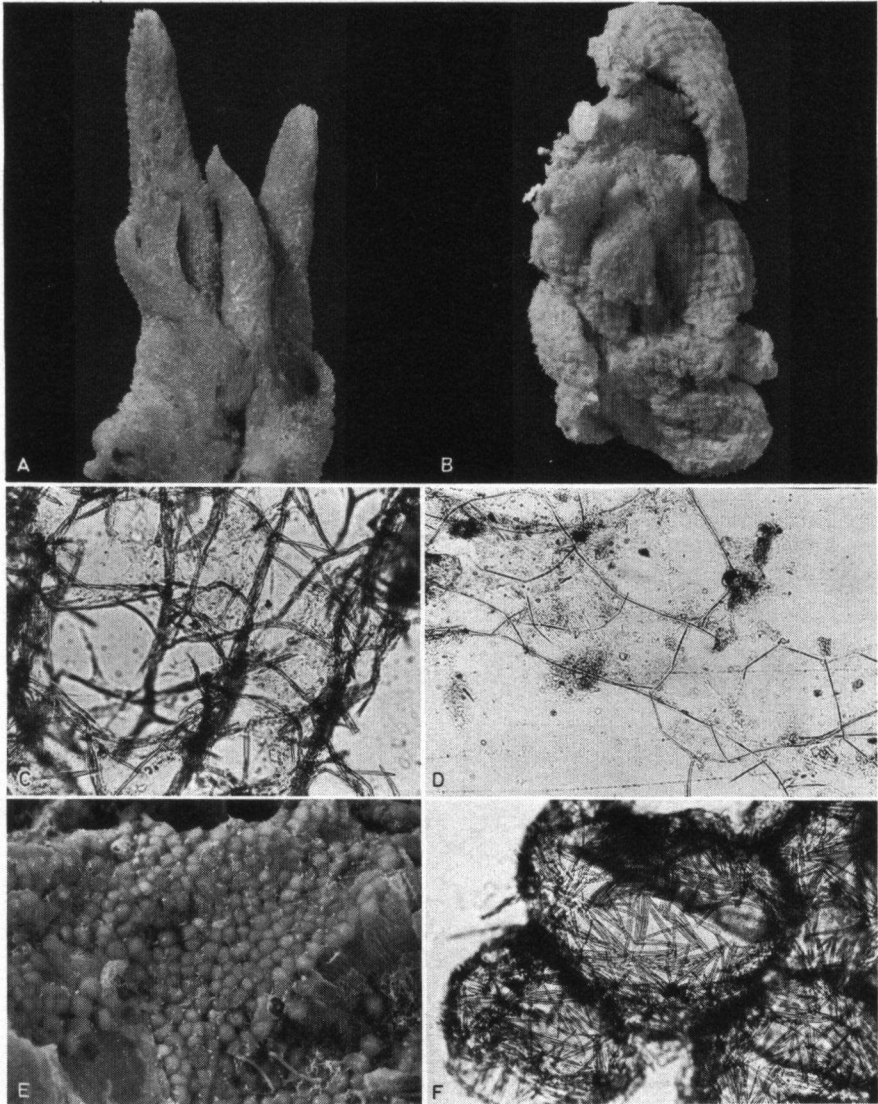


Plate I. A. A colony of *Haliclona loosanoffi* from Zierikzee (ZMA.3552) (x 1.5).  
B. A collapsed colony of *H. loosanoffi* from Yerseke (RMNH.1149) (x 1.5).  
C. Skeleton of a tubular colony of *H. loosanoffi* from Zierikzee (ZMA.3552) (x 78).  
D. Skeleton of a thinly encrusting specimen of *H. loosanoffi* from Kattendijke (ZMA.3551) (Note the extreme delicateness) (x 78).  
E. Gemmules of a *H. loosanoffi* specimen from Yerseke (RMNH.1150) (x 7.5).  
F Gemmules (detail) of a *H. loosanoffi* specimen from Zierikzee (ZMA.3552) (x 100).

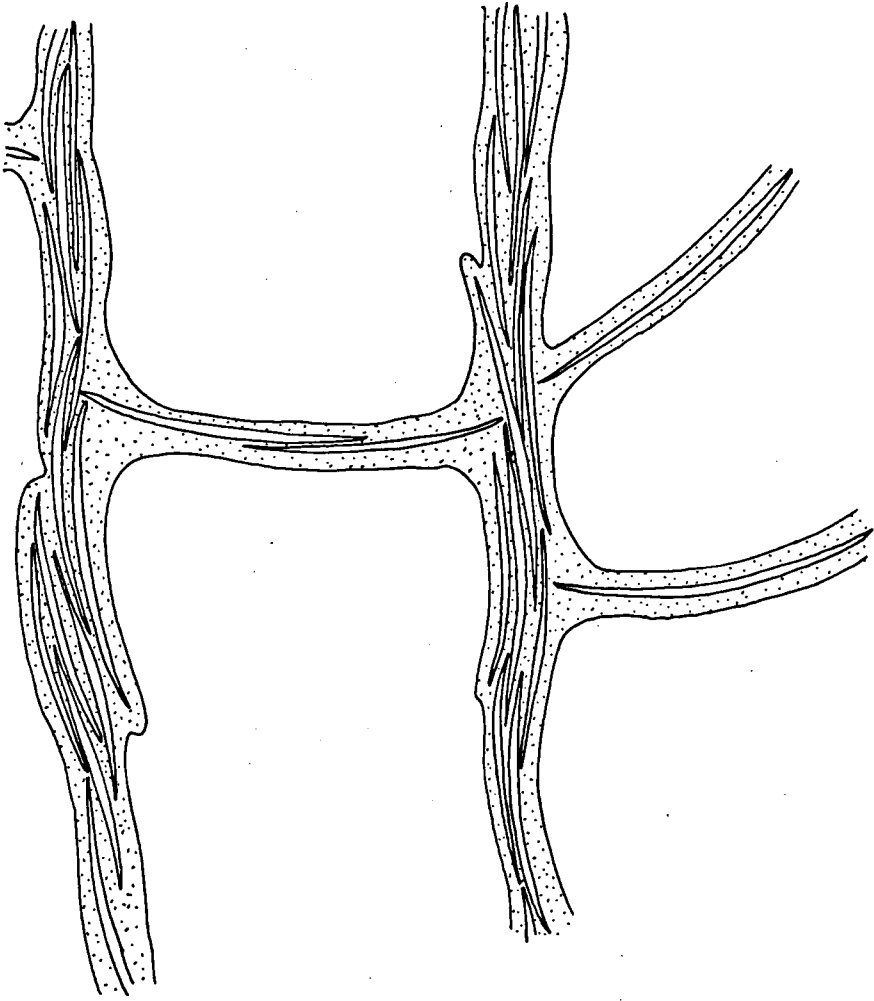


Fig. 1. Drawing of a small portion of the skeleton of *H. loosanoffi* from Kattendijke (ZMA.3551). Spongin is represented by the dotted area.

**Oscules:** Thin sheets apparently do not have distinct oscules; if the specimens show low mounds these are crowned with a small osculum (1—2 mm). Tubuliferous specimens have their oscules exclusively terminal. In fact the tubules just taper into a thin walled osculum (diameter up to 5 mm).

**Ectosomal specialization:** Absent; choanosomal spicule tracts often protrude beyond the surface, giving the sponge a softly hispid appearance. Subdermal cavities are large and numerous.

**Pores:** Minute, barely visible to the naked eye.

**Choanosomal skeleton:** Characteristically, there are numerous ascending tracts of 2—5 spicules per tract. These tracts are regularly interconnected by a single spicule, or 2—3 spicules lying in a row, depending on the distance of

the tracts (text-fig. 1). The skeleton makes a delicate impression, particularly in thinly encrusting specimens. Relatively large amounts of spongin surround the spicule tracts. In specimens with smaller spicules the spongin dominates, giving the impression of a rectangular spongin reticulation. Next to this a varying amount of loose spicules is present.

*Spicules:* Almost exclusively oxea in the size range of 45—122  $\mu$  / 1—6  $\mu$ . Individual spicule size ranges for the studied specimens are given in table I. Styles are not uncommon, but they are almost certainly deformed oxea. Strongyles have not been found. In some specimens a varying percentage of “centrotylote” oxea are present (text-fig. 2). In thin sheet-like specimens the spicules tend to be smaller and more delicate.

*Gemmulae:* These are arranged in a basal layer on the substratum (oyster or mussel shells). Not infrequently gemmules have been found at a little distance from the tissue proper. The average diameter is about 400  $\mu$ . The gemmules are encased in a spiculiferous spongin sheath; the spicules may be arranged quite confused (text-fig. 3) or more or less regularly in bundles (Plate IF). The spicules are of the same size and morphology as those of the sponge tissue. The colour of the gemmules is whitish (fresh specimens) to yellow (preserved specimens).

*Eggs and embryos:* These have been found abundantly in the choanosome of August specimens. Korringa (1954) probably observed the massive release of larvae in August.

#### COMPARISON WITH AMERICAN *Haliclona loosanoffi* SPECIMENS

The two tubuliferous American specimens available for this study show an interesting skeletal variation, which is in accordance with Hartman's (1958) statement, that the species is highly variable.

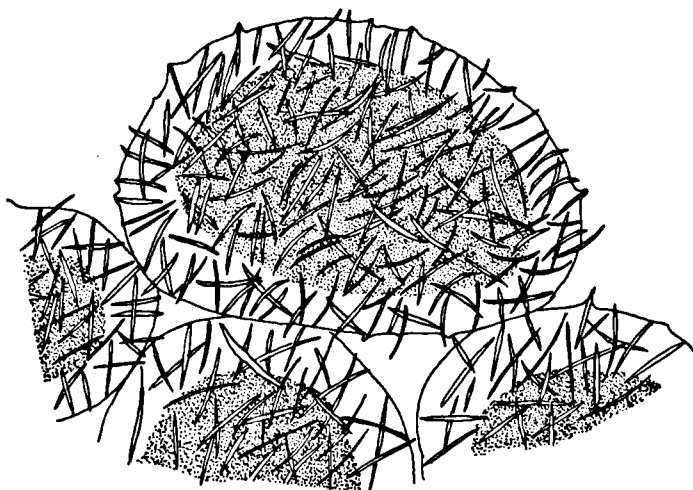


Fig. 2. Gemmules of a thinly encrusting specimen of *H. loosanoffi* (RMNH.1150) (x 160).

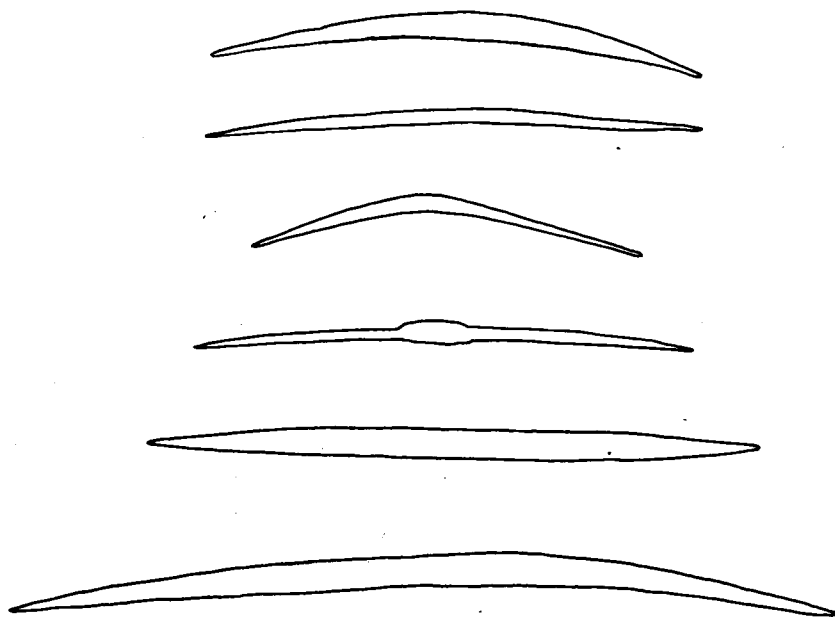


Fig. 3. Spicules of *H. loosanoffi* from the Netherlands.

The paratype from Milford Harbour conforms quite well in its skeleton with Hartman's figure 22. Of both specimens it is also the most similar to Dutch specimens; the only important point of difference seems to be the high amount of spongin, which envelops even the thickest spicule tracts completely in the Dutch specimens. The number of loose spicules in the choanosome is limited.

In the Double Beach specimen the skeleton is much more confused, with little spongin and many loose spicules. There is little skeletal resemblance with Dutch specimens.

TABLE I. Spicule measurements of *Haliclona loosanoffi* (based on 50 spicules per sample; measurements in  $\mu$ ).

sample	length (range and mean)	width (range and mean)
a. Material from the Netherlands		
RMNH.880	72— 82— 89	1.0—1.9—3.0
RMNH.1149	68— 82— 92	2.0—2.6—3.5
RMNH.1150	45— 73— 90	1.0—2.1—3.0
RMNH."Zijpe"	71— 87— 99	1.5—3.8—5.0
ZMA.3551	69— 75— 87	1.0—2.6—3.5
ZMA.3552	72— 80—122	1.0—3.7—6.0
b. American material (copied from Hartman, 1958)		
Milford Harbor	73—100—116	2.1—5.2—8.6
Double Beach	83—123—185	2.0—5.6—7.8

The spicule sizes of American specimens are listed in table I (copied from Hartman's (1958) tables 20—21). American spicules are larger, although the Milford Harbor spicules do not exceed the Dutch ones very much.

#### COMPARISON WITH OTHER ENCRUSTING HALICLONIDS

Hartman (1958) suggested, that comparisons should be made with other, mostly ill-described, encrusting haliclonids, although the possibility that gemmule formation in such species had been overlooked in the past would not be very great.

*Haliclona limbata* (Montagu, 1818): Previous assignment (by Arndt, 1935, and Korringa, 1954) of the presently discussed Dutch material to this species, necessitates a comparison. The shape of this species, though somewhat variable in younger and older specimens, is definitely different from that of *Haliclona loosanoffi*, as it is always rounded, with large oscula which are level with the surface in small specimens, but rise as rounded thick-walled mounds in larger specimens. Immediately apparent is the far more hispid ectosome, which might perhaps be called "microtuberculate", due to the penetration through the dermis of the strong skeletal fibres. Pores are easily visible to the naked eye. Skeletal fibres are strongly developed: frequently more than 10 spicules make out the ascending tracts; horizontal interconnecting tracts are multispicular. Spicule dimensions exceed those of *H. loosanoffi* in thickness: 69—130  $\mu$ , mean 103  $\mu$  long, 3—8  $\mu$ , mean 6  $\mu$  wide. *Haliclona limbata* seems to be a well-defined species; the descriptions of Griessinger (1971) of this species from the Mediterranean suggest that this material is not conspecific with *Haliclona limbata*.

*Haliclona permollis* (Bowerbank, 1866): Hartman (1958) concluded that the new *H. loosanoffi* might be very close to this species, basing this opinion on De Laubenfels' descriptions. *H. permollis* differs from *H. loosanoffi* in colour (pink) and shape: full grown specimens have irregularly repent, anastomosing branches, with the oscula on the branches; there are no oscular tubes. Flat, encrusting specimens (e.g. Bowerbank, 1874: pl. 48) have fairly large oscula level with the surface. The skeleton is basically a unispicular isodictyal reticulation; occasionally multispicular tracts are found. Spicule size range: 105—175  $\mu$ , mean 132  $\mu$  long, 2—5.5  $\mu$ , mean 4  $\mu$  wide.

*Haliclona indistincta* (Bowerbank, 1866): This is a massive, rounded species with large oscula. The skeleton is strikingly resembling *H. limbata*: strong multispicular ascending tracts (over 10 spicules per tract), multispicular to unispicular interconnecting fibres. The spicules, however, are longer and slimmer than those of *H. limbata*: 118—360  $\mu$ , mean 275  $\mu$  long, 3—9  $\mu$ , mean 6.5  $\mu$  wide. It does not resemble *H. loosanoffi*, nor the Dutch material.

*Haliclona viscosa* (Topsent, 1888). Only a small piece of this species is available, which does not allow a description of the sponge shape. The skeleton is a unispicular, isodictyal reticulation and as such differs strongly



from the Dutch material. Spicule dimensions: 120—166  $\mu$ , mean 148  $\mu$  long, 4.5—7  $\mu$ , mean 6  $\mu$  wide.

Other encrusting haliclonids such as *Adocia cinerea* (Grant, 1827), *Reniera elegans* (Bowerbank, 1866) and *Reniera simulans* (Johnston, 1842), of which material is present in the ZMA-collections differ from all above-mentioned species by the presence of a special, tangential dermal skeleton.

Of other species, mentioned by Hartman (1958) as potential senior synonyms of *Haliclona loosanoffi* no material has been studied. However, the resemblance, pointed out by Hartman (l.c.) between *H. loosanoffi* and *Chalina montagui* (Fleming, 1828) and *Chalina flemingi* Bowerbank, 1866, is not very strong. Of *Chalina montagui*, Bowerbank (1866: 366) states, that it has a smooth surface and that the dermis is reticulated. Moreover, the habitus as pictured by Bowerbank (1874: pl. 68, figs. 3—4) resembles *H. permollis*, rather than *H. loosanoffi*. *Chalina flemingi* is stated (Bowerbank, 1866: 370) to have a smooth surface as well, and the skeleton is "uniserial". Again, the figures by Bowerbank (1874: pl. 68, figs. 1—2) resemble growth types of *H. permollis*.

Another species to be mentioned here, is the thinly encrusting *Isodictya simulo* Bowerbank, 1866: 279. Its surface is stated to be minutely hispid, and the skeleton has primary tracts of two or three spicules per tract, while the secondary ones are unispicular. A striking sentence is the last line of the diagnosis of this species: "Gemmules: spherical, membranous, aspiculous". It is clear, of course, that Bowerbank refers to the embryos scattered in the choanosome, a common enough feature in any Haliclonid. Points of difference with *H. loosanoffi* and the Dutch material seem to be the large oscula and the seemingly present special dermal skeleton. The spicules are stated and pictured (Bowerbank, 1874: pl. 48, figs. 11—13) to be rather stout.

There is only one other Dutch haliclonid species, of which gemmule-production is known: *Haliclona oculata* (Pallas, 1766). It is inconceivable, that this species could be confused with *H. loosanoffi*.

#### DISCUSSION

On account of the comparisons with other encrusting haliclonids, it seems to be clear, that the present material is either conspecific with *Haliclona loosanoffi* Hartman, 1958, or represents a new, closely related ("twin") species, restricted to Europe.

Hartman (1958) expressed doubts about the European occurrence of *H. loosanoffi*, because of his inability to find any specimens in more northern locations (he made a thorough survey of the intertidal sponge fauna at six localities north of Cape Cod). It also seems somewhat unlikely that in relatively well investigated areas as Iceland and the British Isles an encrusting, gemmuliferous *Haliclona* species would not have attracted the attention of the spongologists working in these areas.

On the other hand, part of the present material (including gemmules) has without doubt passed the hand of an eminent specialist as Vosmaer, and apparently the gemmules did not attract his attention. Even the negative result of Hartman's survey of the area north of Cape Cod is no definite proof for the absence of *H. loosanoffi* in the Northern Atlantic, the more so, as living colonies of this species can only be found in summer and fall (cf. Hartman, 1958, and Korringa, 1954).

If the Dutch material is conspecific with the American species, as it is considered here, a more or less continuous northern distribution (just as, for instance, in *Haliclona oculata* (Pallas, 1766), *Halichondria panicea* (Pallas, 1766) and *Halichondria bowerbanki* Burton, 1930) has to be assumed, as the free swimming larvae are incapable of crossing the Atlantic.

The possibility of transport of this sponge by human means (attached to ships, etc.) to either Atlantic coast seems small (material of this species dates back as far as 1880!), but of course cannot be excluded entirely.

De Laubenfels (1930) described a haliclonid species from California, *Haliclona ecbasis*, which has been redescribed extensively by Fell (1970). *H. ecbasis* seems to be very close to *H. loosanoffi*: shape, skeleton and life cycle (including gemmule formation) are in accordance with the descriptions of Hartman (l.c.). But for the fact, that *H. ecbasis* is only known from the Pacific coast of North America, there would be no sufficient reason to consider both as separate species.

#### REFERENCES

- ARNDT, W.  
1935 Porifera. — Tierw. Nord-Ostsee, 3 (a, 27) : 1—140.
- BOWERBANK, J. S.  
1866 A monograph of the British Spongiadae, 2 : 1—388 (Ray Society, London).  
1874 A monograph of the British Spongiadae, 3 : i—xviii, 1—367, 92 pls. (Ray Society, London).
- FELL, P. E.  
1970 The natural history of *Haliclona ecbasis* de Laubenfels, a siliceous sponge of California. — Pac. Sci., 24 : 381—386.
- GRIESSINGER, J. M.  
1971 Etude des Réniéridés de Méditerranée (Démospoges, Haploscléridés). — Bull. Mus. nat. Hist. nat., Paris, (3) 3 (Zoologie 3) : 97—182.
- HARTMAN, W. D.  
1958 Natural history of the marine sponges of southern New England. — Peabody Mus. nat. Hist. Bull., 12 : 1—155.
- KORRINGA, P.  
1954 The shell of *Ostraea edulis* as a habitat. — Arch. néerl. Zool., 10 : 32—152.
- LAUBENFELS, M. W. DE  
1930 The sponges of California. — Stanford Univ. Bull., (5) 5 (98) : 24—29.
- VOSMAER, G. C. J.  
1882 Sponzen. — Tijdschr. ned. dierk. Ver., (1) 6 : li—lii.

**DR. R. W. M. VAN SOEST**  
**Institute of Taxonomic Zoology (Zoological Museum)**  
**University of Amsterdam**  
**Plantage Middenlaan 53**  
**Amsterdam 1004 - the Netherlands**