

On the Terrestrial Microfauna of Surtsey during the Summer 1972

By

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INTRODUCTION

During the expedition to Surtsey in July 1972, led by Prof. C. H. Lindroth, material for microbiological investigations was collected and brought to the Institute of Plant Physiology in Uppsala by Drs. Elisabet and L. E. Henriksson. By their generosity the cultures could also be used for the study of microfauna. Some of our material was kindly sent to us from Dr. G. H. Schwabe and derives from his cultures reared at the Max-Planck-Institute in Plön, Germany. Samples containing nematodes were sent to Dr. B. Sohlenius, Stockholm.

DESCRIPTION OF THE LOCALITIES

The material cultured at Uppsala was collected at 21 separate localities, which are described in more detail and marked on a map by Henriksson and Henriksson (1974 and 1975). Only the 7 localities where microscopic animals were found are dealt with below. In addition, microzoa were studied in cultures from two of Dr. Schwabe's localities, viz. 428 and 476.

All these localities inhabited by microzoa are situated above the highest water level close to steam exhalations. Locality 1 is situated in the passage between the tephra cones of Surtur I and Surtur II, 476, on the eastern slope of „New Year Crater“ (Strompur), 12 and 428, immediately S of the head crater of Surtur I, 2, 3 and 4 in the crater area of Surtur II. Locality 15 lies just outside „the Bell“ (see Holmberg and Pejler 1972)

The localities were subjectively chosen, mostly because mosses were seen. That part of the island covered by visible, though minute, vegetation is very small (much less than 1‰). If a

corresponding number of localities had been selected at random probably no microscopic animals would have been found.

METHODS

The methods of sampling and cultivation were the same as in the previous years. The reader is referred to Behre and Schwabe (1970) concerning the laboratory work in Plön and to Henriksson, Henriksson and Pejler (1972) and Holmberg and Pejler (1972) concerning that in Uppsala.

TABLE 1.
OCCURRENCE OF THE FORMS IN THE DIFFERENT LOCALITIES DURING 1972.

| | Locality | | | | | | |
|-------------------------------|----------|----|----|----|----|----|------------|
| | 1 | 2 | 3 | 4 | 10 | 12 | 15 428 476 |
| RHIZOPODA, | | | | | | | |
| AMOEBIDA | | | | | | | |
| <i>Vahlkampfia</i> sp. | .. | .. | × | .. | × | .. | × |
| <i>Hartmanella</i> sp. | .. | .. | × | .. | .. | .. | × |
| <i>Vanella</i> sp. | .. | .. | .. | .. | × | .. | .. |
| <i>Mayorella</i> sp. | × | .. | × | × | .. | .. | .. |
| (“ <i>Astramoeba</i> sp.”) | .. | .. | .. | × | .. | × | .. |
| <i>Thecamoeba</i> sp. | × | × | .. | .. | .. | × | .. |
| <i>Thecamoeba terricola</i> | .. | .. | .. | .. | .. | × | × |
| Greeff | .. | × | .. | .. | .. | .. | .. |
| RHIZOPODA, | | | | | | | |
| TESTACEA | | | | | | | |
| <i>Corythion dubium</i> | .. | .. | .. | .. | .. | .. | × |
| Taranek | .. | .. | .. | .. | .. | .. | .. |
| ROTATORIA, | | | | | | | |
| BDELLOIDEA | | | | | | | |
| <i>Philodina acuticornis</i> | .. | .. | .. | .. | .. | .. | .. |
| <i>odiosa</i> Cohn | .. | × | × | .. | .. | .. | × |
| <i>Habrotrocha constricta</i> | .. | .. | .. | .. | .. | .. | .. |
| Dujardin — <i>elusa</i> | .. | .. | .. | .. | .. | .. | .. |
| <i>vegeta</i> Milne | .. | .. | .. | .. | .. | .. | × |

COMMENTS ON THE DETERMINATION OF THE RHIZOPODS

As the investigation of the rhizopods did not imply the rearing of clones from the material or any other more advanced technique, the naked amoebae could mostly be determined only to their generic level.

No procedure in order to encourage the development of flagellate stages was undertaken, which can be the reason why the widespread *Naegleria gruberi* Schardinger is missing in the list of species.

In order to facilitate comparisons with the data from 1970, the genus "*Astramoeba*" is included, though it is shown to constitute merely a form which can appear in many groups of Amoebida under certain environmental conditions. Thus the name has no taxonomic validity, which is also the case for "*Dactylosphaerium*", mentioned in the list from 1970.

The determinations were made according to Hoogenraad and de Groot (1940) and to several papers by F. C. Page, e. g. those included in the reference list.

COMPOSITION OF THE FAUNA IN 1972

As will be evident from Tab. 2 the list from 1972 agrees as a whole with that from 1970 (see Holmberg and Pejler, 1972). E. g., both years exactly the same two rotifer taxa were found in the terrestrial localities. This ought to be regarded as a proof of the reliability of the methods and the material. It should be stressed that the material has been cultured in two separate laboratories (in Uppsala and Plön, respectively) on several different substrates. Furthermore, it has been collected during different years from a great number of different localities on the island. As there is still so much agreement, the conclusion also may be drawn that the results are really representative of the island at the present stage and that we have got a comprehension of the present microfauna which is about as good as possible in regard to the available methods and resources. However, the species enumerated should, of course, be considered a minimum, because our methods imply that animals which are difficult to culture or to distinguish will be missing.

As the number of forms has not increased noticeably between 1970 and 1972, it is evident that the developmental curve of the biocenose is still in the lag phase, which impression is strengthened by the study of other groups of terrestrial

TABLE 2.
COMPARISON OF FINDS FROM 1970 AND 1972.

| | 1970 | 1972 |
|--------------------------------------------------------|------|------|
| AMOEBIDA | | |
| <i>Vahlkampfia</i> , "limax-type" | × | × |
| <i>Vahlkampfia</i> , "guttula-type" | × | × |
| <i>Hartmanella</i> sp. | × | × |
| <i>Naegleria soli</i> | × | .. |
| <i>Naegleria bistadialis</i> | × | .. |
| <i>Trichamoeba</i> sp. | × | .. |
| <i>Mayorella</i> sp. | × | × |
| <i>Mayorella vespertilio</i> | × | .. |
| " <i>Dactylosphaerium</i> sp." | × | .. |
| " <i>Astramoeba</i> sp." | × | × |
| " <i>Astramoeba stella</i> " | × | .. |
| <i>Vanella</i> sp. | .. | × |
| <i>Thecamoeba</i> sp. | × | × |
| <i>Thecamoeba striata</i> | × | .. |
| <i>Thecamoeba terricola</i> | .. | × |
| <i>Nuclearia</i> sp. | × | .. |
| TESTACEA | | |
| <i>Euglypha</i> sp. | × | .. |
| <i>Corythion dubium</i> | .. | × |
| BDELLOIDEA | | |
| <i>Philodina acuticornis odiosa</i> | × | × |
| <i>Habrotrocha constricta</i> — <i>elusa vegeta</i> | × | × |

plants and animals (see other contributions in this volume).

As stated in 1970, the microfauna is composed of widespread and tolerant forms. As a complement it could be mentioned that one of the two rotifers encountered, viz. *Philodina acuticornis odiosa*, has recently been the object of experiments by Koehler (1967) and Koehler and Johnson (1969), whereby its remarkable resistance to diverse environmental stresses was strikingly shown.

As far as is known, all forms hitherto encountered feed on algae, bacteria and/or detritus, which means that no predator has been found, and the ecological pyramid should still be formed by only two trophic levels.

ABSTRACT

Samples of moss and algal vegetation from the island of Surtsey/Iceland were cultured in the same way as in 1970. The species encountered in these cultures are roughly the same as in those from previous years, indicating that the material is reliable and representative and, furthermore, that the biocenose still remains in the lag phase of its developmental curve.

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