

Report on the Surtsey Investigation in 1966

Terrestrial Invertebrates

by

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The team, consisting of Dr. C.H. Lindroth, Mr. Hugo Anderson, Mr. Högni Bødvarsson, all from the University of Lund, Sweden, was enlarged to include also Mr. Sigurdur Richter, an Icelandic zoology student at the University of Copenhagen.

Field work was carried out in the Westman Islands during the period June 13th to 18th, 1966, and included one day, June 28th, on Surtsey itself. Sigurdur Richter stayed on Surtsey also from August 13th to 18th and visited several of the other small islands August 8th to 13th.

On Surtsey three glue-traps were exposed near the house and kept under observation during about one week in August. Many of the flies (Diptera) recorded below (7 species) were captured by means of these traps.

The collections made on the other islands, incl. Heimaey, are under investigation by many specialists. We therefore restrict our report to a complete account of the species hitherto found on Surtsey.

Terrestrial Arthropods found on Surtsey (26 species)

I. Taxonomy

I N S E C T A

DIPTERA, 17 species.

Fam. Chironomidae

1. Cricotopus variabilis Staeg. (det. M. Hirvenoja).  
3.VII.65, 3 ♀ (Sig. Helgason & Jutta Magnússon)  
28.VI.66, 2 ♀ (Sig. Richter)

- 12.VII.66, ♀ (Arni Johnsen).  
 14.VIII.66, 2 ♀ (Sig. Richter)  
 16.VIII.66, ♂ (Sig. Richter)  
 18.VIII.66, ♀ (Sig. Richter)

2. Diamesa bertrami Edw. (det. D.R. Oliver)  
 28.VI.66, ♂ (H. Andersson)

3. Diamesa zeryni Edw. ("ursus Kieff.")(det. D.R. Oliver)  
 14.V.64, ♀ (Sturla Fridriksson)  
 28.VI.66, ♂, ♀ (H. Andersson)

Fam. Scatopsidae

4. Scatopse notata L. (det. H. Andersson)  
 15.VIII.66, dead ex. in the house (Sig. Richter)

Fam. Syrphidae

5. Syrphus sp. (luniger group)(det. H. Andersson)  
 12.VII.66, ♀ (Arni Johnsen)

Fam. Heleomyzidae (Dryomyzidae)

6. Heterocheila buccata Fall. (det. H. Andersson)  
 12.VII.66, ♀ (Arni Johnsen)  
 14.VIII.66, ♂, ♀ (Sig. Richter)  
 16.VIII.66, ♂, ♀ (Sig. Richter)  
 17.VIII.66, 2 ♀ (Sig. Richter)

Fam. Heleomyzidae

7. Leria Modesta Meig. (Helomyza m.)(det. H. Andersson)  
 24.VII.65, 4 dead ex., 4 empty puparia (Sig. Helgason)  
 3.IX.65, 5 empty puparia (Sig. Helgason)  
 28.VI.66, 8 imagines (one with nymphs of the ecto-  
 parasitic mite Myianoetes digitiferus),  
 6. larvae in dead fish, 290 puparia in dead  
 fish, 6 puparia in dead bird; afterwards  
 altogether 65 flies hatched (H. Andersson, C.H.  
 Lindroth, Sig. Richter)  
 12.VII.66, ♂, 5 ♀ (Arni Johnsen)

- 13.VIII.66, ♂, ♀, 1 larva (Sig. Richter)  
 14.VIII.66, ♂ (Sig. Richter)  
 15.VIII.66, ♂, 2 ♀ (Sig. Richter)  
 17.VIII.66, 2 ♂, 6 ♀ (Sig. Richter)  
 18.VIII.66, ♂, 2 ♀ (Sig. Richter)
8. Tephrochlaena oraria Collin (det. H. Andersson)  
 28.VI.66, 9 larvae, 20 puparia on dead fish, 1 afterwards  
 hatched (H. Andersson, Sig. Richter)
- Fam. Sphaeroceridae (Borboridae)
9. Leptocera (Limosina) penetralis Collin (det. W. Hackman)  
 16.VIII.66, 2 ♂, ♀, in dead fish (Lophius)(Sig. Richter)
- Fam. Drosophilidae
10. Drosophila funebris Fall. (det. H. Andersson)  
 15.VIII.66, 2 dead ♂ in the house (Sig. Richter)
- Fam. Coelopidae
11. Fucomyia frigida F. (det. H. Andersson)  
 28.VI.66, ♂, 2 ♀ (H. Andersson, Sig. Richter)  
 12.VII.66, ♂, 4 ♀ (Arni Johnsen)  
 13.VIII.66, 2 ♂, 3 ♀ (Sig. Richter)  
 14.VIII.66, 14 ♂, 19 ♀ (Sig. Richter)  
 15.VIII.66, 2 ♂, ♀ (Sig. Richter)  
 16.VIII.66, 2 ♂, ♀ (Sig. Richter)  
 17.VIII.66, 27 ♂, 42 ♀ (Sig. Richter)  
 18.VIII.66, 4 ♂, 5 ♀ (Sig. Richter)
- Fam. Scatophagidae (Cordyluridae)
12. Scatophaga stercoraria L. (det. H. Andersson)  
 28.VII.65, 2 ♂ (Sturla Fridriksson, Sig. Jónsson)  
 12.VII.66, 2 ♀ (Arni Johnsen)  
 13.VIII.66, 2 ♀ (Sig. Richter)  
 14.VIII.66, 2 ♂, 3 ♀ (Sig. Richter)  
 16.VIII.66, 2 ♂ (Sig. Richter)

17.VIII.66, ♂, ♀ (Sig. Richter)

13. Scatophaga furcata Say (det. H. Andersson)  
14.VIII.66, ♀ (Sig. Richter)

Fam. Calliphoridae

14. Calliphora erythrocephala Meig. (det. H. Andersson)  
28.VII.65, ♀ (Sig. Helgason)  
13.VIII.66, ♂ (Sig. Richter)

Calliphora larvae (presumably of C. erythrocephala):

- 13.VIII.66, 6 in 2nd stage, 9 in 3rd stage, in dead bird  
(Sig. Richter)  
15.VIII.66, 3 in 3rd stage, in dead bird (Sig. Richter)  
16.VIII.66, 6 in 2nd stage, 24 in 3rd stage, in dead  
fish (Lophius)(Sig. Richter)  
17.VIII.66, 12 in 3rd stage, in dead fish (Lophius)  
(Sig. Richter)

15. Phormia terraenovae R.-D. (det. H. Andersson)  
14.VIII.66, ♀ (Sig. Richter)

Fam. Muscidae

16. Musca domestica L. (det. H. Andersson)  
12.VII.66, 2 ♂, ♀ (Arni Johnsen)  
17.VIII.66, 2 ♂ in the house (Sig. Richter)  
18.VIII.66, ♂, ♀ in the house (Sig. Richter)

17. Fucellia fucorum Fall. (det. H. Andersson)  
28.VI.66, ♂ (H. Andersson)  
13.VIII.66, ♂, ♀ (Sig. Richter)

HYMENOPTERA, 1 species

Fam. Ichneumonidae

18. Diplazon ornatus Gr. (det. G.J. Kerrich)  
2.VIII.66, ♀ (Sig. Jónsson)

COLEOPTERA, 1 species

Fam. Staphylinidae

19. Atheta atramentaria Gyll. (det. C.H. Lindroth)  
28.VI.66, 3 ex. on dead fish, 1 ex. on dead bird  
(C.H. Lindroth, Sig. Richter)

NEUROPTERA, 1 species

Fam. Hemerobiidae

20. Boriomyia nervosa F. (det. Bo Tjeder)  
28.VI.66, ♂ (H. Andersson)

LEPIDOPTERA, 2 species

Fam. Noctuidae

21. Agrotis ypsilon Retz. (det. P. Douwes)  
15.X.64, ♂ (Eypór Einarsson)
22. Plusia gamma L. (det. P. Douwes)  
4.X.65, ♀ (Sturla Fridriksson)  
25.V.66, ♂ (collector not recorded)

A R A C H N O I D E A

ARANEIDA, 1 species

Fam. Linyphiidae

23. Gen.? sp.? (det. Åke Holm)  
28.VI.66, pull. (H. Bödvarsson)

ACARI, 3 species

Fam. Parasitidae

24. Myianoetes digitiferus Träg. (det. M. Sellnick)  
28.VI.66, several nymphs on 1 ex. of the fly Leria modesta (H. Andersson)
25. Thinoseius spinosus Willm. (Lasioseius spinatus Selln., ♀; L. uncinatus Selln., ♂) (det. M. Sellnick)  
24.VII.65, several ex. about 2 m from 4 dead ex. of Leria modesta, apparently killed by falling ashes from Syrtlingur (Sig. Helgason)

28.VII.65, several ex. on the same spot together with  
a dead Orthocladid midge (probably Cricotopus) (Sig. Helgason)

Fam. Oribatidae

26. Oribotritia faeroensis Selln, (det. M. Sellnick)  
28.VI.66, 11 ex. on a gatepost (hinges still on )  
drifted ashore (H. Andersson, Sig. Richter)

## II. Chronology

Only first day of capture on Surtsey for each species given.  
Name of taxonomic group in abbreviated form after the name.

### 1964.

- 14.V. Diamesa zeryni, Dipt.  
15.X. Agrotis ypsilon, Lep.

### 1965.

- 3.VIII. Cricotopus variabilis, Dipt.  
24.VII. Leria modesta, Dipt.  
Thinoseius spinosus, Acar.  
28.VII. Scatophaga stercoraria, Dipt.  
Calliphora erythrocephala, Dipt.  
4.X. Plusia gamma, Lep.

### 1966.

- 28.VI. Diamesa bertrami, Dipt.  
Tephrochlaena oraria, Dipt.  
Fucomyia frigida, Dipt.  
Fucellia fucorum, Dipt.  
Atheta atramentaria, Col.  
Boriomyia nervosa, Neur.  
Gen.sp. (Linyphiidae) Aran.  
Myianoetes digitiferus, Acar.  
Oribotritia faeroensis, Acar.

- 12.VII. Syrphus sp., Dipt.  
Heterocheila buccata, Dipt.  
Musca domestica, Dipt.

August. - All remaining species.

### III. Dispersal

1. Active flight. The two Noctuid moths: Agrotis ypsilon and Plusia gamma. Both are excellent flyers, notorious as migratory species. They are not native in Iceland and may very well have arrived to Surtsey directly from the mainland of Europe or the British Islands.

2. Anemochorous transport. This has no doubt been the most important dispersal agency. Of course, it usually works in combination with flying activity. All insects found on Surtsey are winged but, with the exception of the two moths mentioned, none is likely to have reached the island by air without the aid of favourable winds. Thus, all Diptera except two, which are thought to have arrived with man (below), are referred to this group. Also the single representative of the orders Hymenoptera, Coleoptera and Neuroptera, respectively. The last named, Boriomyia nervosa is a particularly weak flyer.

Ballooning spiders are entirely surrendered to the hazards of air currents. Most of them migrate in this way only in immature stages; this was the case concerning the single spider found on Surtsey and for that reason it could not be identified. Dr. Holm informs us that he was unable to place it within any of the Palaearctic genera. It seems possible, therefore, that it belongs to the Nearctic species and that it has been carried to Surtsey across the North Atlantic.

3. Hydrochorous transport. The Oribatid mite Oribotritia faeroensis was no doubt carried ashore with the gatepole on which no less than 11 specimens were collected. We were not able to locate the origin of the pole but it should be mentioned that on Heimaey, the only inhabited island of the Westman group, the dumping-place of the town is on the northwestern shore (S of Herjólfsdalur). We intend to investigate this place next summer in search for this particular mite.

4. Zoochorous transport. Since no birds have started breeding on Surtsey - probably due to the heavy fall of ashes from the neighbouring small island volcanoes - no effect of ornithochorous transport of small animals could be stated. However, two species of mites (Acari), with an ectoparasitic life in the nymphal stages, have been brought to the island attached to flies.

5. Anthropochorous transport. All possible precaution has been taken to prevent transport of small animals and plant diaspores with man. Two species of flies, Drosophila funebris and Musca domestica, both strictly synanthropic in Iceland, have been observed on Surtsey in the house only. They have most likely arrived through transport with some kind of provisions.

#### IV. Origin of species arrived

As mentioned above, it might be possible to trace the place from where the gatepole carrying a species of mite arrived. The plan to release a great number of small yellow plast grains into the sea off Heimaey - referred to in the report for 1965 - will likewise be postponed to the summer of 1967.

The important question whether the main part of the immigrated animals on Surtsey came from the other islands of the Westman group or from the Icelandic mainland, cannot be properly tackled until



complete faunal lists for the Westman Islands have been compiled. Most of the necessary field work was carried out during the expeditions of 1965 and 1966, but the material is still being worked up by taxonomic specialists in many countries. We expect to have this part of the project accomplished by the end of this year.

#### V. Colonization

The almost complete absence of higher vegetation on Surtsey implies that the available supply of organic food for animals is extremely scarce. It is virtually restricted to what is washed ashore; seaweed, dead fishes and birds. Insects able to breed in matters of this kind are the only animals that have colonized and become permanent inhabitants of the island. Thus, three species of flies have been stated to breed in carcasses of fish and birds on Surtsey: Leria modesta (the commonest insect on the island), Tephrochlaena oraria, and Calliphora (?) erythrocephala. As soon as more seaweed has collected on the shore, another fly, Fucomyia frigida, already observed in great numbers, will no doubt become a resident too.

The anticipated arrival of nesting birds (probably of Rissa tridactyla first) will not only mean increased chances of transportation for small animals but also an additional supply of food.

All efforts are made to prevent refuse from the house to be available as an artificial source of food for insects.