

VERSLAGEN EN TECHNISCHE GEGEVENS

Instituut voor Systematiek and Populatie Biologie (Zoölogisch Museum)

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(South Atlantic) --**

List of sampling stations April-May 1995

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Institute of Systematics and Population Biology

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INTRODUCTION

In a series of NATO subsidized publications, under contract RG 001/88, scientists from various NATO countries (D, F, NL, SP, UK, and USA) have executed comparative studies on the aquatic biotas, in particular the stygofauna, of various mid-Atlantic islands: Madeira, Canary Islands, Cape Verde Islands, and Ascension.

We were fortunate enough to receive NATO support again (under reference CRG 940976) for a follow-up study on another island in the central Atlantic, St. Helena.

St. Helena (15°55' S 05°42' W) is a volcanic, oceanic island some 1800 km remote from the nearest point on the African coast (Angola) and some 3000 km from the coast of Brazil. The nearest land, but always still 1120 km remote, is Ascension Island. St. Helena is not only remote because of the great distances to the nearest land, but also in the sense that it is hard to reach, as it has no airport or -strip, and no inshore harbour.

On the island, the members of the Dutch team, Jan H. Stock and Jan H. Vermeulen, joined Dr. Philip Ashmole and Mrs. Myrtle Ashmole from the University of Edinburgh (U.K.). The Ashmole's studied the island's evolution mainly through land-arthropods living in underground conditions, and it is evident that such a study would be perfectly supplemented by similar research from the Dutch side on the groundwater organisms.

Geologists assume that the emergence of St. Helena above sea-level took place about 14 My (=million years) ago, which makes the island very much older than Ascension (1-2 My). If these great differences in age are right (and we have reason to doubt the "young" age of Ascension), St. Helena is expected to show a greater biodiversity in the ground water than Ascension. The effect of the longer evolution time available, could be enhanced by the contrasting physical nature of the islands: although approximately of the same size and the same altitude, St. Helena is much wetter, having numerous springs and permanent freshwater streams, whereas Ascension has very few springs and no permanent streams at all.

The preliminary results of the present study do not support the idea that the biodiversity in the ground water of St. Helena is very much greater than that of Ascension. As point of fact, the biodiversity of both islands is low, and we would not be surprised if -- after a detailed analysis of the St. Helena samples -- Ascension would even have a more diversified stygofauna than St. Helena. The reason for this remains unclear for the moment.

During a stay of some 3 weeks on St. Helena, 74 samples were taken, in different habitats and biotopes. Since the island is quite small (some 13 x 11 km), we can safely say that we sampled about 90% of the accessible aquatic localities on the island. The habitats can be roughly divided into the following types:

- (a) open springs, discharging directly into the vegetation;
- (b) captured springs, discharging into closed-off structures or into pipes;
- (c) reservoirs and basins;
- (d) bore-holes reaching to the groundwater level;
- (e) man-made wells;
- (f) interstitial waters in sediments (sand, gravel) on the border of fresh streams;
- (g) interstitial waters in marine beach sediments;
- (h) upwellings of ground water in the bed of otherwise dry guts, often disappearing again in the sediments after a few metres.

True caves or cave waters have not been found on St. Helena. Geomorphological features bearing this name on various maps, are always very shallow recesses or overhangs of the rock, in which daylight can penetrate.

The geographic references used in the station list of this report have been taken from the following sources:

- Directorate of Overseas Surveys (D.O.S.), St. Helena, series G891 (D.O.S. 360), 1 : 25,000, in 1 sheet, editions 6 (1983) and 7 (1990).
- Government of the United Kingdom (Ordnance Survey), St. Helena, series G893 (D.O.S. 260), 1 : 10,000, 6 sheets, edition 2 (1990).

Discrepancies between the series G891 and G893 in the name or spelling of localities are not infrequent. In such cases the nomenclature of the 1 : 10,000 maps has been given preference.

During the home-bound leg of our travel, a transfer from ship to plane in Ascension Island, allowed us to take a few additional samples, to supplement our 1989 studies on Ascension.

Acknowledgements.- The present study of St. Helena was made possible by the NATO Collaborative Grant Programme, Brussels, contract SA. 5-2-05 (CRG 940976).

On the island, we enjoyed the hospitality and close cooperation of Dr. Ph. Ashmole and his wife M. Ashmole, of the University of Edinburgh. Furthermore we are indebted to the Government of St. Helena for various ways of encouragement and support, in particular to H.H. the Governor, Mr. Alan N. Hoole OBE and the Chief-Secretary, Mr. John Perrot; to the staff of the Agriculture and Forestry Department, Mr. Chris Lomas and Mr. A.B. Hill and in particular to Mr. George Benjamin, who guided us with his perfect knowledge of the island to many places that we would not have found without his help; and to the Senior Officer of the Water Authority, Mr. C. George. Thanks are also due to various islanders who granted us permission to visit their lands and sample their springs and wells. Last but not least we acknowledge the most kind hospitality of Mrs. Pat Musk of Willowdene, who housed us and our little field-laboratory, and did all to make us feel home.

The transportation of personnel and gear was provided by the Royal Air Force, Brize Norton Base (through Mr. P. Karmy of the Foreign & Commonwealth Office, London) and the Cunrow Shipping Line Ltd., Porthleven, U.K.

STATION LIST

The sequence of the data in the Station List is as follows:

Station number; locality name; type of habitat; UTM grid coordinates; gear used; conductivity, total salinity and temperature of the water sampled; sampling date; provisional biological inventory.

[95-01 through 95-13 pertain to samples taken outside the sampling area.]

95-14. James Bay (western end of Jamestown); rockpools, intertidal, fairly exposed, under rocks; UTM²0845 823805; hand-collecting; depth 0-0.5 m; 21 Apr. 1995; marine fauna (Actiniaria, Decapoda, Serpulidae, Gastropoda, sponges).

95-15. Hutt's Gate Reservoir; inlet pipes carrying unfiltered spring water; UTM²1063 823375; fine net; 22 Apr. 1995; rich growth of iron bacteria

95-16. Willowbank; recently drilled deep well (diameter 6", depth 18 m), under gravel bank; alt. 680 m; UTM²1138 823380; fine net, in water pumped up by electric pump; cond. 0.35 mS/cm; S c. 0.3 ppt; 18.9° C; *Rana grayi* and tadpoles.

95-17. Briar's Gut, just W of Briar's Pavilion; alt. 230 m; small stream, shadow of many trees, under stones and plant debris; UTM²0930 823530; fine net; 22 Apr. 1995; many *Talitriator* (Amphipoda).

95-18. Sandy Bay; volcanic sand and gravel; UTM²0890 822920; beach in zone of strong surf; Bou-Rouch pump, probe at 50 cm blow sediment surface; 50 l filtered; 23 April 1995.

95-19. Sandy Bay Valley, at bridge closest to the sea; UTM²0871 822985; Bou-Rouch pump, in gravel and loam, probe at 40-50 cm; stream slowly running, abt. 1 m wide; cond. 1.2 mS/cm; S c. 1 ppt; 23.8° C; Planaria.

95-20. Sandy Bay Valley, between ruin and Blarney House; UTM²0875 823049; shallow, slowly flowing stream, width 50 cm; bank of coarse sand; method Karaman-Chappuis; cond. 1.3 mS/cm; S 0.8 ppt; 24.4° C; 23 Apr. 1995; Oligochaeta; Collembola.

95-21. Wrangham's, N. of Sandy Bay School; UTM²0963 823270; along road, between loam, stones, leaf litter; alt. 540 m; 23 Apr. 1995. Talitridae (Amphipoda).

95-22. Frenches Gut Borehole; UTM²0703 823216; spring-fed reservoir, 2.5 m deep; cond. 0.3 mS/cm; S 0 ppt; 20.0° C; 23 Apr. 1995; frogs.

95-23. Sandy Bay Ridge; clear, shadowed pool, spring-fed; alt. c. 680 m; handnet; 23 Apr. 1995; tadpoles, Gastropoda, aquatic plants.

95-24. Rupert's Bay; beach in surf zone; UTM ²0813 ⁸²3806; rock, gravel, black volcanic sand; method Karaman-Chappuis and hand-collecting; 24 Apr. 1995; Gasteropoda, Actiniaria.

95-25. Small spring in bank of Sandy Bay Gut, S. of former Experimental Garden; UTM ²0881 ⁸²2955; springing from clay and gravel; fine handnet; cond. 2.1 mS/cm; S 0.5 ppt; 24.3° C; Talitridae (Amphipoda).

95-26. Mouth of Sandy Bay Gut; beach of black sand and gravel; UTM ²0905 ⁸²2920; method Karaman-Chappuis; cond. 2.7 mS/cm; S 0.15 ppt; 25.9° C; 25 Apr. 1995.

95-27. Same place as 95-26, but stirring sand and stones in the stream-bed; on boundary of fresh and seawater; cond. 2.3 mS/cm; S 0.1 ppt; 24.5° C.; 25 Apr. 1995; Polychaeta.

95-28. Same place as 95/20, but Bou-Rouch pump used; probe at 40-50 cm below sediment surface; 60 l water filtered; 25 Apr. 1995; Polychaeta.

95-29. Alexander's Spring; UTM ²0875 ⁸²3310; alt. 600 m; almost stagnant, discharging into large basin, muddy; fine handnet; S 0 ppt; 19.0_ C; 25 Apr. 1995; Ostracoda; Oligochaeta; red mosquito larvae.

95-30. Tower's Spring; UTM ²0813 ⁸²3300; spring on bottom of closed, cemented well; depth 2 + 0.10 m; large Cvetkov net; cond. 0.2 mS/cm; S 0 ppt; 18.1_ C; 25 Apr. 1995.

95-31. Rupert's Bay, surf zone of beach (same place as 95-24); Bou-Rouch pump at low tide line; gravel and volcanic sand; marine; 26 Apr. 1995.

95-32. Rupert's Bay, eastern end; UTM ²0923 ⁸²3873; gravel and boulders; Bou-Rouch pump at low tide line; marine; 26 Apr. 1995.

95-33. South of Bishops Bridge (dirt road to Oakbank House); spring-fed trough; UTM ²0878 ⁸²3413; fine handnet; cond. 0.1 mS/cm; S 0.01 ppt; 22.7° C; alt. 530 m; 26 Apr. 1995.

95-34. On same road as 95-33, but closer to Oakbank House; UTM ²0878 ⁸²3380; on bank of gut, under leaves of banana, yam, etc. and in hose fed by spring; 26 Apr. 1995; *Talitriator* (Amphipoda), Collembola, terrestrial Isopoda.

95-35. Same place as 95-25; various methods: Karaman-Chappuis, Bou-Rouch, fine handnet, and hand-collecting. 26 Apr. 1995; Talitridae (Amphipoda).

95-36. Broad Gut, near junction with Gates of Chaos, c. 700 m from the sea; UTM ²0845 ⁸²2960; in coarse sand and fine gravel; stream disappears underground at this point; method Karaman-Chappuis; cond. 8.3 mS/cm; S 4.8 ppt; 25.2° C; alt. 40 m; 27 Apr. 1995; Ostracoda, Oligochaeta, Polychaeta, various arthropods.

95-37. 50 m upstream of 95-36, c. 750 m from the sea; UTM ²0825 ⁸²2968; upwelling water in dry streambed; gravel; method Karaman-Chappuis; cond. 7.5 mS/cm; S 5 ppt; 27.7° C; 27 Apr. 1995; Talitridae (Amphipoda), Oligochaeta.

95-38. Sandy Bay Valley, same place as 95-20; Bou-Rouch pump in gravel and finer sediments, much plant debris; 27 Apr. 1995.

95-39. Lufkins Spring; UTM ²0863 ⁸²3380; alt. 640 m; closed, spring-fed concrete trough, 1.5 m deep; fine handnet; cond. 0.3 mS/cm; S 0 ppt; 19.2° C; 28 Apr. 1995; frogs, Oligochaeta, Talitridae (Amphipoda).

95-40. Harding's Spring; UTM ²0793 ⁸²3308; alt. 700 m; open, concrete trough, 60 X 60 cm; mud, leaf debris; practically stagnant; shadowed; cond. 0.2 mS/cm; S 0 ppt; 18.2° C; 28 Apr. 1995; red mosquito larvae, Talitridae (Amphipoda).

95-41. Francis' Gut spring; UTM ²709 ⁸²3175; alt. 670 m; slowly flowing spring, feeding small iron basin; cond. 0.4 mS/cm; S not taken; 17.5° C; 8 Apr. 1995; red mosquito larvae, tadpoles, Oligochaeta, Talitridae (Amphipoda).

95-42. Ladies Bath; UTM ²0725 ⁸²3450; alt. 560 m; spring in closed sheet-iron shed; water depth 30-40 cm; large Cvetkov net, fine handnet; cond. 0.4 mS/cm; S 0 ppt; 19.8° C; 28 Apr. 1995; Talitridae (Amphipoda).

95-43. Fish Pond Spring; UTM ²0750 ⁸²3420; alt. c. 600 m; very slowly running through concrete gutter, ending in small basin of 30 cm depth; cond. 0.2 mS/cm; S 0 ppt; 19.5° C; 28 Apr. 1995; tadpoles.

95-44. Powell's Spring; UTM ²0768 ⁸²3435; alt. c. 640 m; closed, in rectangular concrete basin, abt. 3 X 2 m; depth 1 m; large Cvetkov net; cond. 0.3 mS/cm; S 0 ppt; 19.4° C; 28 Apr. 1995; *Talitriator* (Amphipoda).

95-45. Pumphouse Springgut (Shringgut); UTM ²0767 ⁸²3355; alt. 600 m; tree rootlets; fine handnet; cond. 0.3 mS/cm; S 0 ppt; 19.2° C; 28 Apr. 1995; Planaria.

95-46. Broad Gut, same place as 95-37; Bou-Rouch pump, probe at 40 cm below sediment surface; 50 l water filtered; 29 Apr. 1995; Oligochaeta.

95-47. Same place as 95-46, but probe at 70 cm below sediment surface; 100 l water filtered; cond. 7.8 mS/cm; S 5 ppt; 25.1° C; 29 Apr. 1995.

95-48. Same place as 94-46, but method Karaman-Chappuis; 100 l water filtered; cond. 8.3 mS/cm; S 6 ppt; 24.7° C; 29 Apr. 1995; Talitridae (Amphipoda), Oligochaeta.

95-49. Same place as 95-36; between gravel in almost dry streambed; 29 Apr. 1995; Talitridae (Amphipoda).

95-50. Sandy Bay Valley (same place as 95-19), near bridge closest to the sea; gravel and loam; 30 Apr. 1995; Talitridae (Amphipoda).

95-51. Same place as 95-25; gravel, loam, decaying plants; 30 Apr. 1995; Talitridae (Amphipoda).

95-52. Salt Spring nr. 1; UTM 20625 823350; 20 m above house of H. Francis; small excavation and basin in the rock; cond. 0.9 mS/cm; S 0.1 ppt; 21.1° C; 30 Apr. 1995; fine handnet; 30 Apr. 1995; frogs.

95-53. Salt Spring nr. 2; UTM 20601 823358; near house H. Thomas; bore hole, diam. 4", closed off; depth 1.5 m; contains very little, murky water; fine handnet; cond. 2.9 mS/cm; S 12 ppt; 22.9° C; 30 Apr. 1995; Collembola.

95-54. Trapp Cottage (Hermitage Gut); UTM 20745 823480; alt. c. 430 m; in bank of dry gut; 1 May 1995; Gastropoda terr., Isopoda terr.

95-55. Warren's Gut, upstream section; UTM 21170 823301; alt. 540 m; very little water captured in open concrete trough; fine handnet; cond. 0.2 mS/cm; S 0 ppt; 19.6° C; 1 May 1995; *Talitriator* (Amphipoda).

95-56. Deep Valley, upstream part; UTM 21133 823203; stream-fed, closed concrete tank, discharging into large open tank; cond. 0.3 mS/cm; S 0 ppt; 20.0° C; 1 May 1995; very numerous ostracods, *Talitriator* (Amphipoda) in wet grass.

95-57. Powell's Valley, upstream part; UTM 21065 823154; hand-collected alongside the road; 1 May 1995; *Talitriator* (Amphipoda).

95-58. Perkins Gut, upstream part; UTM 20983 823231; hand-collected under rather dry stones; 1 May 1995; *Talitriator* (Amphipoda).

95-59. Jamestown, mouth of The Run; UTM 20840 823805; discharge of small gut into the sea, just above the breaker zone; gravel and plant debris; fine handnet; cond. 1.1 mS/cm; S 1.8 ppt; 24.8° C; 2 May 1995; Planaria, Talitridae (Amphipoda).

95-60. Hermitage Well; UTM 20780 823413; alt. 600 m; closed concrete well, 30 X 40 cm, depth 50 cm; much plant debris; large Cvetkov net; cond. 0.2 mS/cm; S 0.2 ppt; 19.1° C; 2 May 1995; frog eggs, *Talitriator* (Amphipoda).

95-61. Hermitage Spring; UTM ²0785 ⁸²3416; alt. 610 m; upwelling water in gravel at bottom of closed concrete basin; rootlets; large Cvetkov net; depth 35 cm; cond. 0.3 mS/cm; S 0.1 ppt; 18.9° C; 2 May 1995.

95-62. Oak Bank well; UTM ²0880 ⁸²3388; alt. 560 m; open well under trees, diameter 1.50 m; depth 1.70 m; large Cvetkov net; cond. 0.2 mS/cm; S 0 ppt; 19.8° C; 2 May 1995.

95-63. Hambess' Spring; UTM ²0920 ⁸²3618; alt. 150 m; clean spring, in closed shed; sandy; rootlets; cond. 0.5 mS/cm; S 0 ppt; 21.5° C; 2 May 1995; Tanaidacea, Isopoda aquat.

95-64. Tom Peters Spring; UTM ²0923 ⁸²3628; alt. 150 m; in closed shed; clean; sandy; rootlets; fine handnet; cond. 0.3mS/cm; S 0 ppt; 21.2° C; 2 May 1995; Tanaidacea, Planaria.

95-65. Drummond's Point; UTM ²0913 ⁸²3595; alt. 150 m; open concrete gutter, in which water derived from a spring higher up; rootlets; fine handnet; cond. 0.8 mS/cm; S 0 ppt; 21.0° C; 2 May 1995; Planaria.

95-66. Sandy Bay Valley, mouth of gut in the sea (same place as 95-26); method Karaman-Chappuis; stones, sand, some mud, plant debris; cond. 18.1 mS/cm; S 9.8 ppt; 25.5° C; 3 May 1995; Brachyura.

95-67. Gates of Chaos; UTM ²0725 ⁸²2916; alt. c. 200 m; distance to the sea c. 1600 m; coarse sand, gravel, loam; upwelling water in dry bed; fine handnet; cond. 14.3 mS/cm; S 11 ppt; 25.1° C; 3 May 1995; Polychaeta.

95-68. C. 30 m upstream of 95-67; UTM ²0715 ⁸²2916; alt. c. 200 m; distance to the sea c. 1630 m; very small spring in bank of gut; coarse sand, stones; fine handnet; cond. 14.5 mS/cm; S 11 ppt; 25.5° C; 3 May 1995; Polychaeta.

95-69. Same as 95-63; fine handnet in silt; 4 May 1995; Tanaidacea, Isopoda aquat., Planaria, Oligochaeta.

95-70. Same as 95-64; fine handnet in rootlets; 4 May 1995; Tanaidacea, Isopoda aquat.

95-71. Churchyard Spring (western area of Botley's); UTM ²0535 ⁸²2943; alt. 540 m; small gutter; shadowed; mud; fine handnet; cond. 0.9 mS/cm; S 0.1 ppt; 19.8° C; 5 May 1995; Oligochaeta.

95-72. High Knoll Fort; UTM ²0865 ⁸²3598; open well on inner court of the fort; depth c. 8 m; large Cvetkov net; cond.3.2 mS/cm; S 0.2 ppt; 20.2° C; 6 May 1995; mosquito larvae.

95-73. Napoleon's Tomb Spring; UTM ²1060 ⁸²3422; small, muddy spring; fine handnet; cond. 0.5 mS/cm; S 0.1 ppt; 19.1° C; 8 May 1995; tadpoles.

95-74. Napoleon's Tomb, small tank fed by spring of Stn. 95-74. UTM ²1061 ⁸²3424; fine handnet; 8 May 1995; tadpoles.

APPENDIX

Stations on Ascension Island, sampled on home-bound voyage

95-75. Green Mountain, The Piggery; UTM ⁵7170 ⁹¹2103; alt. 2500 ft; hand-collecting; 11 May 1995; Talitridae (Amphipoda).

95-76. English Bay, Klinka Club; UTM ⁵6878 ⁹¹2762; method Karaman-Chapuis in coarse coral sand; behind rocks, rather sheltered; 11 May 1995; Planaria, Oligochaeta, Gastropoda, Halacarida, Amphipoda oc.

95-77. Ariane Tracking Station, beach; UTM ⁵7400 ⁹¹2470; coarse sand in rockpool; method Karaman-Chappuis; 12 May 1995; Harpacticoida.

95-78. Shelly Beach, rockpools at low tide; UTM ⁵6640 ⁹¹1653; 13 May 1995; hand-collecting; sponges, Mollusca, Amphipoda.

95-79. Shelly Beach, Coral Pools (anchihaline); UTM ⁵6660 ⁹¹1653; washings or coral and rocks; 13 May 1995; *Typhlatia*; sponges; Amphipoda; Ostracoda.

