The 'Oceanic Reefs' Expedition to the Seychelles (1992-1993)

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A brief description is given of the 'Oceanic Reefs' Expedition to the Seychelles held in 1992 and 1993 as part of the Netherlands Indian Ocean Programme. Included are an overview of the programme and its scientific backgrounds, a list of the participants, a description of facilities and methods, a list of stations and maps of the investigated areas.

Introduction

The study of ecology and biogeography of tropical benthic systems performed by Dutch research teams is currently directed primarily towards coral reefs and related ecosystems. Research groups of the National Museum of Natural History (NNM), Leiden, and the Institute for Systematics and Population Biology, University of Amsterdam, participate with several other Dutch institutes in long-term research projects in a few areas (notably Indonesia and the southern Caribbean). In addition several ship-board expeditions (e.g. with *Luymes*, *Tydeman* and *Tyro*) were made in the course of the years to tropical and subtropical areas (Caribbean, West Africa, Indonesia), allowing the study of a great variety of environments. Many foreign institutes and universities in the areas involved and elsewhere, participate in these activities.

In these long-term programmes comparative research in a high oceanic region was considered a scientific priority. The Netherlands Indian Ocean Programme (1992-1993) offered an excellent opportunity for research in a suitable area, for which the Seychelles were chosen. A series of coherent projects were proposed, which center on the question of interocean variability of reef properties. Differences and similarities observed between non-oceanic regions such as Indonesia and the Caribbean, may reflect e.g. prolonged separate histories and local circumstances. An expedition to an oceanic region, which is pristine for a considerable part and not effected by cyclones, such as the Seychelles, may contribute to answering some fundamental questions, because of the proximity and shared history with the Indo-West Pacific convergence area and a similar diversity on the one hand and the lack of continental influences on the other hand.

The research plans were described before the expedition in two booklets (An., 1991; 1992) and immediately after the expedition a shipboard report was published (van der Land, 1993), with an account of what actually happened and some preliminary results. The cruise report of the 'Oceanic Reefs' expedition (van der Land, 1994) contains a more detailed account of the expedition and 15 preliminary reports on the scientific results. The present paper gives a summary of the programme and its back-

grounds, participants, facilities and methods and a list of the stations with maps, as an introduction to the scientific papers in this volume and others to follow later.

Programme and backgrounds

For a better understanding of the highly complex tropical marine biota multidisciplinary long-term in-depth studies are indispensable. Typically this is the type of work being done in fieldstations. However, a disadvantage is that only a restricted number of the diverse biota can be studied. Because of local circumstances generalizations are often unwarranted (Birkeland, 1987a, b).

In the only general textbook on tropical marine ecology (Longhurst & Pauly, 1987) attention is drawn to the unbalanced development of tropical marine benthology. The main reasons seem to be that most research projects are restricted to certain areas and to certain disciplines, and that the conceptual framework is not always well developed (van der Land, 1989). A nomenclatorial problem is that the term 'coral reef' is used in several different ways.

Interdisciplinary projects with a wide scope, as well as geographically comparative, are needed. Ship-based expeditions can be extremely usefull for this purpose but regrettably they are rare nowadays.

Biogeography and taxonomy

Many marine benthic species are distributed throughout the Indo-Pacific and for that reason this whole area is often regarded as a single marine biogeographic region. Local endemism certainly occurs in the Indo-Australian region and in the Red Sea, but other peripheral areas are suspect areas of endemism. It has been suggested in the literature (e.g. by Briggs, 1974; Vacelet et al., 1976) that the Western Indian Ocean has its own endemic species. However, doubts are warranted because reports on endemism are mostly based on comparison of the Western Indian Ocean specimens with descriptions in the literature or museum specimens (Hoeksema, 1989). Sheppard (1987) made an effort to sort out the references to the hermatypic corals of the Indian Ocean and could recognize geographical groupings by cluster analysis. A comprehensive review of these biogeographic problems and the present status of our knowledge is given by Rosen (1988).

Our research group has a unique experience in that most participants recently gained first-hand knowledge of the Indonesian fauna in the field. Now there was an opportunity to compare selected genera and species of several groups of reef organisms (including algae, sea grasses, sponges, actiniarians, corals, serpulids, crustaceans, molluscs and echinoderms) from the central Indian Ocean with those of the Indo-West-Pacific. The choice of representatives of several animal and plant groups guarantees that conclusions are not hampered by group-related peculiarities. It is quite helpful that at least some groups of benthic organisms are reasonably well known, e.g. fishes (Polunin, 1984; Smith & Smith, 1969), echinoderms (Clark, 1984), decapods (Garth, 1984; Bruce, 1984), molluscs (Taylor, 1968, 1971) and scleractinians (Rosen, 1971; Pillai et al., 1973; Wijsman-Best et al., 1980).

Is the relatively young age of most oceanic island biota reflected by the composi-

Fig. 1. R.V. *Tyro*.

tion of their deep water fauna? It is well-known that pre-Tethyan reef-building organisms persist in slope localities beyond modern reef habitats in areas of considerable age. We do not expect that the granitic Seychelles, considered to be a separate 'microcontinent' since the early Tertiary, have given elements of an old fauna a possibility to survive, but of course it is possible. The occurrence of the famous relic *Latimeria* near the Comores is probably not unique. The basic continental rocks in the area, derived from Gondwanaland, are of pre-Cambrian age, but little is known about the marine biological history of the region (Braithwaite, 1984). Deep water observations were made by dredging on the platform and the slopes at depths down to 500 m at several localities. This is also important because there have been few dredging expeditions in the area, so relatively little is known about the benthic fauna and flora at depths greater than 30 m, i.e., the greater part of the Seychelles and Amirante banks. Indeed quite a few species unknown for the area, as well as species new to science were found here (see e.g. van Egmond & Randall, 1994).

Meanwhile preliminary reports on taxonomic and biogeographic studies of several groups were published, viz. macroalgae (Coppejans et al., 1994), seagrasses (van Avesaath, 1994), sponges (van Soest, 1994), sea anemones (den Hartog, 1994), stony reef corals (Hoeksema, 1993; Hoeksema & Best, 1994), octocorals (van Ofwegen & Slierings, 1994), serpulid polychaetes (ten Hove, 1994), palaemonid shrimps (Fransen, 1994a, b), and fishes (van Egmond & Randall, 1994; Randall & van Egmond, 1994).

Meiobenthic flatworms were studied in particular from a biogeographic point of view. In addition to this work, which for technical reasons had to be done from a laboratory on land, parasitic flatworms in fishes and echinoderms were studied as well (see De Clerck (1994) and preliminary report by Martens & De Clerck (1994)).

Much material was obtained of groups of animals and plants which, according to the programme and because of the available man-power, cannot be studied immediately. This applies particularly to material sampled in deep water with grabs, dredges and trawls and to the smaller infauna, which can hardly or not at all be observed in the field. The sampling conseqently resulted in collections of some size that form a valuable source of material for future studies, as a follow-up of the main project.

Autoecology

It was tried to determine the distribution, relative to depth, exposure and bottom morphology, of a number of dominant or otherwise important sessile organisms of several groups. This approach, independant of subjectively chosen 'communities' has been proven to be valuable for a better understanding of benthic biota. Nutrient availability, itself depending on several other factors, is a major determining factor for benthic distributions (Wilkinson, 1986; Birkeland, 1987b). The study of certain species may be an effective tool for practical ways of reef monitoring as was shown by Moll (1986). Such studies should not be restricted to certain types of animals (scleractinians are often used), but should include a variety of organisms, including e.g. sponges and seagrasses (Nienhuis et al., 1989; van Avesaath, 1994; van Soest, 1994).

The occurrence of certain types of symbiosis was studied, particularly the symbiotic relationships between prawns, fishes and actiniarians. The fact that symbionts of sedentary hosts have minor possibilities for dispersal, may promote endemism as

has been observed in actinian-associated clown fishes (*Amphiprion*). Endemic species of this group are present in various relatively isolated archipelagos and limited areas, including the Seychelles (den Hartog, 1994). The fact that twin species in *Amphiprion* occur on both sides of the area between Malaysia and Australia may be explained by the fact that this area was an almost complete land-barrier in the Pleistocene. In our analysis of the results of this expedition we shall try to determine whether the same phenomenon occurs in crustacean symbionts of actiniarians by comparing observations in Indonesia with material from the Indian Ocean (see first reports by Fransen, 1994a, b). The fact that in this respect a considerable amount of basic information on the Seychelles fauna is available, facilitates such studies (see Bruce, 1984, for shrimps and Garth, 1984, for brachyurans). The study of life specimens and in-situ colour photographs is essential for a determination of the slight differences to be expected.

Biochemistry

Are allelopathic interactions in Indian Ocean reef organisms comparably frequent and important as a structuring force as in the Indo-West Pacific? From the number of studies describing allelopathic (frequently anti-biotic, anti-fungal or anti-viral) compounds isolated from reef organisms, it is clear that Indo-West Pacific benthic organisms (notably alcyonarians and sponges) produce these compounds more frequently and more diversely than do comparable organisms in the Atlantic (Braekman, pers. comm.). Before embracing the theory that Atlantic benthic organisms somehow lost the need or the ability to synthesize such compounds, it should be tested whether the isolated islands of the Indian Ocean harbour organisms as prolific in their biochemistry as those from Micronesia, North East Australia and S. Japan. Methods included collecting and deep-freezing of reef organisms. Further processing will be done in Brussels.

Reef structure and ecology

Various reef models and generalities were formulated which should be tested under 'ideal' circumstances such as those of oceanic islands. These include hypotheses about the influence on reef composition and productivity of (1) abiotic factors such as distance from river outflow, exposure and sedimentation, (2) biological factors such as availability of larval supply from neighbouring reefs, growth form and biochemical properties as survival factors, and predation and competition for space, and (3) geological factors such as the history of sea level fluctuations and age of the reef base. Our expedition aimed at testing such hypotheses by carrying out systematic transect-type of observations of the composition of marine biota of selected reefs.

The Seychelles region is well suited for this type of research because of the presence of a wide variety of coastal environments, from high islands with an old base to open sea reefs, from exposed to sheltered situations, from highly disturbed or exploited to pristine areas. Much of the variety of the physical environment is due to the yearly cycle of trade winds. The area is practically completely situated outside the region of cyclones, which eliminates a complicating factor.

The role of phototrophic organisms on reefs is important. Since available infor-

Table 1. Expedition schedule

Land-based research on Mahé, Praslin, La Digue and some other islands:	
4-15 December 1992	4 biologists
10-15 December	6 biologists
15 December - 8 January 1993	1 paleontologist and 2 zoologists
10-30 January	1 zoologist
Cruise schedule of r.v. *Tyro*:	
11 December 1992	Departure from Mombasa, Kenya
15 December 12.00	Arrival in Victoria harbour
16 December 13.00	Casting off
9 January 1993 09.00	Arrival in Victoria harbour
11 January	Departure of scientific crew from Mahé airport
Research schedule on board r.v. *Tyro*: (see track chart, Fig. 2):	
17 - 19 December 1992	near Aride and Praslin
20 - 22 December	near Bird Island and on oceanic slope
23 December	S of La Digue
24 - 25 December	E of Mahé
26 - 28 December	St Joseph's Atoll
29 & 31 December & 1 January 1993	Poivre Atoll
30 December	near Desroches
2 January	near Ile Desnoeufs
3 - 6 January	Alphonse and St François atolls
7 - 8 January	Platte Island atoll

mation shows that at least part of the reefs of the Seychelles are exposed and devoid of terrigenous sediment, it was expected that the dominant life forms are zooxanthellate corals, calcareous algae and autotrophic sponges (*Phyllospongia*) (e.g. Wilkinson, 1987), and that spatial competition from heterotrophs (Alcyonarians, heterotrophous sponges) is weak. This would support various hypotheses concerning the crucial role of sedimentation in structuring reef composition and productivity. Detailed hypotheses about the relationship of exposure gradients and physiognomic-structural attributes of reefs (Bak & Povel, 1989) or occurrence of certain taxa (e.g. Hoeksema, 1989; Hoeksema & Moka, 1989; van Soest, 1989; Wilkinson, 1987) are being tested outside their centre of diversity, the Indo-Pacific convergence. Preliminary results are given by Van Soest (1994).

Details on the methods used in the transect studies and preliminary results were presented by Van Avesaath (1994: seagrasses), Bak (1994: interaction studies), Van Duyl (1994: cover, size frequency distribution and growth of dominant coral species), Hoeksema (1994: species diversity of stony corals and mushroom coral sizes) and De Kluijver (1994: reef structure and growth forms).

The area

Our research took place in the area of the Seychelles and Amirante Islands and near a few outlying reefs (Fig. 2), most of it on board the RV *Tyro*, part of it on or from the land, particularly on Mahé.

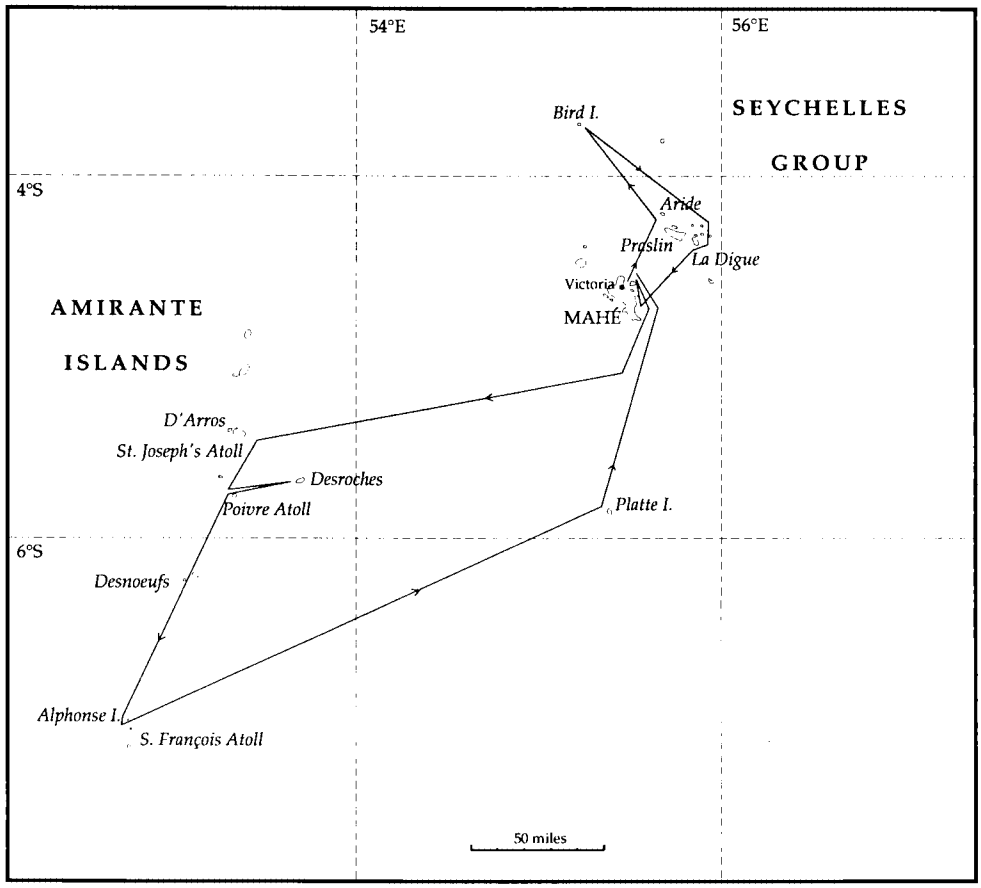

Fig. 2. Track chart of r.v. *Tyro* during the 'Oceanic Reefs' Expedition.

Research as described before has to take place far away from any continental influence. The Seychelles are situated on a platform in the central Indian Ocean, which means that the area has a key position from a biogeographic point of view, between the Indo-Pacific convergence, the most diverse region in the world, and East-Africa and the Red Sea, also highly diverse areas. This is particularly the case because the continental margin of most of South-Asia is unsuitable for blue-water benthos.

Another reason why the Seychelles were chosen as a research area is that its marine biota are not yet well known. In his review paper on coral reefs of the Seychelles Stoddart (1984) states "The reefs of the Seychelles and adjacent areas of the western Indian Ocean are still among the least well-known, though most extensive, of the reefs of the world" and concludes: "It is clear from this account that a great deal of work needs to be done before the reefs of the Seychelles can be described as adequately known...". Meanwhile several expeditions with russian ships added much to our knowledge (Preobrazhensky, 1993; Littler & Littler, 1992) and in the country itself there are now several ongoing long-term research projects (Shah, 1994).

From the available accounts (Stoddart, 1972, 1984; Wells, 1988) it was evident that several different types of reefs are present. Several of these are important for fisheries purposes or interesting for tourists and consequently of economic importance (see overview by Shah, 1994). In a cruise of a short duration the whole area of the Republic of the Seychelles, West to Aldabra, cannot be crossed. Therefore a choice had to be made from the northernmost islands of the Seychelles proper and the Amirante Islands. Of course advantage was taken from the availablity of a research vessel to study remote islands that are least known.

Fringing reefs along the east coast of Mahé were studied, because this is the largest, highest and most densely populated island. Of course these reefs are the best-known in the archipelago (e.g. Lewis, 1968, 1969; Rosen, 1971; Taylor, 1968). The reefs of some of the granitic islands NE of Mahé are also important for tourism and several of these are protected in national parks or special reserves. Bird Island is of interest because this small, non-granitic island is situated on the edge of the bank, with steep slopes down to the deep sea (Stoddart & Fosberg, 1981). The same holds for Platte Island, but this is isolated from the Seychelles bank, and its reefs had hardly been studied. Desroches (Stoddart & Poore, 1970), St Joseph (see Stoddart et al., 1979; Preobrazhensky, 1993), Poivre, Alponse and St François in the Amirantes were visited, because they represent a variety of atolls in different states of development. Because of contradictory observations mentioned in the literature, it was decided to make a reappraisal of the remnants of fossil reefs on some of the islands, particularly Mahé. Results of this and our studies on the structure of several reefs, in particular the carbonate platforms, including various types of atolls, were compiled by Boekschoten et al. (1994).

Participation

Project management

Dr. J. van der Land of the National Museum of Natural History, Leiden, acted as chief scientist. Co-chief scientists were: Dr. R.W.M. van Soest of the Institute for Systematics and Population Biology, University of Amsterdam, and David P. Boullé of the Seychelles Fishing Authority, Victoria.

Participants in the field work

About 40 persons were present on board r.v. *Tyro*, including the crew of 15 persons. A list of participating institutes, scientists and technicians with their functions and specialities is given below, including three scientists who spent most or all of their time on shore.

Bishop Museum, Honolulu, Hawai'i, U.S.A.	
Randall, Dr. J.E., scientist	Fishes
Botanical Laboratory, University of Gent, Belgium	
Coppejans, Prof.Dr. E.G.G., scientist	Algae
Dept. of Zoology, University of Nairobi, Kenya	
Martens, Mrs. Dr. E.E.P., scientist	Flatworms

Institute for Earth Sciences, Free University, Amsterdam	
Boekschoten, Prof.Dr. G.J., scientist	Paleontology
Institute for Systematics and Population Biology, University of Amsterdam	
Hove, Dr. H.A. ten, scientist	Annelida
Kluijver, M.J., de, technician/scientist	Sponges, reef ecology
Soest, Dr. R.W.M. van, co-chief scientist	Sponges
Laboratory for Aquatic Ecology, Nijmegen University	
Avesaath, P.H. van, scientist	Seagrasses
Limburg University Center, Diepenbeek, Belgium	
Clerck, G.G. De, scientist	Meiofauna
National Herbarium, Leiden	
Audiffred, P.A.J., technician	Algae
Kooistra, W.H.C.F., scientist	Algae
National Museum of Natural History, Leiden	
Best, Mrs. Dr. M.R.R.B., scientist	Stony corals
Egmond, J. van , technician	Fishes
Fransen, C.H.J.M., scientist	Crustacea
Goud, J., technician	Mollusca
Guillén, B., video-operator	Video
Hartog, J.C. den, scientist	Coelenterates
Hoeksema, Dr. B.W., scientist	Stony corals, coral ecology
Kolvoort, W.W.Ch., photographer	Underwater photography
Land, Dr. J. van der, chief scientist	Benthology, geomorphology
Ofwegen, L.P. van, scientist	Soft corals
Slierings, M., technician	Benthic invertebrates
National Parks and Conservation Division, Victoria	
Souyave, J.C., conservationist	Marine conservation
Netherlands Institute for Sea Research, Texel	
Bak, Prof.Dr. R.P.M., scientist	Coral reef ecology
Blom, J., technician	Technical support
Duyl, Mrs. Dr. F.C. van, scientist	Coral reef ecology
Willems, C., technician	Technical support
Seychelles Fishing Authority Victoria	
Boullé, D.P., co-chief scientist	Fishes / fisheries
Grandcourt, E., scientist	Fishes / fisheries

Facilities and methods

The ship and sampling techniques

On r.v. *Tyro* containers, placed on deck or in one of the holds, are used as laboratories and workshops, of which 16 were in use during this expedition. Between cruises the container laboratories could be re-arranged to suit the new research group. Two whinches, one on starboard and one at the stern, were used for the deployment of sampling equipment down to depths of 600 m. Small cranes on starboard were used extensively for the deployment of the six rubberboats for scuba diving operations and visits to islands and reefs.

For sampling of the sediment and the bottom fauna in deeper water, from 20 to 600 m, the following equipment was used:

- van Veen grab for taking bottom samples, deployed over the starboard side midship without any problems; no gear was lost. A total of about 35 grab samples were taken at 10 stations.
- rectangular dredge, particularly for sampling of rocky bottom. It was used with great succes in shallow water from 20 to 60 m depth, but dredging on the slopes of the banks proved to be difficult. There were a number of succesfull hauls (in total about 29 at 18 stations), but also several failures (8 at 6 stations). All five dredges got lost, the last one on the last station near Platte Island, when the wire broke and 700 m of wire was lost.
- Agassiz trawls of three sizes: 1.2 m, 2.4 m and 3.5 m. They could only be used on sandy and muddy bottom and gave very important results. Only one 1.2 m Agassiz trawl was severely damaged, none lost. An Agassiz trawl is not a suitable gear in a reef environment with many rocks, so it was not used very often: in total about 17 succesful hauls at 15 stations.

Dredges and trawls were deployed from the stern. Some experiments were made with baited small fish traps or traps with light, but this method was not succesful.

Collections of fishes were made using the ichthyocide rotenone, the anaesthetic quinaldine, hand nets, plastic bags, spears, and powerhead blast. Similarly for the sampling of several other groups of animals and plants for taxonomic and biogeographical purposes more or less specific sampling techniques were used, for details of which I refer to the Cruise Report.

Diving

Most of the research work was done by scuba diving in shallow water along the coasts of islands or on reefs in open sea and additional snorkeling and shore or reef collecting. Of the 26 participants 21 were divers. In total bout 550 scuba dives were made during the expedition and in addition a large number of snorkeling trips to shallow water. There were about 24 scuba sets on board, which was mostly too small a number for the whole day: a small number of tanks had to be refilled between dives. The tanks were filled with the large airgun compressor, which permits very small filling times.

All diving was done from rubberboats, of which six were operational. When the group came on board two boats had to be repaired, another was not reparable but could be replaced in Victoria bij an Achilles plastic boat of the Seychelles Fishing Authority. Thanks to this generosity there was never a shortage of boat capacity. One of the two big 'Joker' rubberboats was mostly used for special tasks (Fig. 3), because they are not well suited for diving (the other was used as a stand-by boat for emergencies).

Transect studies

Observations along transects were an important method for ecological studies, on the reef edges as well as in seagrass fields. We used belt and line transect methods in 5 × 10 m sized quadrats to determine the characteristics of benthic coral reef commu-

Fig. 3. Two of the rubberboats coming back to the ship.

nities. Six parallel lines were roped off to subdivide the quadrat into five 10 × 1 m areas. The result is a 50 × 1 m long belt transect and a 60 m long line transect (6 × 10 m). Depending on specific aims of the research and logistics the whole or parts of these transects were used by the individual members of the reef ecology group. A total of 23 transects was surveyed on reefs at depths between 5 and 12 m (see list of stations).

The vertical zonation and biomass distribution of seagrasses was studied along transects perpendicular to the coast using a line-intercept method. For technical reasons the transects were started at the deepest end of a vegetation of seagrasses. At fixed distances (50 m or 25 m depending of the length of the transect and available time) a quadrat with an area of 0.04 m^2 was placed on the bottom.

Photography and video

One of the important aims of the expedition was to document underwater life by photography and video. Two underwater video camera's of two new types were used. One was not suitable for macro work and was only used for landscape recording, also above water in amphibious situations, when it was to risky to use an ordinary video camera. There were also several still camera's available. Photographs of selected specimens of several groups were also taken in the laboratory, often in aquaria, as soon as possible after sampling.

Lists of stations

In the Netherlands Indian Ocean Programme each expedition was given a series of station numbers. Our expedition were granted the numbers 600 to 799, of which the 600-series was used for the work on the islands and the 700 series for the research on and from the r.v. *Tyro*.

Shore stations
a. Shore party zoology and botany Mahé 5-15th December 1992

Sta. 601: Mahé, NE coast, Anse Nord D'Est; 04°34'S 55°28'E. 5 Dec. 1992. Outer reef flat, slightly sloping down, rather bare with cover of short massive Alcyonacea, scattered stony corals and considerable patches of *Discosoma* spec.; snorkeling, zoological sampling.

Sta. 602: Mahé, SW coast, Baie Lazare/Anse Gaulettes; 04°46'S 55°29'E. 6 Dec. 1992. Sandy bay with calcareous barrier, calcareous algae and some coral; snorkeling, zoological sampling.

Sta. 603: Mahé, SE coast, just south of Pointe au Sel and Ile Souris; 04°44'S 55°32'E. 7 Dec. 1992. Depth: intertidal to 2 m. Snorkeling. Sandy reef flat with isolated granitic rock (islets at high tide) and intertidal beachrock; zoological sampling.

Sta. 604: Mahé, NE coast, North East Point; 04°35'S 55°28'E. 8 Dec. 1992. Depth: intertidal to 5 m. Snorkeling. Reef flat (with significant cover of Zoantharia (*Zoanthus* and *Palythoa*) and slope with many corals; zoological sampling.

Sta 605: Mahé, W coast, Port Launay National Park; 04°38'S 55°23'E. 9 Dec. 1992. Depth: intertidal to shallow subtidal. Snorkeling and scuba diving in cove with sandy beach and beachrock, bordered to the north by a bare, exposed rocky promontery with solitary tunicates and large Ostreidae (*Lopha*), and to the south by a smaller promontery and a more protected reef with dense cover of Alcyonacea, also Scleractinia and Corallimorpharia Discosomatidae; zoological and botanical sampling.

Sta. 606: Mahé, E. coast, north side of Moyenne Island; 04°37'S 55°31'E. 10 Dec. 1992. Depth: intertidal to slope at 6 m. Snorkeling and scuba diving. Reef flat with brown algae and Zoantharia (*Palythoa* spp) and slope with abundant coral growth (especially *Acropora*); zoological sampling.

Sta. 607: Mahé, SE coast, Anse Forbans bay near Cap Maçons; 04°47'S 55°32'E. 10 Dec. 1992. Depth: intertidal to shallow sublittoral. Snorkeling and scuba diving, sandy reef flat and granite cliffs; botanical sampling.

Sta. 608: Mahé, SE coast, Anse Royale bay near Pointe au Sel and Ile Souris; 04°44'S 55°32'E. 10 and 24 Dec. 1992. Depth: intertidal to 10 m. Snorkeling and scuba diving in lagoon and on outer reef; botanical sampling. Same area as Sta. 740 and 741.

Sta. 609: Mahé, NW coast, Vista Do Mar; 04°34'S 55°26'E. 11 Dec. 1992. Depth: intertidal to 9 m. Snorkeling and scuba diving. Beach with beachrock and granitic boulders; shallow subtitdal with abundant growth of Alcyonacea; somewhat deeper considerable coral cover (*Acropora*) and significant patches of Zoantharia and Corallimorpharia-Discosomatidae; sandy bottom at 4-9 m, botanical and zoological sampling.

Sta. 610: Mahé, NE coast, North East Point; 04°35'S 55°28'E. 11 Dec. 1992. Depth: intertidal to shallow subtidal. Snorkeling and scubadiving. Beach with beachrock, sandy reef flat, granite boulders; botanical sampling.

Sta. 611: Mahé, NE coast, bay just S of North East Point; 04°35'S 55°28'E. 11 Dec. 1992. Depth: intertidal to shallow subtidal. Snorkeling and scubadiving. Bay with sewage outlets: beach with garbage, beachrock and large tidepools, sandy reef flat, reef slope; botanical sampling.

Sta. 612: Mahé, E coast, Cap Maçons / Anse de Forbans; 04°46'S 55°31'E. 12 Dec. 1992. Depth: intertidal to 7 m. Snorkeling and shorecollecting. Tidal reef flat and slightly declining reef slope; zoological sampling.

Sta. 613: Mahé, NW coast, Beau Vallon near Le Corsaire; 04°37'S 55°26'E. 12 Dec. 1992. Depth: littoral to shallow sublittoral. Snorkeling and scubadiving along rocky and sandy shore with beachrock and rockpools, sandy sub-littoral; botanical sampling.

Sta. 614: Mahé, NW coast, Beau Vallon near Mare Anglaise; 04°37'S 55°26'E. 12 Dec. 1992. Depth: littoral to shallow sublittoral. Snorkeling and scubadiving along sandy shore with beachrock and rockpools, sub-littoral with coral rubble; botanical sampling.

Sta. 615: Mahé, W coast, Ilot de l'Islette; 04°40'S 55°25'E. 13 Dec. 1992. Snorkeling. Granitic rocks and corals; zoological sampling.

Sta. 616: Mahé, SW coast, Little Police Bay; 04°48'S 55°30'E. 13 Dec. 1992. Depth: high and middle intertidal. Steep sandy beach with beach rock and tidepools; botanical sampling.

Sta. 617: Mahé, W coast, Anse l'Islette, opposite Ilot l'Islette; 04°40'S 55°25'E. 13 Dec. 1992. Depth: intertidal. Mangrove (*Sonneratia*) in mouth of small stream; botanical and zoological sampling.

Sta. 618: Mahé, NE coast, North East Point; 04°35'S 55°28'E. 14 Dec. 1992. Depth: intertidal to 12 m. Shore collecting, snorkeling and scuba diving. Reef flat with zoantharians (*Zoanthus* and *Palythoa*), exposed reef slope with sparse coral cover merging into sandy bottom at about 12 m depth; Shore collecting, snorkeling and scuba diving, zoological sampling (same locality as Sta. 604).

Sta. 619: Mahé, NW coast, Beau Vallon; 04°37'S 55°26'E. 15 Dec. 1992. Scuba diving. Rocky coast, bottom with patches of coral (some with high density and diversity) and Alcyonacea; zoological sampling.

Sta. 620: Mahé, W coast, Ilot de l'Islette; 04°40'S 55°25'E. 14 Dec. 1992. Depth: from upper intertidal to reef slope. Snorkeling and scuba diving, Sandy beach, granitic rocks and dead corals; botanical sampling.

Sta. 621: Mahé, E coast, S of airport; 04°41'S 55°32'E. 14 Dec. 1992. Depth: from upper intertidal to shallow sublittoral. Snorkeling and scuba diving. Sandy beach, reef flat and shallow lagoon with seagrass beds, coral rubble and hard bottom; botanical sampling.

b. Shore party meiobenthos and parasites 15th December 1992 - 14th January 1993

Sta. 625: Mahé, W coast, Anse l'Islette; 04°40'S 55°25'E. 17 Dec. 1992. Littoral and shallow sublittoral, silt to coarse sediment; meiobenthos sampling.
Sta. 626: Mahé, W coast, Grand Anse; 04°41'S 55°27'E. 19 Dec. 1992. Littoral zone, fine to coarse sediment; meiobenthos sampling.
Sta. 627: Mahé, SE coast, Anse Marie-Louise; 04°47'S 55°32'E. 19 Dec. 1992. Depth 30 cm, fine sediment; meiobenthos sampling, parasites of fishes and echinoderms.
Sta. 628: Bird Island, W coast, southern part; 03°43'S 55°12'E. 22 Dec. 1992. High eulittoral, coarse sediment; meiobenthos sampling.
Sta. 629: Bird Island, W coast; 03°43'S 55°12'E. 22 Dec. 1992. High eulittoral, fine sediment; meiobenthos sampling, parasites of fishes and echinoderms.
Sta. 630: Bird Island, E coast, northern part; 03°43'S 55°12'E. 23 Dec. 1992. High eulittoral (beach rim), fine sediment; meiobenthos sampling.
Sta. 631: Bird Island, N point; 03°43'S 55°12'E. 23 Dec. 1992. High eulittoral, medium sediment; meiobenthos sampling.
Sta. 632: Bird Island, W coast, northern part; 03°43'S 55°12'E. 23 Dec. 1992. Middle eulittoral, medium sediment; meiobenthos sampling.
Sta. 633: Bird Island, W coast, southern part; 03°43'S 55°12'E. 24 Dec. 1992. Reef flat, among green algae; meiobenthos sampling, parasites of echinoderms.
Sta. 634: Bird Island, W coast, southern part; 03°43'S 55°12'E. 24 Dec. 1992. Tide pool, coarse sediment; meiobenthos sampling.
Sta. 635: Bird Island, E coast, southern part; 03°43'S 55°12'E. 24 Dec. 1992. High eulittoral, medium sediment and dead seagrass; meiobenthos sampling.
Sta. 636: Bird Island, S point; 03°44'S 55°12'E. 24 Dec. 1992. Depth: 1.5 m, coarse sediment; meiobenthos sampling, parasites of echinoderms.
Sta. 637: Bird Island, S point; 03°44'S 55°12'E. 24 Dec. 1992. Middle to low eulittoral, fine sediment; meiobenthos sampling.
Sta. 638: Mahé, SE coast, Anse aux Pins; 04°42'S 55°32'E. 26 Dec. 1992. Sandy sediment in surge channel and on reef flat (depth 50 cm); fine, medium and coarse sediment; meiobenthos sampling, parasites of echinoderms.
Sta. 639: Mahé, NE coast, Anse Nord d'Est; 04°34'S 55°28'E. 27 Dec. 1992. Middle and high eulittoral, exposed beach with boulders; coarse sediment; meiobenthos sampling, parasites of echinoderms.
Sta. 640: Mahé, NW coast; 04°34'S 55°26'E. 27 Dec. 1992. Middle and high eulittoral, sheltered beach with river; fine and medium sediment; meiobenthos sampling.
Sta. 641: Mahé, NW coast, Beau Vallon; 04°36'S 55°26'E. 27 Dec. 1992. High eulittoral, sheltered beach with river; fine and coarse sediment; meiobenthos sampling, parasites of echinoderms.
Sta. 642: Mahé, E coast, ferry port; 04°36'S 55°28'E. 28 Dec. 1992. Polluted creek with *Avicennia*, fine sediment; meiobenthos sampling.

Sta. 643: Mahé, Anse Royale; 04°44'S 55°31'E. 28 Dec. 1992. Parasites of fish (*Siganus* sps).

Sta. 644: Mahé, W coast, Port Launay, N part of bay; 04°39'S 55°24'E. 29 Dec. 1992. Middle and high eulittoral, medium and coarse sediment; meiobenthos sampling.

Sta. 645: Mahé, W coast, Port Launay, S part of bay; 04°39'S 55°24'E. 29 Dec. 1992. High eulittoral, medium sediment; meiobenthos sampling.

Sta. 646: Mahé, W coast, Port Launay, S part of bay; 04°39'S 55°24'E. 29 Dec. 1992. Shallow sublittoral on reef flat, fine sediment; meiobenthos sampling, parasites of echinoderms.

Sta. 647: Mahé, S coast, Police bay; 04°48'S 55°31'E. 30 Dec. 1992. Middle and high eulittoral, exposed beach, coarse sediment; meiobenthos sampling.

Sta. 648: Mahé, SW coast, Takamaka; 04°47'S 55°30'E. 30 Dec. 1992. Middle to low eulittoral, coarse sediment; meiobenthos sampling.

Sta. 649: Mahé, SW coast, Baie Lazare; 04°46'S 55°29'E. 30 Dec. 1992. Depth 30 cm, very fine sediment; meiobenthos sampling.

Sta. 650: Praslin, Grande Anse; 04°20'S 55°43'E. 31 Dec. 1992. Depth 20 cm, silty sediment, much detritus; meiobenthos sampling, parasites of echinoderms.

Sta. 651: Praslin, Anse Petite Kerlan; 04°19'S 55°41'E. 01 Jan. 1993. Depth 60 cm, fine sediment, much detritus; meiobenthos sampling, parasites of echinoderms.

Sta. 652: Praslin, Anse Kerlan; 04°19'S 55°41'E. 01 Jan. 1993. Middle eulittoral to 2 m, fine sediment in *Sargassum* bed, coarse sediment on beach; meiobenthos sampling.

Sta. 653: Praslin, Grande Anse; 04°20'S 55°43'E. 01 Jan. 1993. Depth 3 m, medium sediment; meiobenthos sampling.

Sta. 654: La Digue, port; 04°19'S 55°50'E. 02 Jan. 1993. Middle to high eulittoral (-coarse sediment) and at 50 cm depth (fine sediment); meiobenthos sampling.

Sta. 655: La Digue, Anse Fourmis; 04°19'S 55°51'E. 03 Jan. 1993. Middle to high eulittoral, medium sediment; meiobenthos sampling.

Sta. 656: La Digue, Anse Grosse Roche; 04°19'S 55°51'E. 03 Jan. 1993. Middle eulittoral (beach pool), fine sediment; meiobenthos sampling.

Sta. 657: La Digue, Anse Severe; 04°19'S 55°50'E. 03 Jan. 1993. Middle to high eulittoral of exposed beach, coarse sediment; meiobenthos sampling.

Sta. 658: La Digue, Grande Anse; 04°18'S 55°51'E. 03 Jan. 1993. Middle eulittoral of exposed beach, fine sediment; meiobenthos sampling.

Sta. 659: La Digue; 04°19'S 55°50'E. 03 Jan. 1993. Parasites of echinoderms.

Sta. 660: Mahé, NW point, l'Ilot; 04°34'S 55°26'E. 05 Jan. 1993. Depth 22 m. Scuba diving. Coarse sediment with detritus; meiobenthos sampling, parasites of echinoderms.

Sta. 661: Mahé, NW coast, Beau Vallon; 04°37'S 55°26'E. 05 Jan. 1993. Depth 10 m, scuba diving, fine sediment; meiobenthos sampling, parasites of echinoderms.

Sta. 662: Mahé, Victoria harbour. 05 Jan. 1993. Parasites of fish.

Sta. 663: Desroches island, SW coast; 05°42'S 55°39'E. 06 Jan. 1993. From high eulittoral to 4 m, fine sediment with detritus and coral debris; meiobenthos sampling.

Sta. 664: Desroches island, 'Circus'; 05°40'S 55°38'E. 07 Jan. 1993. Depth: 24 m, scuba diving, coarse sand on rock; meiobenthos sampling.

Sta. 665: Desroches island, reef flat off W coast; 05°42'S 55°39'E. 08 Jan. 1993. Depth: 2-4 m, snorkeling, fine and coarse sediment; meiobenthos sampling, parasites of echinoderms.
Sta. 666: Desroches island, SE coast; 05°41'S 55°40'E. 08 Jan. 1993. Low eulittoral, medium sediment; meiobenthos sampling.
Sta. 667: Desroches island, SE coast; 05°41'S 55°40'E. 08 Jan. 1993. Low eulittoral, beach pool, medium sediment; meiobenthos sampling.
Sta. 668: Silhouette Island, SE coast, 04°30'S 55°15'E. 11 Jan. 1993. Middle to high eulittoral, medium to fine sediment; meiobenthos sampling.

c. Shore party molluscs 12th - 30th January 1993

Sta. 675: Mahé, W of Port Glaud, Anse L'Islette; 04°40'S 55°24.5'E. 12 Jan. 1993. Reef flat near fresh water stream, many algae, 0.5-2 m depth; snorkeling.
Sta. 676: Mahé, 2 km W of Port Glaud, La Plaine; 04°39'S 55°24.5'E. 12 Jan. 1993. Mangrove; shore collecting.
Sta. 677: Mahé, between Villa Carol and L'Ilot; 04°33'S 55°26'E. 13 Jan. 1993. Large rocks on sandy bottom, patches of coral and many *Lopha*; scuba diving, depth 13 m.
Sta. 678: Mahé, North East Point; 04°35'S 55°28'E. 13 Jan. 1993. Rocky bottom towards sandy beach; scuba diving, depth 10 m.
Sta. 679: Mahé, SE coast, Anse Marie-Louise; 04°47'S 55°31'E. 14 Jan. 1993. Sandy beach, reef flat with algae and loose stones; shore collecting.
Sta. 680: Mahé, E coast, Ile au Cerf, NE side; 04°37'S 55°30'E. 15 Jan. 1993. Sandy bay with seagrass, rocks at end of beach; snorkeling and shore collecting.
Sta. 681: Mahé, E coast, St Anne, Anse Cimetière; 04°36'S 55°30'E. 15 Jan. 1993. Sandy beach with large rocks; shore collecting.
Sta. 682: Mahé, E coast, St Anne, Anse Mare Jupe; 04°36'S 55°30'E. 15 Jan. 1993. Rocky shore, seagrass, algae and coral reef; snorkling and shore collecting.
Sta. 683: Mahé, N of Victoria, Pointe Conan; 04°36'S 55°27'E. 16 Jan. 1993. Muddy sand, large algae, rocks along the shore; shore collecting.
Sta. 684: SW coast of Mahé, 2 km S of Quatre Bornes, Anse Corail; 04°47'S 55°30'E. 17 Jan. 1993. Large granitic rocks; shore collecting.
Sta. 685: E coast of Mahé, 1 km N of Brillant Point; 04°39'S 55°29'E. 17 Jan. 1993. Reef side of 'new land', muddy reef flat, man-made pier; shore collecting.
Sta. 686: E coast of Mahé, 3 km SE of Victoria, Mamelles; 04°38'S 55°28'E. 17 Jan. 1993. Lagoon side of 'new land', muddy mangrove, young trees; shore collecting.
Sta. 687: W coast of Praslin, northern side of Anse Kerlan; 04°18'S 55°41'E. 21 Jan. 1993. Sandy bay with *Sargassum* and seagrass, some large rocks; snorkeling.
Sta. 688: NW coast of Praslin, Petite Anse Kerlan; 04°18'S 55°41'E. 21 Jan. 1993. Exposed sandy bay with old coral blocks, large rocks formation; shore collecting.
Sta. 689: SW coast of Praslin, N side of Grand Anse, Amitié; 04°19'S 55°42'E. 20/23 Jan. 1993. Large shallow bay, sandy beach; shore collecting.
Sta. 690: SW coast of Praslin, Grand Anse, Fond de l'Anse; 04°20'S 55°43'E. 22 Jan. 1993. Sandy and muddy tidal flat, near fresh water stream; shore collecting.
Sta. 691: S coast of Praslin, Anse Consolation, Pte Cocos; 04°21'S 55°45'E. 22 Jan. 1993. Bay with narrow reef flat, steep rocks, large *Sargassum*; snorkeling.

Sta. 692: N coast of Praslin, N side of Anse Volbert; 04°18'S 55°44'E. 23 Jan. 1993. Bay with large rocks, low exposure; shore collecting.
Sta. 693: N coast of Praslin, Anse Volbert, between the beach and Chauve Souris Isl.; 04°18'S 55°45'E. 23 Jan. 1993. Shallow sandy flat, seagrass; shore collecting.
Sta. 694: NW coast of La Digue, Anse Severe; 04°20'S 55°50'E. 24 Jan. 1993. Sandy beach, reef flat with old coral blocks; shore collecting.
Sta. 695: E coast of La Digue, Anse Fourmis; 04°21'S 55°51'E. 24 Jan. 1993. Large granit rocks; shore collecting.
Sta. 696: W coast of La Digue, Anse la Réunion; 04°21'S 55°49'E. 25 Jan. 1993. Reef flat with sandy lagoon and coral rubble; shore collecting.
Sta. 697: E coast of La Digue, Grand L'Anse; 04°22'S 55°50'E. 26 Jan. 1993. Reef flat with large tidepools; shore collecting.
Sta. 698: W coast of La Digue, Pte Source D'Argent; 04°22'S 55°49'E. 27 Jan. 1993. Reef flat and shallow lagoon with seagrass; shore collecting.
Sta. 699: W coast of Mahé, Anse Boileau; 04°42'S 55°29'E. 30 Jan. 1993. Reef flat with old coral blocks; shore collecting.

Tyro stations

Sta. 700: NE of Mahé; 04°33'S 55°50'E. 15 Dec. 1992. Depth 38 m, van Veen grab (5x), calcareous sand with polychaetes, Foraminifera and shells.
Sta. 701: W of Aride Island; 04°13'S 55°34'E. 17 Dec. 1992. Depth 45 m, van Veen grab (5x), muddy calcareous sand with polychaetes and shells.
Sta. 702: W of Aride Island; 04°13'S 55°34'E. 17 Dec. 1992. Depth 47 m, rectangular dredge, dead and live coral, sponges, varied epifauna.
Sta. 703: Praslin Island, NW coast, Chevalier bay; 04°17'S 55°42'E. 17 Dec. 1992. Scuba diving along rocky shore, zoological sampling.
Sta. 704: Praslin Island, S coast, Grande Anse; 04°20'S 55°42'E. 17 Dec. 1992. Scuba diving and snorkeling, botanical sampling.
Sta. 705: NW of Praslin Island; 04°16'S 55°40'E. 17 Dec. 1992. Depth 25 m, rectangular dredge, dead and live coral, sponges, soft corals and other epifauna, holothurians.
Sta. 706: NW of Praslin Island; 04°15'S 55°38'E. 17 Dec. 1992. Depth 34 m, van Veen grab, muddy calcareous sand.
Sta. 707: SW coast of Praslin Island; 04°18'S 55°41'E. 17 Dec. 1992. Scuba diving near outlying rock, 10-12 m, zoological sampling.
Sta. 708: Praslin Island, S coast, off Grande Anse; 04°20'S 55°42'E. 17 Dec. 1992. Scuba diving.
Reef ecology transect no. 1.
Sta. 709: SW coast of Praslin Island, near Miller's Point; 04°17'S 55°41'E. 17 Dec. 1992. Shore collecting and snorkeling in shallow sub-littoral, rocky and sandy shore with granite boulders.
Sta. 710: NE of Aride Island; 04°11'S 55°42'E. 18 Dec. 1992. Depth 55 m, rectangular dredge (3x), small sample: some hydroids, sponges and alcyonarians.
Sta. 711: S coast of Aride Island; 04°13'S 55°40'E. 18/19 Dec. 1992. Scuba diving, snorkeling, shorecollecting; sandy and rocky shore and calcareous reef and slope.
Reef ecology transect nos 2 & 3.

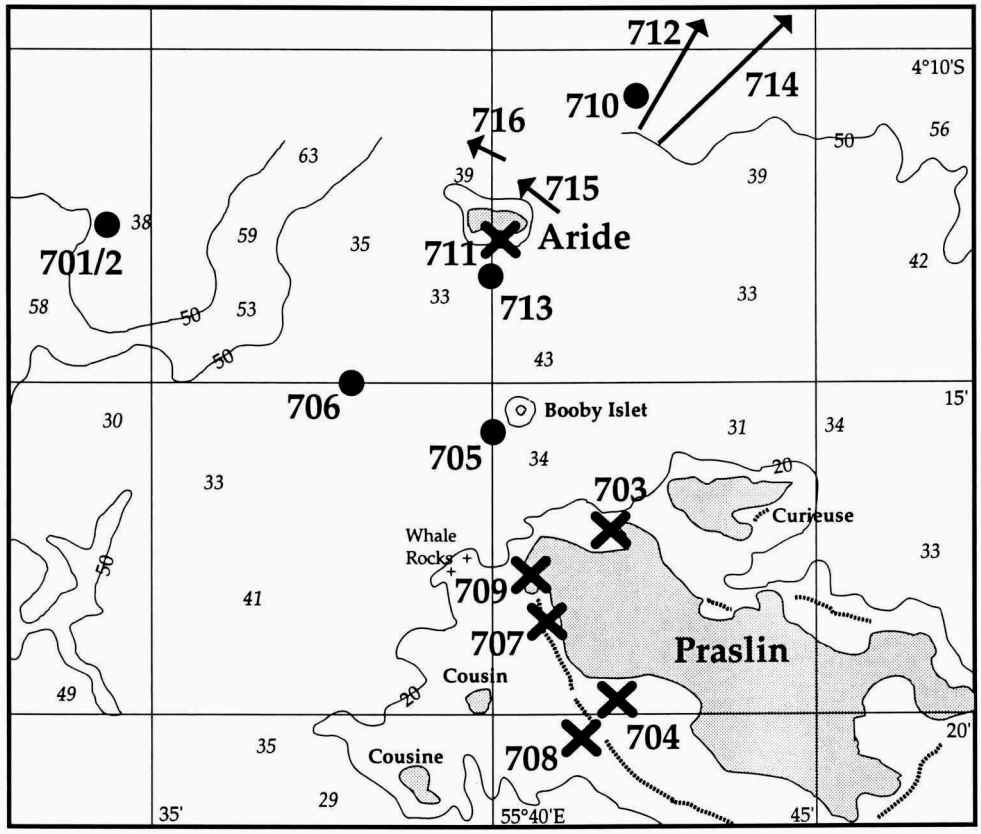

Fig. 4. Stations near Praslin and Aride. Arrows and dots indicate sampling from r.v. *Tyro*, the arrows indicating distance and direction of hauls with dredge or Aggasiz trawl. Crosses give approximate location of scuba-diving and shore-collecting stations.

Sta. 712: NE of Aride Island; 04°10'S 55°42'E. 18 Dec. 1992. Depth 55 m, 1.2 m Agassiz-trawl (2x), small sample but numerous small animals of many groups.

Sta. 713: S of Aride Island; 04°13'S 55°40'E. 19 Dec. 1992. Depth 35 m, rectangular dredge, calcareous nodules (red algae).

Sta. 714: NE of Aride Island; 04°10'S 55°44'E. 19 Dec. 1992. Depth 55 m, 2.4 m Agassiz trawl (2x), muddy sand bottom with soft corals, hydroids, crustaceans and echinoderms.

Sta. 715: NE of Aride Island; 04°12'S 55°41'E. 19 Dec. 1992. Depth 40 m, rectangular dredge, calcareous nodules (red algae).

Sta. 716: N of Aride Island; 04°12'S 55°40'E. 19 Dec. 1992. Depth 40 m, rectangular dredge, calcareous nodules (red algae).

Sta. 717: Bird Island, off E coast; 03°43'S 55°13'E. 20/21 Dec. 1992. Scuba diving and snorkeling at edge of bank, zoological and botanical sampling.
Reef ecology transect no. 4.

Sta. 718: E of Bird Island; 03°44'S 55°13'E. 20 Dec. 1992. Depth 40 m, Van Veen grab, calcareous fine sand with some shell gravel, calcareous algae and polychaetes.

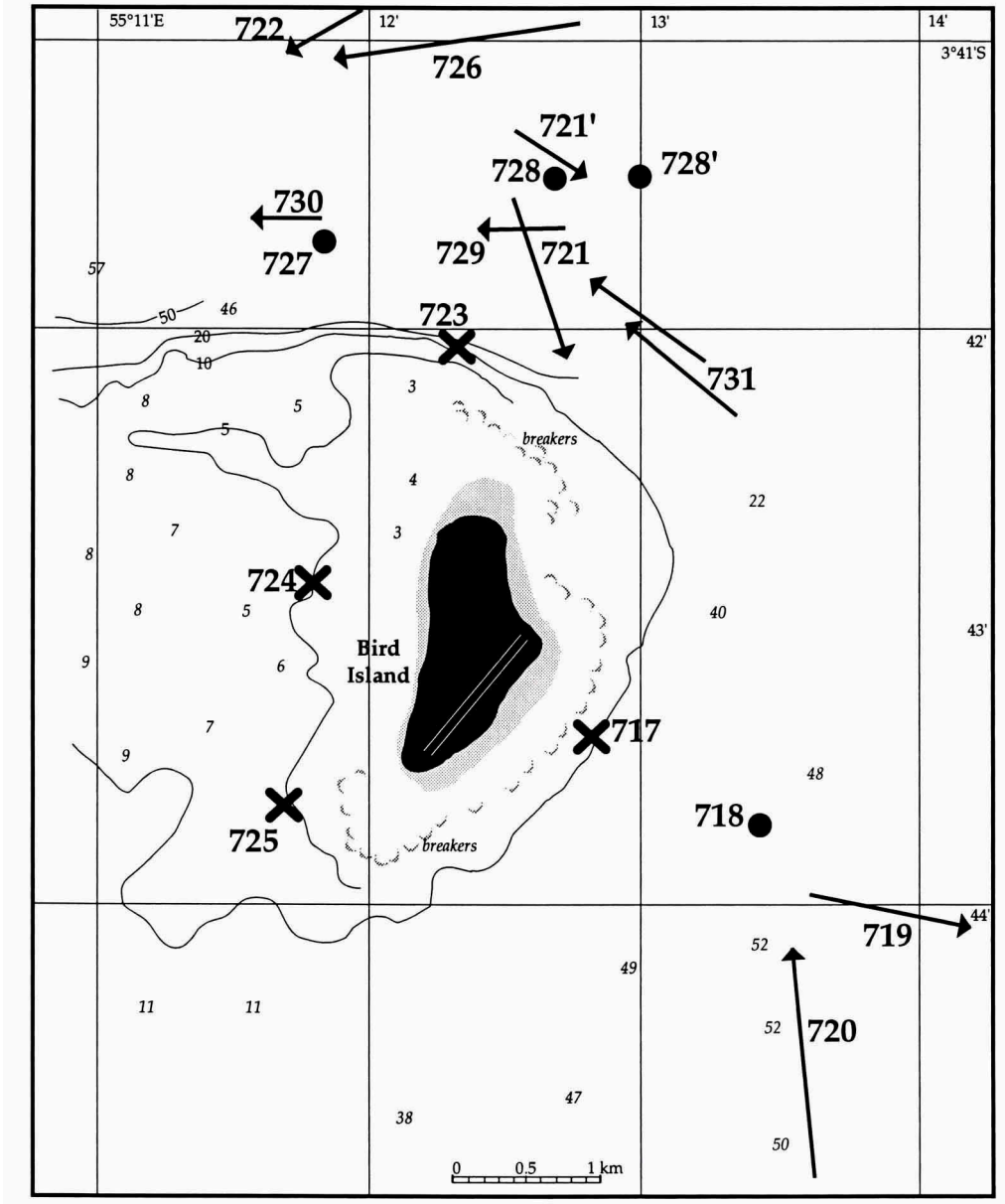

Fig. 5. Stations near Bird Island. Explanation: see fig. 4.

Sta. 719: E of Bird Island; 03°44'S 55°14'E. 20 Dec. 1992. Depth 45 m, rectangular dredge, sandy bottom with numerous small rhodolites, many crustaceans.

Sta. 720: E of Bird Island; 03°45'S 55°14'E. 20 Dec. 1992. Depth 45 m, 1.2 m Agassiz trawl, sediment mainly *Halimeda*, seagrass remnants, sponges and a few rhodolites.

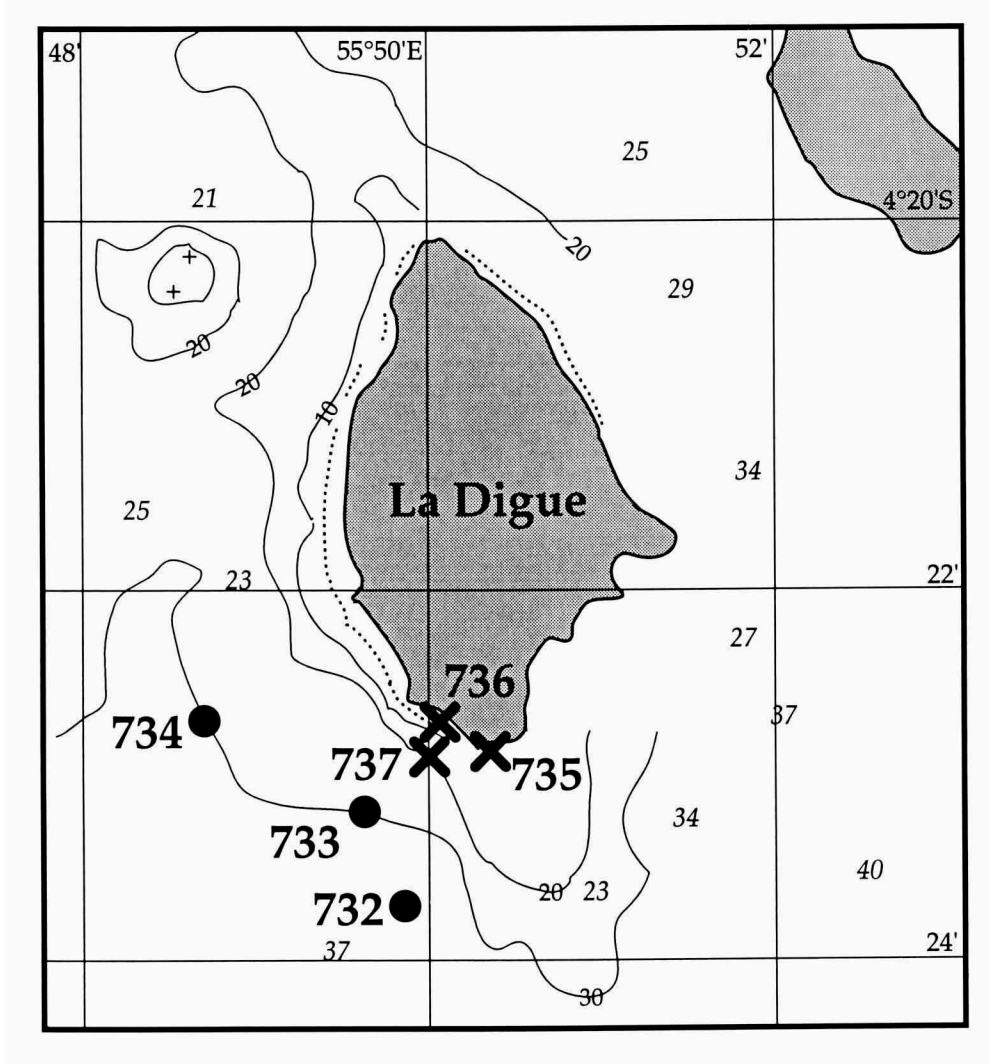

Fig. 6. Stations near La Digue. Explanation: see fig. 4.

Sta. 721: N of Bird Island; 03°42'S 55°13'E. 21 Dec. 1992. Depth 45-55 m, rectangular dredge (2x), corals, gorgonians and sponges.

Sta. 722: N of Bird Island; 03°41'S 55°12'E. 21 Dec. 1992. Depth 250 m, rectangular dredge, failure: net lost.

Sta. 723: Bird Island, off N coast; 03°42'S 55°12'E. 21/22 Dec. 1992. Scuba diving near drop-off at 8 - 30 m, zoological sampling.
Reef ecology transect nos 5 & 6.

Sta. 724: Bird Island, off W coast; 03°43'S 55°12'E. 21 Dec. 1992. Scuba diving and snorkeling on sandflat with seagrass and rubble, depth to 5 m, botanical sampling.

Sta. 725: Bird Island, off SW coast; 03°44'S 55°12'E. 21 Dec. 1992. Scuba diving on sandflat, sponge ecology survey.

Sta. 726: N of Bird Island; 03°41'S 55°12'E. 21 Dec. 1992. Depth 250 m, rectangular dredge, failure: gear lost.

Sta. 727: N of Bird Island; 03°42'S 55°12'E. 21 Dec. 1992. Depth 50 m, 1.2 m Agassiz trawl, failure: net torn.

Sta. 728: N of Bird Island; 03°42'S 55°13'E. 22 Dec. 1992. Depth 50-55 m, van Veen grab (5x), very small samples of calcareous sand (apparently hard bottom).

Sta. 729: N of Bird Island; 03°42'S 55°13'E. 22 Dec. 1992. Depth 50-52 m, 1.2 m Agassiz trawl, sandy bottom with calcareous algae.

Sta. 730: N of Bird Island; 03°42'S 55°12'E. 22 Dec. 1992. Depth 55-63 m, 1.2 m Agassiz trawl, corals, sponges, antipatharians, some calcareous algae.

Sta. 731: NW of Bird Island; 03°42'S 55°13'E. 22 Dec. 1992. Depth 40-50 m, rectangular dredge (2x), small catches: plant material (dead seagrass etc.), *Pinna* fragments, few calcareous nodules.

Sta. 732: SW of La Digue island; 04°24'S 55°50'E. 23 Dec. 1992. Depth 26-28 m, van Veen grab (3x), calcareous sand with some shell gravel and rhodolites.

Sta. 733: SW of La Digue island; 04°23'S 55°50'E. 23 Dec. 1992. Depth 25 m, 1.2 m Agassiz trawl, shells, some corals, some rhodolites.

Sta. 734: SW of La Digue island; 04°23'S 55°49'E. 23 Dec. 1992. Depth 30 m, rectangular dredge, corals and sponges.

Sta. 735: La Digue island, S coast; 04°23'S 55°50'E. 23 Dec. 1992. Scuba diving near rocky shore, depth 8 to 16 m, zoological sampling.

Sta. 736: La Digue island, SW coast; 04°23'S 55°50'E. 23 Dec. 1992. Snorkeling and shore collecting on reef flat, botanical and zoological sampling.

Sta. 737: La Digue island, SW coast; 04°23'S 55°50'E. 23 Dec. 1992. Scuba diving near rocky shore, depth 5 to 14 m, zoological sampling.
Reef ecology transect no. 7.

Sta. 738: SE of Mahé; 04°45'S 55°33'E. 24 Dec. 1992. Depth 35-45 m, rectangular dredge, dead and living corals, sponges, rhodolites.

Sta. 739: Mahé, SE coast, near Pointe Cocos; 04°47'S 55°32'E. 24 Dec. 1992. Scuba diving, near rocky shore, depth about 15 m, zoological sampling.

Sta. 740: Mahé, SE coast, Anse Royale bay; 04°44'S 55°31'E. 24 Dec. 1992. Scuba diving in deep lagoon, snorkeling and shore collecting, botanical and zoological sampling; fish from tidepools.

Sta. 741: Mahé, SE coast, Anse Royale bay off Ile Souris; 04°44'S 55°32'E. 24 Dec. 1992. Scuba diving, on outside of reef barrier, depth to 10 m, zoological sampling.
Reef ecology transect no. 8 .

Sta. 742: SE of Mahé; 04°46'S 55°33'E. 24 Dec. 1992. Depth 45-50 m, rectangular dredge (2x), shells and some animals (very small samples).

Sta. 743: SE of Mahé; 04°47'S 55°35'E. 24 Dec. 1992. Depth 55 m, 1.2 m Agassiz trawl, few animals, mostly small molluscs and hermitcrabs (very small sample).

Sta. 744: E of Mahé, off Victoria; 04°37'S 55°32'E. 25 Dec. 1992. Depth 19 m, rectangular dredge, coral bottom, few sponges and algae.

Sta. 745: E of Mahé, off Victoria; 04°35'S 55°33'E. 25 Dec. 1992. Depth 27-30 m, rectangular dredge, rhodolites, much seaweed, few corals.

Sta. 746: E of Mahé, off Victoria; 04°37'S 55°32'E. 25 Dec. 1992. Depth 20 m, van Veen grab (4x), calcareous fine sand, shells, calcareous algae; meiofauna sample.

Sta. 747: E of Mahé, near Sainte Anne Island, Beacon islet; 04°37'S 55°31'E. 25 Dec.

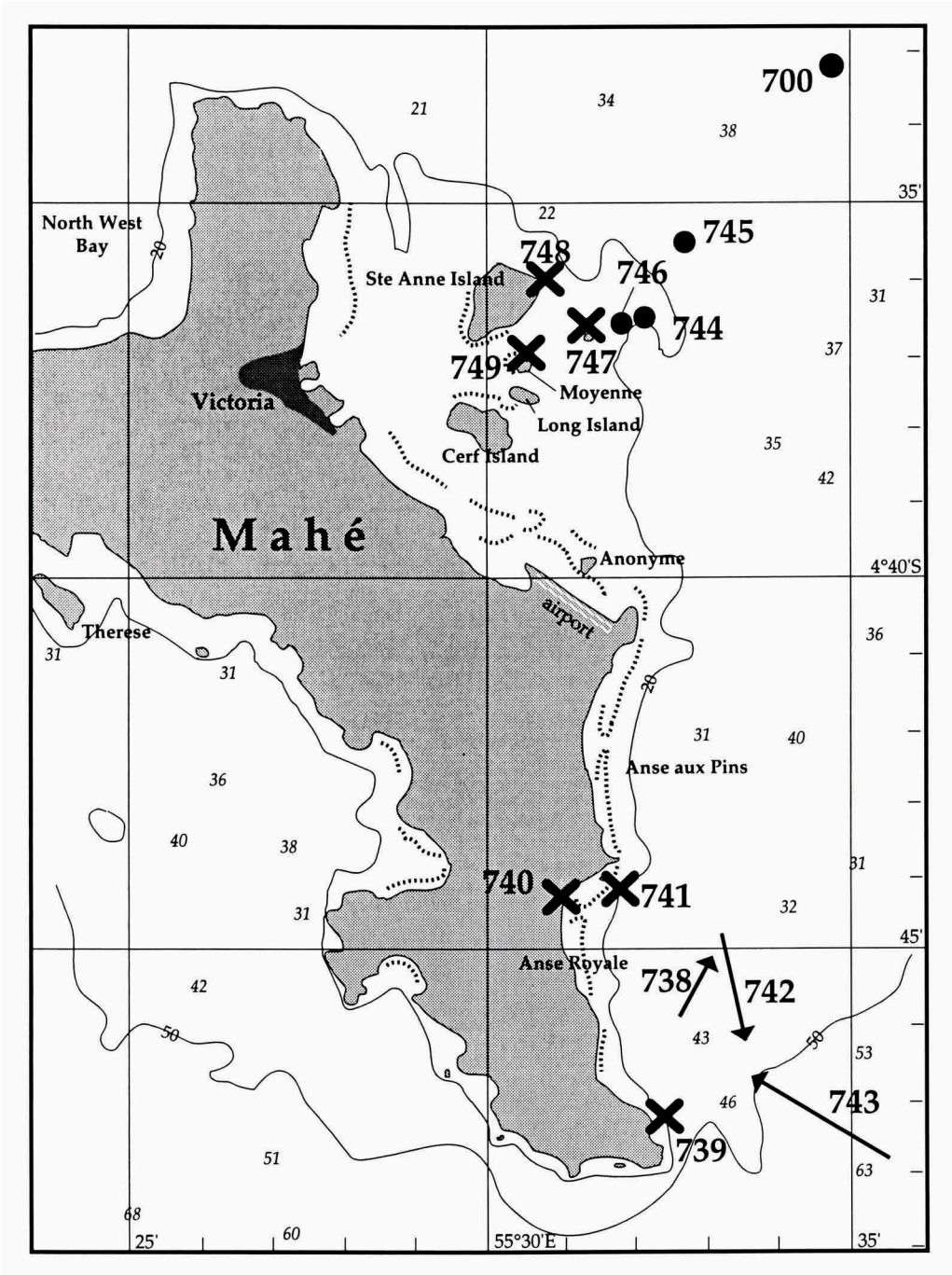

Fig. 7. Stations E of Mahé. Explanation: see fig. 4.

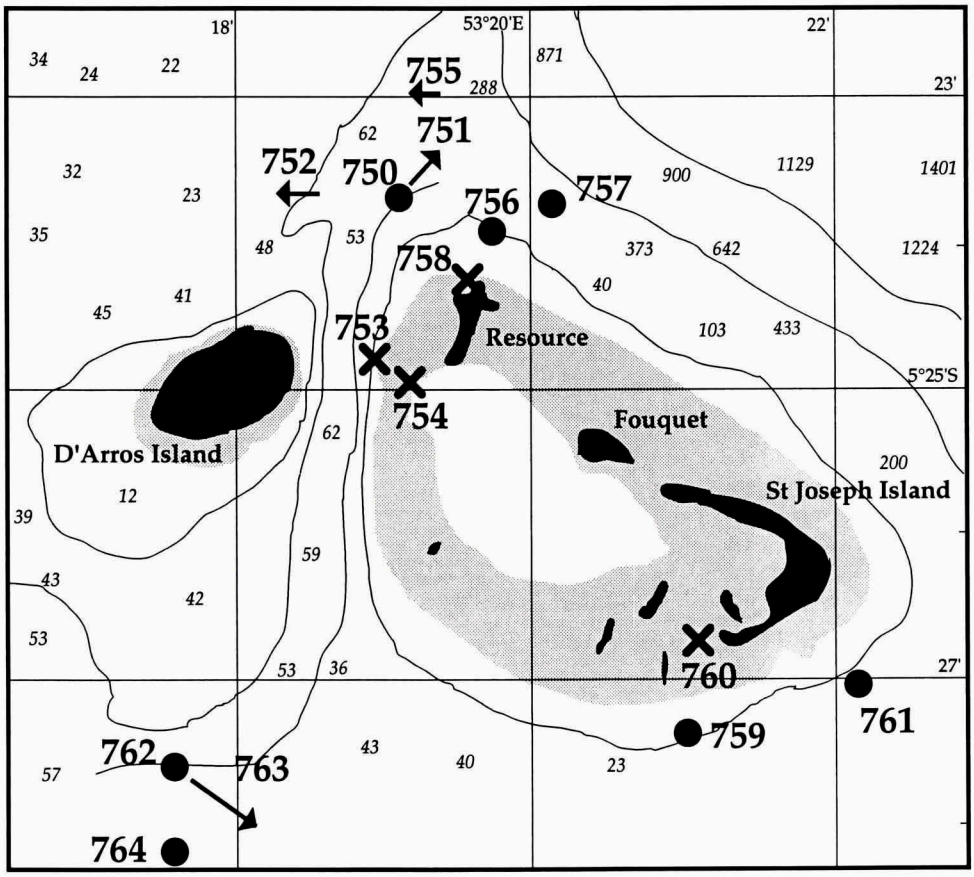

Fig. 8. Stations near D'Arros and St Joseph atoll. Explanation: see fig. 4.

1992. Scuba diving, depth to 10 m, zoological sampling.

Sta. 748: E of Mahé, E coast of Sainte Anne Island; 04°36'S 55°31'E. 25 Dec. 1992. Scuba diving, depth to 17 m, zoological sampling.

Sta. 749: E of Mahé, N of Moyenne Island; 04°37'S 55°31'E. 25 Dec. 1992. Scuba diving and snorkeling, depth to 7 m, zoological and botanical sampling.
Reef ecology transect no. 9.

Sta. 750: NE of D'Arros Island; 05°24'S 53°19'E. 26 Dec. 1992. Depth 48-53 m, van Veen grab (3x), calcareous sand with small rhodolites, sponges and soft corals.

Sta. 751: NE of D'Arros Island; 05°24'S 53°19'E. 26 Dec. 1992. Depth 56-59 m, rectangular dredge, large sample of rhodolites, siliceous sponges and soft corals.

Sta. 752: N of D'Arros Island; 05°24'S 53°19'E. 26 Dec. 1992. Depth 45-55 m, rectangular dredge, large sample of rhodolites, small soft corals.

Sta. 753: St Joseph atoll, NW rim, 05°25'S 53°19'E. 26 Dec. 1992. Scuba diving on reef slope, zoological and botanical sampling.
Reef ecology transect no. 10.

Sta. 754: St Joseph atoll, NW rim, 05°25'S 53°19'E. 26 Dec. 1992. Snorkeling and shore

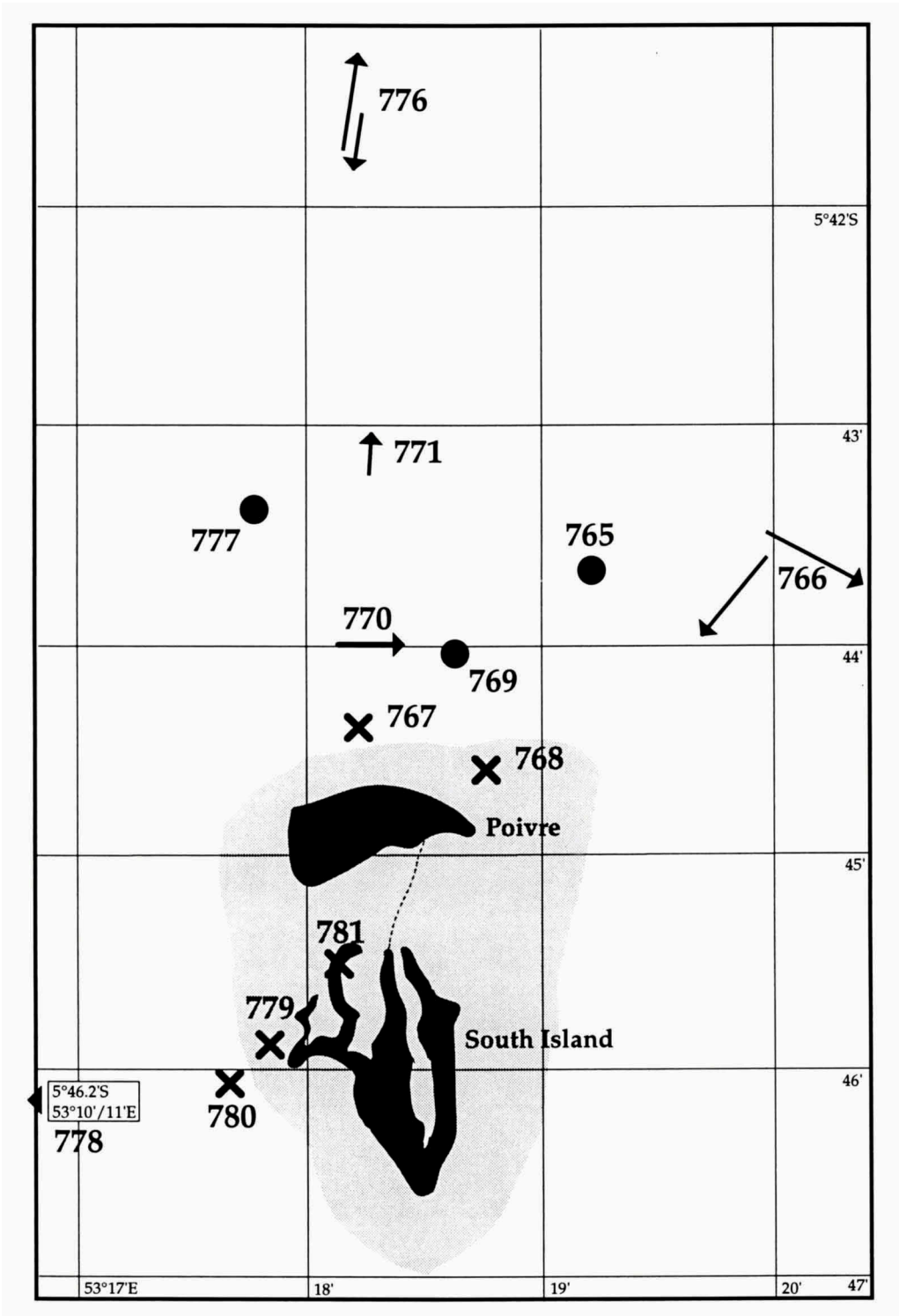

Fig. 9. Stations near Poivre atoll. Explanation: see fig. 4.

collecting on reef flat, zoological and botanical sampling.

Sta. 755: N of St Joseph atoll; 05°23'S 53°19'E. 26 Dec. 1992. Depth 60 m, 1.2 m Agassiz trawl, sandy bottom with rhodolites, shells and soft corals (large fan corals).

Sta. 756: St Joseph atoll, N rim, 05°24'S 53°20'E. 27 Dec. 1992. Scuba diving on reef slope, zoological and botanical sampling.
Reef ecology transect no. 11.

Sta. 757: N of St Joseph atoll; 05°24'S 53°20'E. 27 Dec. 1992. Depth 250 m, rectangular dredge, failure (gear lost).

Sta. 758: St Joseph atoll, N rim, 05°24'S 53°20'E. 27 Dec. 1992. Snorkeling and shore collecting on reef flat, zoological and botanical sampling.

Sta. 759: St Joseph atoll, S rim, 05°27'S 53°21'E. 28 Dec. 1992. Scuba diving on reef slope, zoological and botanical sampling.
Reef ecology transect no. 12.

Sta. 760: St Joseph atoll, S rim, 05°27'S 53°21'E. 28 Dec. 1992. Snorkeling and shore collecting on reef flat, zoological and botanical sampling.

Sta. 761: St Joseph atoll, SE rim, 05°27'S 53°22'E. 28 Dec. 1992. Scuba diving on reef slope, zoological sampling.

Sta. 762: S of D'Arros Island; 05°28'S 53°18'E. 28 Dec. 1992. Depth 50 m, van Veen grab (4x), muddy, very fine calcareous sand with some shell gravel.

Sta. 763: S of D'Arros Island; 05°28'S 53°18'E. 28 Dec. 1992. Depth 52 m, 1.2 m Agassiz trawl, small sample of sponges and molluscs.

Sta. 764: S of D'Arros Island; 05°28'S 53°18'E. 28 Dec. 1992. Depth 50-55 m, 1.2 m Agassiz trawl, dead and living coral, soft corals and many sponges.

Sta. 765: NW of Poivre Island; 05°44'S 53°19'E. 29 Dec. 1992. Depth 38-40 m, van Veen grab (4x), rather coarse calcareous sand with rhodolites.

Sta. 766: N of Poivre Island; 05°44'S 53°20'E. 29 Dec. 1992. Depth 43-48 m, rectangular dredge, coarse calcareous sand with rhodolites, varied infauna and epifauna; few stony and soft corals.

Sta. 767: Poivre atoll, N rim, 05°45'S 53°18'E. 29 & 31 Dec. 1992. Scuba diving on reef slope, zoological and botanical sampling.
Reef ecology transect nos 13 & 15.

Sta. 768: Poivre atoll, N rim, 05°44'S 53°19'E. 29 & 31 Dec. 1992. Snorkeling and shore collecting on reef flat, zoological and botanical sampling.

Sta. 769: N of Poivre Island; 05°44'S 53°19'E. 29 Dec. 1992. Depth 24 m, rectangular dredge, failure (gear lost).

Sta. 770: N of Poivre Island; 05°44'S 53°18'E. 29 Dec. 1992. Depth 30-32 m, 1.2 m Agassiz trawl, small catch: mainly seaweed, some calcareous nodules and shells.

Sta. 771: N of Poivre Island; 05°43'S 53°18'E. 29 Dec. 1992. Depth 40 m, 1.2 m Agassiz trawl, large catch: mainly rhodolites with epifauna.

Sta. 772: Desroches atoll, W rim, 05°41'S 53°35'E. 30 Dec. 1992. Scuba diving on outer reef slope, zoological and botanical sampling.
Reef ecology transect no. 14.

Sta. 773: Desroches atoll, W rim, 05°41'S 53°36'E. 30 Dec. 1992. Scuba diving on reef flat and inner reef slope, botanical sampling.

Sta. 774: Desroches atoll, SW rim, 05°43'S 53°37'E. 30 Dec. 1992. Scuba diving on outer reef slope, zoological sampling.

Sta. 775: Desroches atoll, N of Desroches island, inside lagoon, 05°41'S 53°40'E. 30

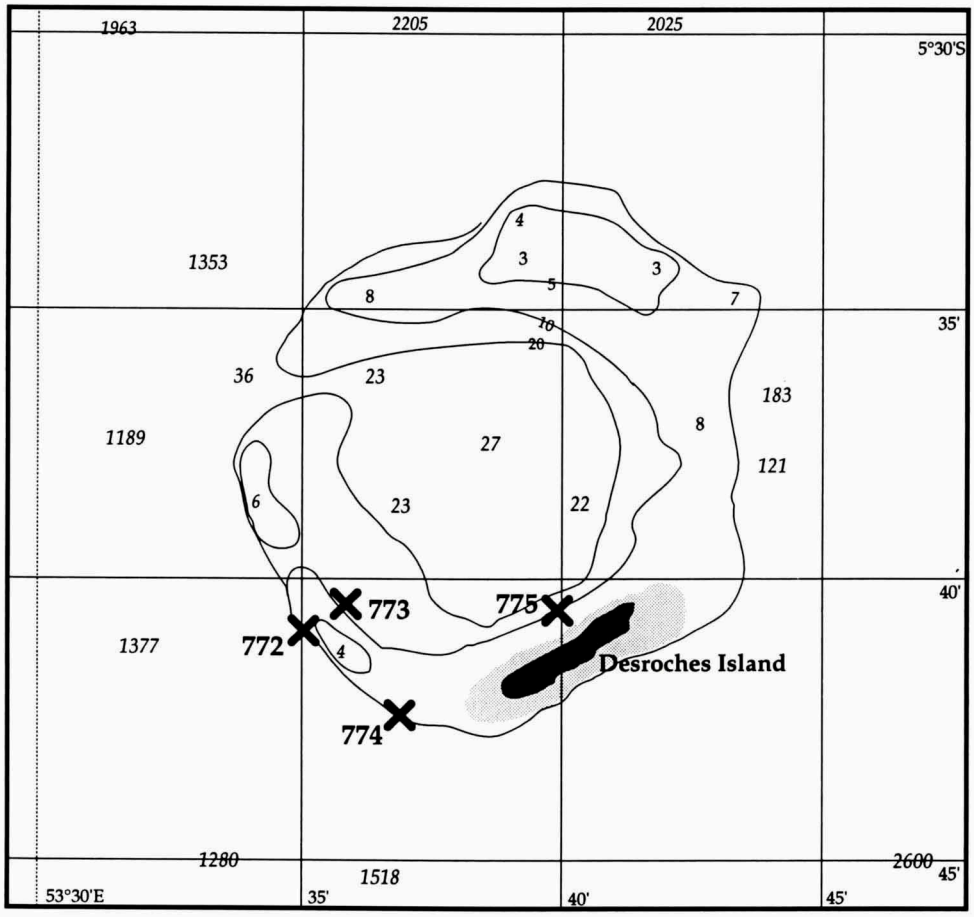

Fig. 10. Stations on Desroches atoll. Explanation: see fig. 4.

Dec. 1992. Snorkeling and shore collecting, zoological sampling.

Sta. 776: N of Poivre Island; 05°42'S 53°18'E. 31 Dec. 1992. Depth 42-45 m, 2.4 m Agassiz trawl, calcareous gravel: *Halimeda* deposit and small rhodolites.

Sta. 777: NW of Poivre Island; 05°43'S 53°18'E. 31 Dec. 1992/1 Jan. 1993. Depth 43 m, 3 baited fishtraps, practically no catch.

Sta. 778: W of Poivre atoll; 05°46'S 53°11'E. 1 Jan. 1993. Depth 57 m, 3.5 m Agassiz trawl, soft bottom with sponges and shells; soft corals, fishes, echinoderms, molluscs.

Sta. 779: Poivre atoll, W rim, 05°46'S 53°18'E. 1 Jan. 1993. Snorkeling and shore collecting on reef flat, zoological and botanical sampling.

Sta. 780: Poivre atoll, W rim, 05°46'S 53°18'E. 1 Jan. 1993. Scuba diving on reef slope, zoological and botanical sampling.
Reef ecology transect no. 16.

Sta. 781: Poivre atoll, lagoon area of South Island, 05°46'S 53°18'E. 1 Jan. 1993. Snorkeling and shore collecting on reef flat and among mangroves, zoological sampling.

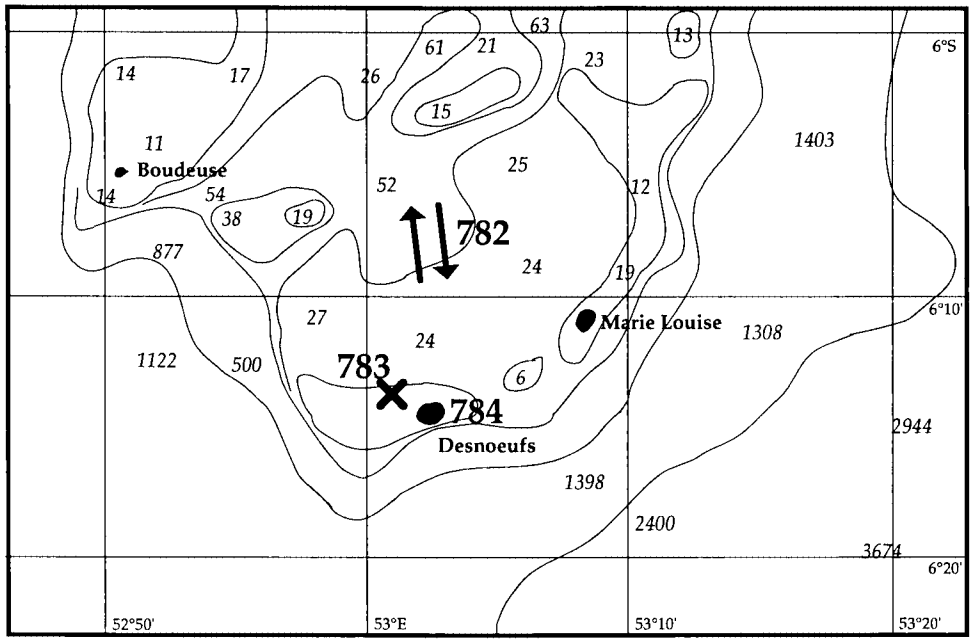

Fig. 11. Stations near Desnoeufs and Marie Louise. Explanation: see fig. 4.

Sta. 782: N of île Desnoeufs; 06°08'S 53°02'E. 2 Jan. 1993. Depth 54 m, 3.5 m Agassiz trawl, soft bottom with sponges and seagrass roots; soft corals, fishes, crabs, sponges, molluscs.

Sta. 783: Northern slope of île Desnoeufs platform, 06°13'S 53°01'E. 2 Jan. 1993. Scuba diving on reef slope, zoological and botanical sampling.
Reef ecology transect no. 17.

Sta. 784: île Desnoeufs, 06°14'S 53°02'E. 2 Jan. 1993. Snorkeling and shore collecting, zoological and botanical sampling.

Sta. 785: S of Alphonse atoll, Canal de Mort, 07°03'S 52°43'E. 3/5 Jan. 1993. Depth 160-200 m, rectangular dredge (3x and 3 failures), net bag filled with coral rubble; echinoids, ophiuroids, crustaceans and shells, very poor epifauna.

Sta. 786: Alphonse atoll, NW edge, 07°00'S 52°43'E. 3 Jan. 1993. Scuba diving on rather steep slope, zoological and botanical sampling.
Reef ecology transect no. 18.

Sta. 787: Alphonse atoll, NW edge, 07°00'S 52°43'E. 3 Jan. 1993. Snorkeling and shore collecting on reef flat, zoological and botanical sampling.

Sta. 788: Alphonse atoll, SE part of lagoon, 07°2'S 52°44'E. 4 and 6 Jan. 1993. Scuba diving and snorkeling on patch reefs and reef flat down to 8 m depth, zoological and botanical sampling.
Reef ecology transect nos 19 and 21.

Sta. 789: Alphonse atoll, SW edge, 07°02'S 52°43'E. 4 Jan. 1993. Scuba diving on outer slope, zoological sampling.

Sta. 790: Alphonse atoll, SE part of lagoon, 07°02'S 52°44'E. 4 Jan. 1993. Snorkeling on

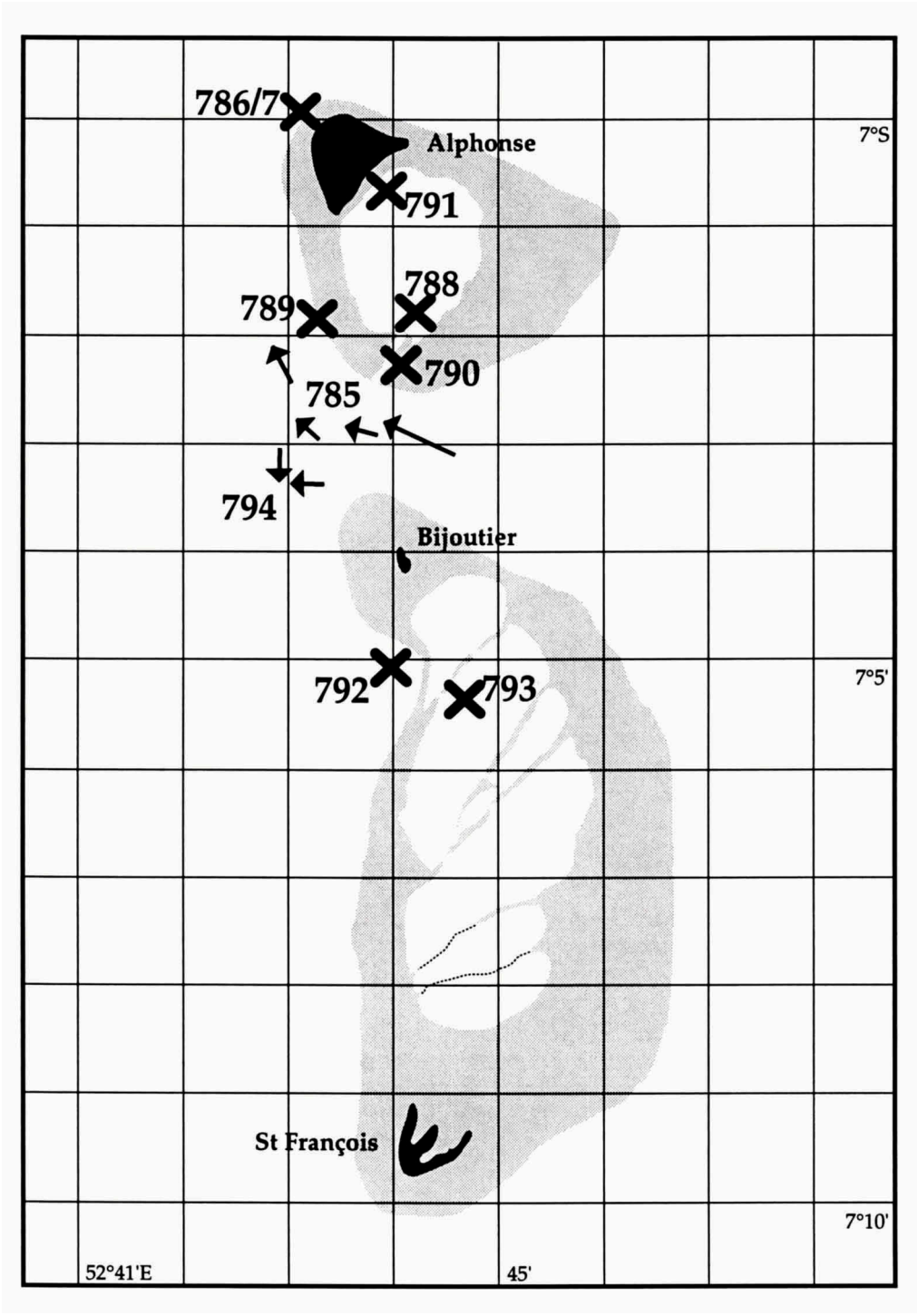

Fig. 12. Stations near Alphonse and St François atolls. Explanation: see fig. 4.

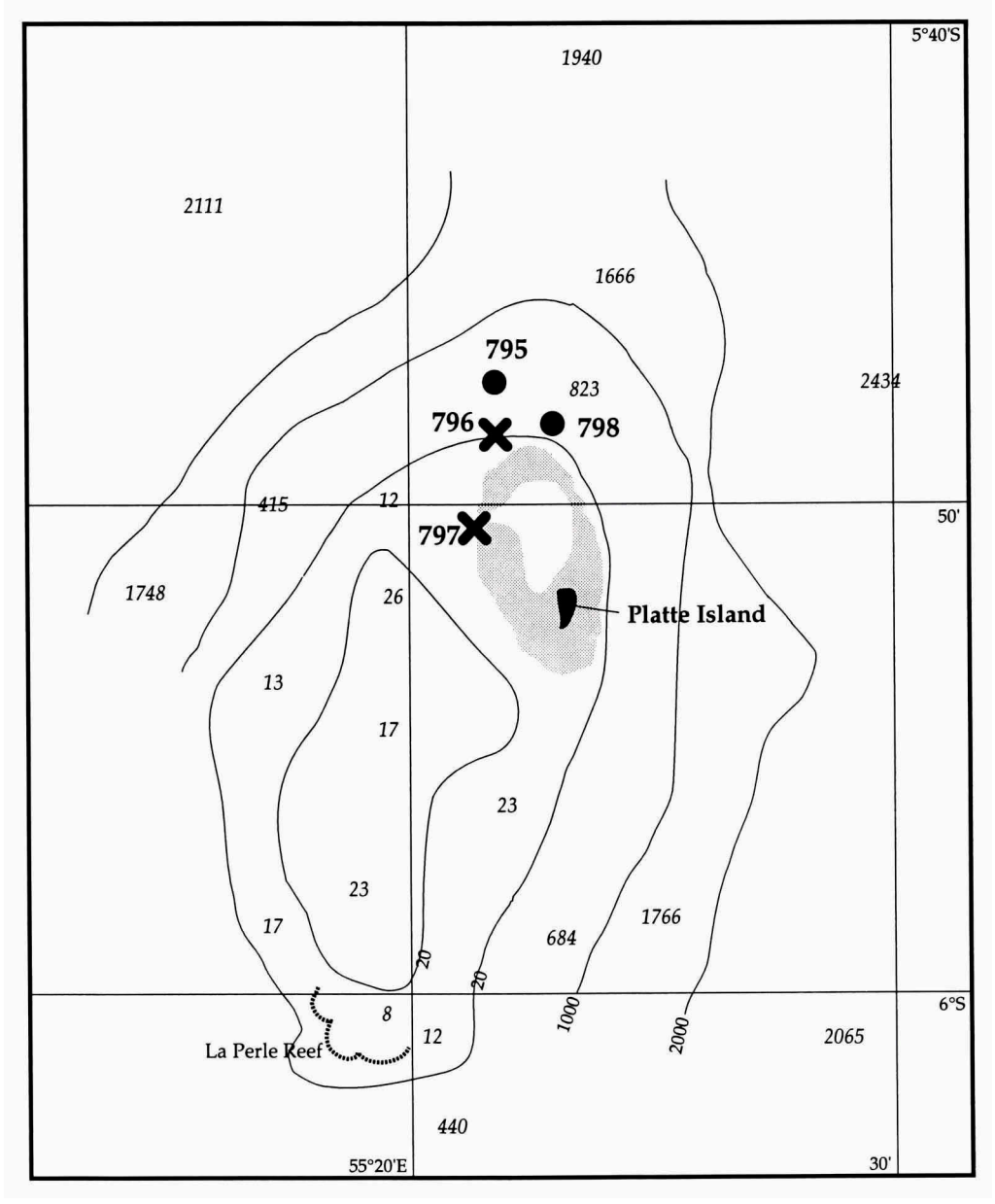

Fig. 13. Stations near Platte island atoll. Explanation: see fig. 4.

reef flat, zoological and botanical sampling.

Sta. 791: Alphonse atoll, NW part of lagoon,07°01'S 52°44'E. 5 Jan. 1993. Snorkeling and shore collecting on beach near settlement, botanical and zoological sampling.

Sta. 792: St François atoll, W rim, 07°05'S 52°44'E. 5/6 Jan. 1993. Scuba diving and snorkeling on outer slope down to 27 m depth, zoological and botanical sampling.

Reef ecology transect no. 20.

Sta. 793: St François atoll, lagoon, 07°05'S 52°45'E. 6 Jan. 1993. Scuba diving and snorkeling in shallow lagoon, botanical sampling.

Sta. 794: S of Alphonse atoll, 07°03'S 52°43'E. 5/6 Jan. 1993. Depth 480-600 m, rectangular dredge (3x), coral rubble; zoantharians, serpulids, crustaceans and shells, generally poor epifauna.

Sta. 795: N of Platte Island atoll, 05°48'S 55°22'E. 7 Jan. 1993. Depth 600 m, rectangular dredge, netbag completely filled with coral rubble and calcareous rocks and sand; corals, zoantharians, serpulids, echinoderms and shells.

Sta. 796: N of Platte Island atoll, 05°49'S 55°22'E. 7/8 Jan. 1993. Scuba diving on N slope, zoological and botanical sampling.
Reef ecology transect nos 22 & 23.

Sta. 797: Platte Island atoll, lagoon of inner atoll, 05°50'S 55°21'E. 7 Jan. 1993. Scuba diving and snorkeling, botanical sampling.

Sta. 798: N of Platte Island atoll, 05°50'S 55°21'E. 8 Jan. 1993. Depth 250 m, rectangular dredge, failure: wire broken

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