ALVARINO A: 1964(b) Report on the Chaetognatha, Siphonophorae, and Medusae of the MONSOON Expedition in the Indian Ocean. Prelim. results of SIO Investigations in the Indian Ocean during Expeditions MONSOON & LUSIAD (1960-1963). Rep. Scripps Instn. Oceanogy: 103-108, 209-212, fig 3, 6, 7, 8.

Oceans via Indonesia, whereas cold water species populations are continuous between the two oceans through the waters of South Australia and Tasmania. S. planktonis, S. gazellae, and S. tasmanica are bounded on the north by the Subtropical Convergence, while this serves as the southern boundary for S. hexaptera. The southern boundary for S. regularis coincided with the boundary between the Equatorial and central waters. The chaetognaths collected on MONSOON Expedition are treated in detail by Alvariño (1964).

In the case of the siphonophores, MONSOON catches in some instances represent new occurrences in the Indian Ocean for species known to be widely distributed in the Atlantic and Pacific. It may be noted that species occurring abundantly in the Indian Ocean samples are also found abundantly throughout wide distributional ranges in all three oceans, whereas species sparsely represented in the Indian Ocean samples are also scarce through the rest of their ranges. Also, the abundant species are found in the upper layers of water, the scarce species in deeper waters. These two facts may be evidence for species regression in these scarce species.

Forty-four species of siphonophores were observed in the Indian Ocean: 29 species were collected in the upper 400 meters, the remainder in strata below this level (Table VIII). Of these species not previously known from the Indian Ocean are Abyla carina, L. challengeri, and Nectodroma reticulata. S. angusta, M. orthocannoides, and Amphicaryon ernesti were reported by Totten, 1954, the former two from South and East African waters, the latter from the Red Sea.

Siphonophores recorded by Alvariño in collections from the Western Pacific, Philippine, or Indonesian waters, and also recorded from the Indian Ocean by previous workers, but not occurring in MONSOON samples include:

1. Abyla brownia, S. tottoni
2. Bargmannia elongata
3. Ceratocymba intermedia
4. Diphyes chamissoni
5. Enneagonun hyalinum
6. Erenna richardi
7. Lensia campanella, L. subtiloides, L. reticulata
8. Melophysa melo
9. Nectopyramis diomedeae
10. Praya sp.
11. Porpita sp.
12. Sulculeolaria monoica
13. Stephanomia bijuga
14. Vogtia glabra

Metric siphonophores (Muggiaea atlantica or M. kochi) were not observed due to the oceanic nature of the samples; this also probably accounts for the absence of D. chamissoni.

The siphonophores inhabiting Equatorial waters include:

1. Diphyes bojani
2. Diphyopsis mitra
3. Chelophyes contorta
4. Abylopsis tetragona; A. eschscholtzi

5. Lensia Lenoidea; L. meteori

6. Sulculeolavia augusta; S. biloba; S. quadridentata

7. Vogtia pentacantha; V. Spinosa

8. Agalma oveni

9. Stephanomia rubra

10. Marrus orthocannoides

11. Amphicaryon acaule; A. ernesti

Abyla bicarinata, A. carina, A. haeckeli, A. schmidti; Ceratocymba dentata, C. leuckarti, and C. sagittata (the last also observed in the upper layers near the Subtropical Convergence), were found occupying the deep layers of the Indian Equatorial waters, close to Indonesia, in the northeastern part of the region sampled on MONSOON.

Some of the above species (Diphyes bojani; Abylopsis tetragona and A. eschscholtzi; Lensia conoidea and L. meteori; Sulculeolaria quadridentata; Amphicaryon acaule, and A. ernesti) inhabit the tropical-equatorial region of the Pacific and extend also into the Central Pacific.

Chelopyes appendiculata; Eudoxoides spiralis; Lensia challengeri and L. subtilis; Vogtia serrata; Nectopyramis thetis, N. natans; and (Velella sp.) appeared to be the characteristic siphonophores in Central Indian waters, and they also occur in similar habitat regions in the Pacific. Figs. present examples of patterns of distribution of some siphonophore species in the Indian Ocean.

Medusae were not found extensively in the MONSOON Indian Ocean collections. A few species were taken at only three or four stations each, and only Atolla wyvillei was observed in 5 mid-water trawls in the Indian Ocean. Several species, whose presence might have been

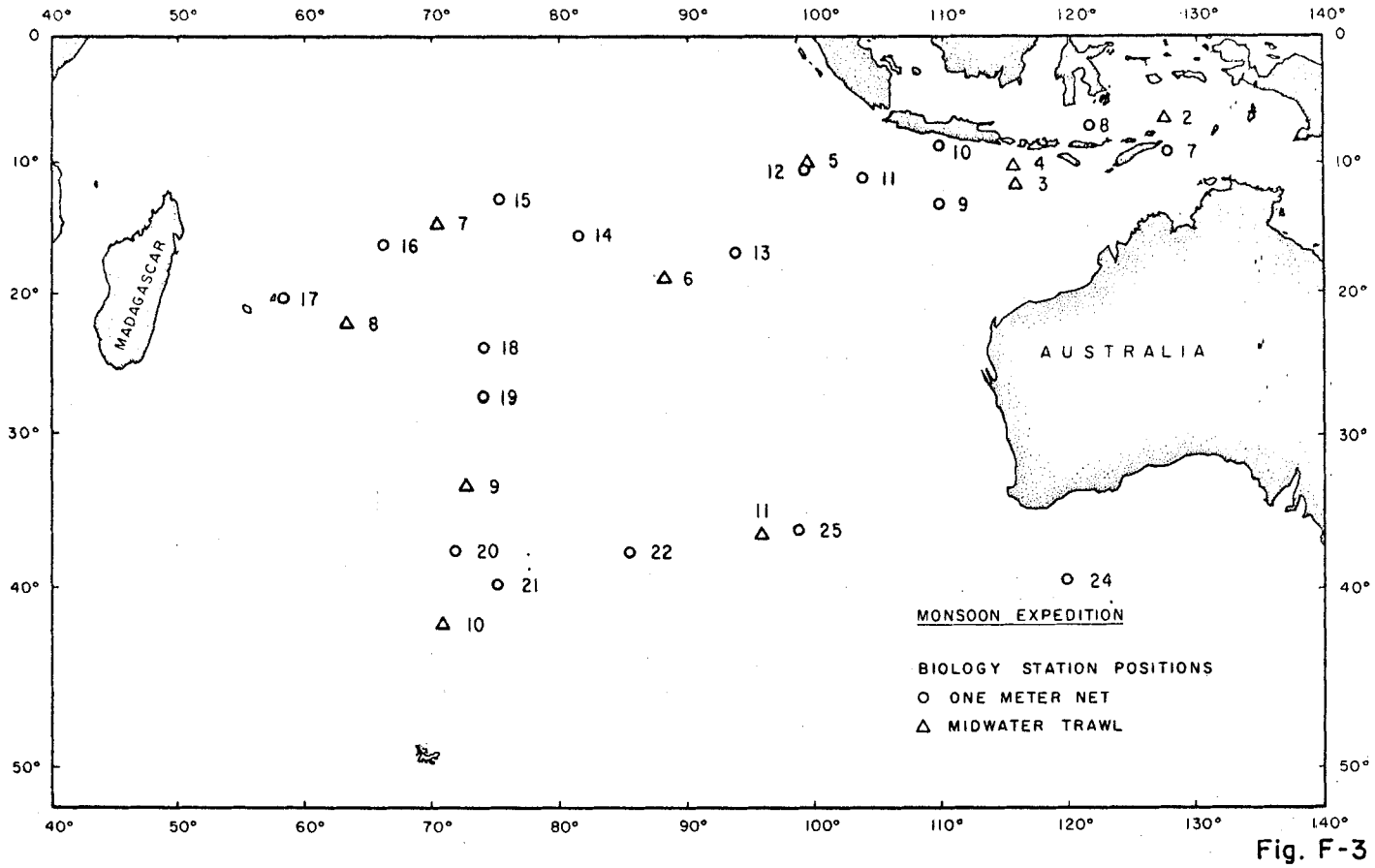
MADAGASCAR
AUSTRALIA
MONSOON EXPEDITION
BIOLOGY STATION POSITIONS
O ONE METER NET
Δ MIDWATER TRAWL

Fig. F-3

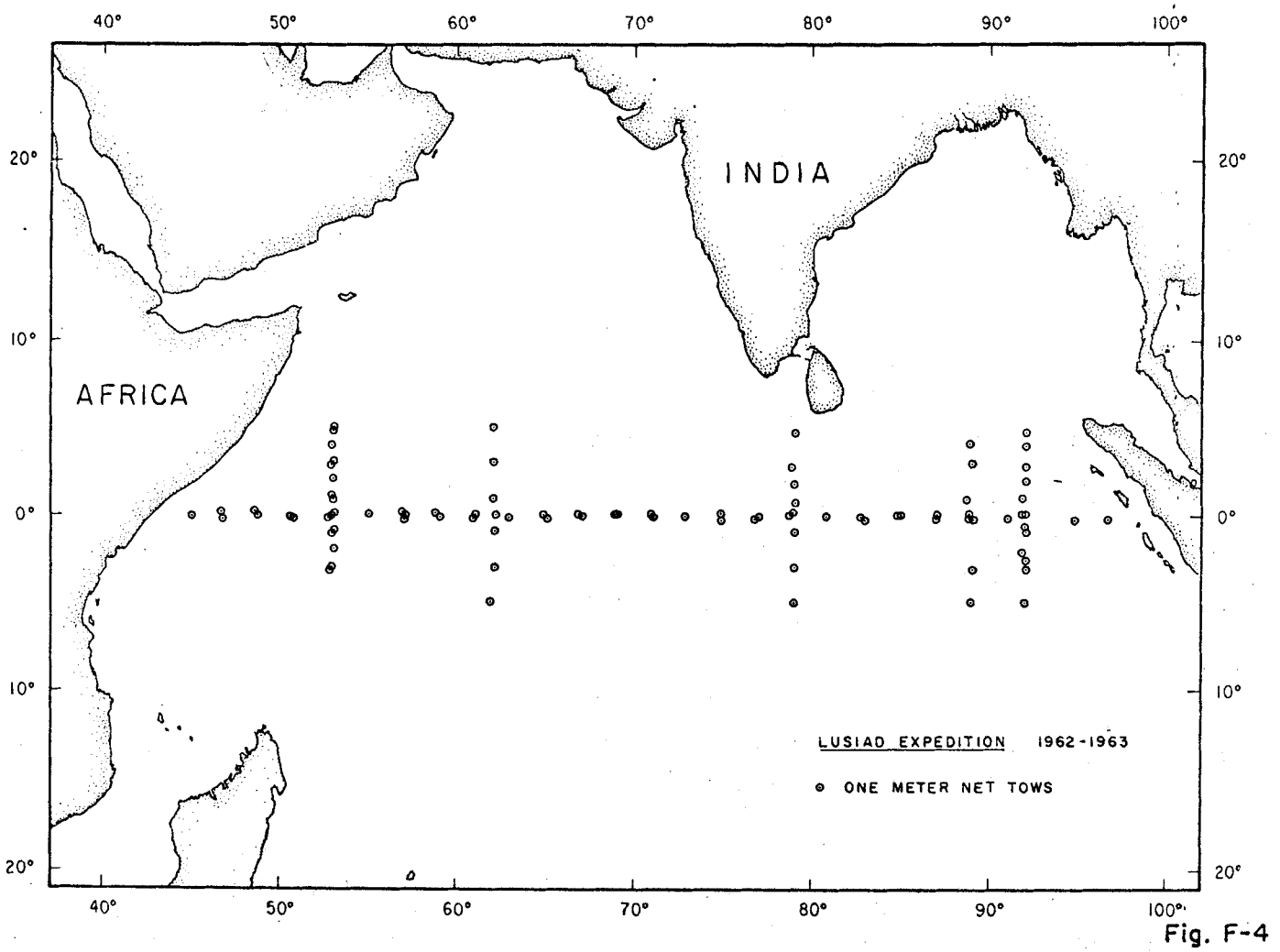
INDIA
AFRICA
LUSIAD EXPEDITION 1962-1963
ONE METER NET TOWS

Fig. F-4

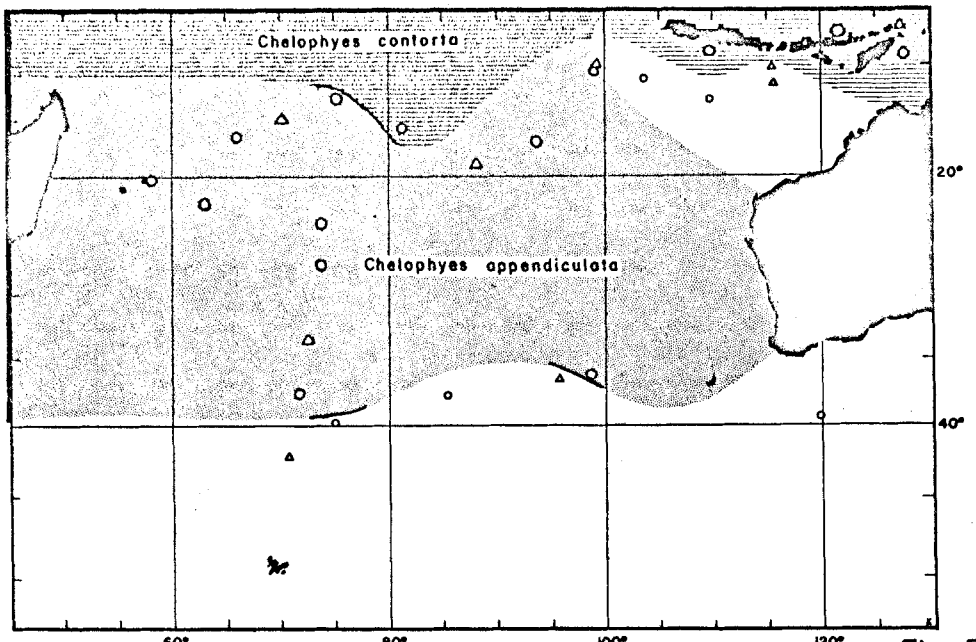

Fig. F-6

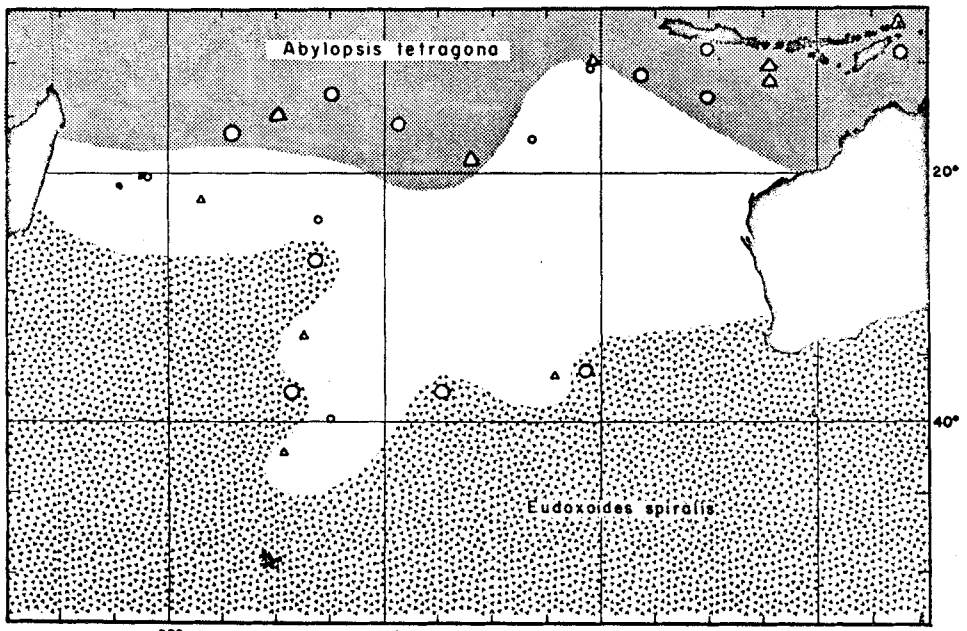

Fig. F-7

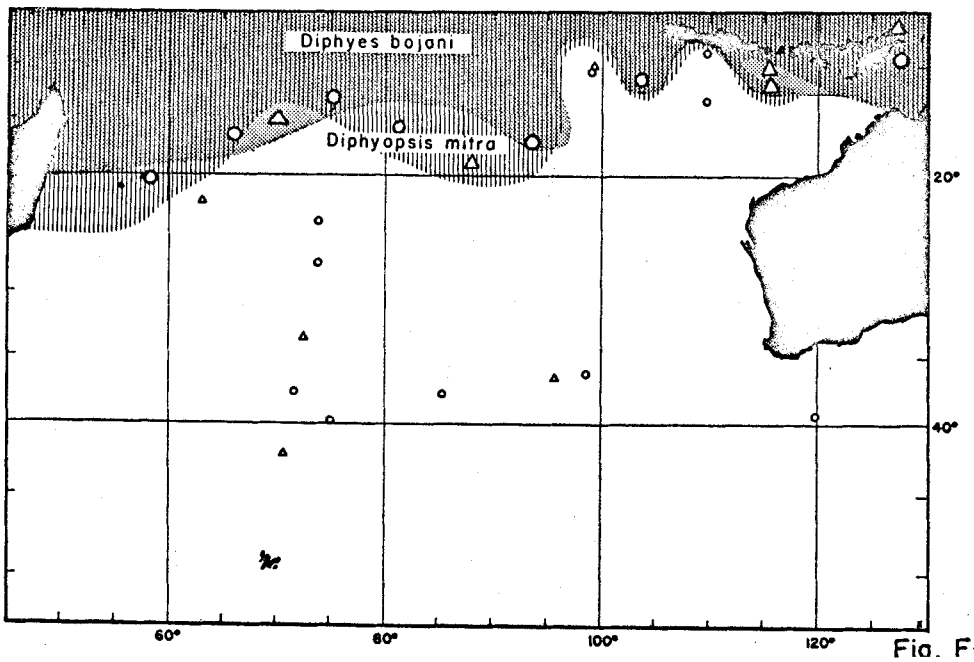

Fig. F-8

TABLE VIII

SIPHONOPHORES - MONSOON EXPEDITION

(a) (Indian and Pacific Oceans, occupying mainly the upper 400 m)

Chelophyes appendiculata Eschscholtz

Ch. contorta (Lens and Riemsdijk)

Diphyes bojani (Chun)

D. dispar Chamisso and Eysenhardt (Also in deep waters)

Diphyopsis mitra (Huxley)

Dimophyes arctica (Chun) (also in deep waters)

Eudoxoides spiralis Bigelow

Abyla carina Haeckel

A. ingeborgae Sears

Abylopsis tetragona (Otto)

A. eschscholtzi (Huxley)

Ceratocymba sagittata Quoy and Gaimard

Bassia bassensis (Quoy and Gaimard)

Lensia challengeri Totton

L. conoidea Keferstein and Ehlers

L. hotspur Totton

L. meteori (Leloup)

L. multicristata (Moser)

L. subtilis (Chun)

Sulculeolaria angusta Totton

S. biloba Sars

S. quadridentata (Quoy and Gaimard)

Agalma okeni Eschscholtz

Stephanomia rubra (Vogt)

Physophora hydrostatica Forskal

Hippopodius hippopus (Forskal)

Vogtia pentacantha Kölliker

V. serrata Moser

Amphicaryon acaule Chun

Velella sp. Lamarck

(b) Occurring below 400 meters

Chuniphyes multidentata Lens and Riemsdijk

Ch. moserae Totton

Abyla bicarinata Moser

A. haeckeli Lens and Riemsdijk

A. trigona Quoy and Gaimard

A. schmidti Sears

Ceratocymba dentata Bigelow

C. leuckarti Huxley

C. sagittata Quoy and Gaimard

Rosacea plicata Quoy and Gaimard

Nectopyramis natans (Bigelow)

N. thetis Bigelow

Nectodroma reticulata Bigelow

Marrus orthocannoides Totton

Vogtia spinosa Keferstein and Ehlers

Amphicaryon ernesti Totton

(c) Pacific Ocean only upper 400 m

Diphyes antarctica Moser

Nectopyramis diomedae Bigelow

Erenna richardi Bedot

Bargmannia elongata Totton