

## Pelagic shrimp (Crustacea: Decapoda) from shelf and oceanic waters in the southeastern Atlantic Ocean off South Africa

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*Abstract.*—Thirty-two species of pelagic decapod shrimps are recorded from 57 stations off the southeastern coast of South Africa. The material was trawled from between 200 m and the surface. The assemblage includes typical shelf forms like *Solenocera africana* Stebbing, 1917 and *Pasiphaea semispinosa* Holthuis, 1951, as well as typically oceanic species of *Sergestes* H. Milne Edwards, 1830, *Sergia* Stimpson, 1860 and *Gennadas* Bate, 1881. Several species seem to co-occur consistently, especially in the oceanic component of the fauna.

Decapod crustaceans having a primarily pelagic adult lifestyle are found in two major groups of shrimps, viz. the penaeideans and the carideans, and occur in the families Benthescymidae, Penaeidae, Sergestidae, Luciferidae, Oplophoridae, Pandalidae, and Pasiphaeidae. For southern Africa, there have been few reports on these organisms, and these are mainly taxonomic in nature. Barnard (1950) summarized what was then known about the taxonomy and distribution of these shrimps. Kensley (1971a) provided keys to, and distributional information on, southern African Sergestidae, and in 1971b, similar information for the genus *Gennadas* Bate, 1881. Kensley (1981) provided a brief discussion of the zoogeography of southern African pelagic decapods. Information on the biology of these organisms from South African waters is sparse. Grindley & Penrith (1965) sampled the mesopelagic fauna to depths of about 500 m around South Africa as part of a program to identify the organisms from stomach contents of tuna. Miller et al. (1983) recorded some

data on distribution and biomass of the penaeid *Funchalia woodwardi* Johnson, 1867 off the west coast. Macpherson (1991) provided information on benthic and pelagic decapods off the coast of Namibia, and noted the species-clustering of offshore true pelagics. Gibbons et al. (1994) presented data on distribution and abundance of the caridean *Pasiphaea semispinosa* Holthuis, 1951.

Given this paucity of information, the aim of this paper is to document the species diversity and species associations from a limited area off the southwestern Cape, based on material from 58 stations in surface and near-surface waters.

### Materials and Methods

The material for this study comes from the survey of phyllosoma larvae conducted by the South African Sea Fisheries Research Institute, from 7–19 August 1982. The area was surveyed at 95 stations stretching from just south of the Orange River off Port Nolloth, to just north of the Cape Peninsula. Decapod material (about 2400 specimens) was available from 57 of these stations (see Appendix 1). All samples were taken with

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an opening/closing 2 meter Rectangular Midwater Trawl (RMT2) at night, in depths from 0–197 m. The duration of the hauls ranged from 22 to 60 minutes, with 38 of the 57 stations having each been sampled for one hour. Pagès & Gili (1992) refer to this Phyllosoma Survey, and provide a map of some of the stations as well as a useful summary map of the main hydrographic features of the region.

For ease of reference, authors and dates for all taxa are given in the body of this work, but due to the non-taxonomic nature of the study, they are not included in the Literature Cited. All specimens have been deposited in the collections of the South African Museum, Cape Town.

### Results

The shrimp species recorded at each of the 57 stations are listed in Appendix 1. Thirty-two species of decapods are recorded, all of which were previously known from the southeastern Atlantic (Table 1). The list of species contains both shelf and oceanic species. Macpherson (1991), describing decapod communities off Namibia, included *Systellaspis debilis* and *Sergestes armatus* as being closely associated in a group of oceanic species.

Of the three most abundant species, *Sergestes armatus* and *Sergia prehensilis* co-occur in 15 stations (26%); *Sergestes armatus* and *Systellaspis debilis* co-occur in 16 stations (28%); *S. prehensilis* and *S. debilis* co-occur in 14 stations (25%); all three species co-occur in 10 stations (18%).

The caridean shrimp *Systellaspis debilis* occurred at 23 stations, with ovigerous females being found in eight of these, suggesting that this species is actively reproducing in the southeastern Atlantic. Similarly, ovigerous females of the pandalid caridean *Stylopandalus richardi* were

found at two stations, of the oplophorid *Acanthephyra quadrispinosa* at one.

The occurrence of *Solenocera africana* and *Solenocera* sp. from six stations, with juveniles at all stations, except those beyond the shelf, is not surprising. The occurrence of adult *Solenocera* at four stations is surprising, as the adult has an epibenthic habit.

The occurrence of *Pasiphaea semispinosa* at stations 50–53 (bottom depths 100–200 m) concurs with Gibbons et al. (1994) that the species is characteristic of the mid-shelf region of the West African region. All 10 specimens were juveniles, with carapace length between 7.2–8.7 mm.

As all the stations were fished from between 200 m and the surface, the list of species caught is rather restricted with regard to true meso- and bathypelagics (eight species of *Sergestes*, four species of *Sergia*, and three species of *Acanthephyra*), as such shallow water is well above the normal depth range of several species of these genera.

### Discussion

Some understanding of the role of pelagic decapods in the midwater energy cycles of the Atlantic can be gleaned from a few scattered sources. De Jaeger (1963) recorded *Funchalia woodwardi* being eaten by several species of tuna. Talbot and Penrith (1963) were more specific, noting *Funchalia woodwardi* being eaten by *Thunnus albacares* (Bonnaterre, 1788), *T. alalunga* (Bonnaterre, 1788), *T. obesus* (Lowe, 1839), and *T. thynnus orientalis* (Temminck and Schlegel, 1844). Dragovich (1969) recorded four species of sergestids and one *Gennadas* in the stomach contents of *Thunnus alalunga*, and *Funchalia woodwardi* from *T. albacares*, *T. alalunga*, *T. obesus*, and *T. thynnus* (Linnaeus, 1758). Dragovich (1970) and Dragovich & Potthoff (1972) recorded sergestid shrimp in the stomach

Table 1.—Species list of shrimp from 1982 Phyllosoma Cruise, with number of stations (*n*) at which each species was recorded and expressed as percentage of total number of stations (57).

| Species   | <i>n</i> | %  |
|---|----------|----|
| <i>Sergestes armatus</i> Kroyer, 1855               | 30       | 52 |
| <i>Sergia prehensilis</i> (Bate, 1881)              | 28       | 48 |
| <i>Sergestes</i> sp.                                | 27       | 47 |
| <i>Styellaspis debilis</i> (A. Milne Edwards, 1881) | 23       | 40 |
| <i>Sergestes atlanticus</i> H. Milne Edwards, 1830  | 17       | 29 |
| <i>Sergestes orientalis</i> Hansen, 1919            | 16       | 28 |
| <i>Gemadas brevirostris</i> Bouvier, 1905           | 13       | 22 |
| <i>Gemadas scutatus</i> Bouvier, 1906               | 13       | 22 |
| <i>Sergestes pectinatus</i> Sund, 1920              | 13       | 22 |
| <i>Sergestes disjunctus</i> Burkenroad, 1940        | 12       | 21 |
| <i>Sergestes sargassi</i> Ortmann, 1893             | 9        | 16 |
| <i>Sergestes arcticus</i> Kroyer, 1855              | 8        | 14 |
| <i>Acanthephyra quadrispinosa</i> Kemp, 1939        | 6        | 10 |
| <i>Funchalia villosa</i> (Bouvier, 1905)            | 6        | 10 |
| <i>Gemadas gilchristi</i> Calman, 1925              | 6        | 10 |
| <i>Gemadas</i> sp.                                  | 6        | 10 |
| <i>Sergestes corniculum</i> Kroyer, 1855            | 6        | 10 |
| <i>Sergia scintillans</i> (Burkenroad, 1940)        | 6        | 10 |
| <i>Sergia splendens</i> (Sund, 1920)                | 6        | 10 |
| <i>Stylopandalus richardi</i> (Coutiere, 1905)      | 6        | 10 |
| <i>Gemadas tinayrei</i> Bouvier, 1906               | 5        | 9  |
| <i>Solenocera africana</i> Stebbing, 1917           | 5        | 9  |
| <i>Gemadas clavicarpus</i> De Man, 1907             | 4        | 7  |
| <i>Pasiphaea semispinosa</i> Holthuis, 1951         | 4        | 7  |
| <i>Gemadas incertus</i> (Balls, 1927)               | 3        | 5  |
| <i>Oplophorus</i> sp.                               | 2        | 3  |
| <i>Acanthephyra pelagica</i> (Risso, 1816)          | 1        | 2  |
| <i>Chlorotocus crassicornis</i> (Costa, 1871)       | 1        | 2  |
| <i>Funchalia woodwardi</i> Johnson, 1867            | 1        | 2  |
| <i>Gemadas kempii</i> Stebbing, 1914                | 1        | 2  |
| <i>Gemadas parvus</i> Bate, 1881                    | 1        | 2  |
| <i>Oplophorus novaezeelandiae</i> De Man, 1931      | 1        | 2  |
| <i>Sergia potens</i> (Burkenroad, 1940)             | 1        | 2  |
| <i>Solenocera</i> sp.                               | 1        | 2  |

contents of the yellowfin tuna *T. albacares* and skipjack tuna *Katsuwonus pelamis* Kishinouye, 1923. Judkins and Fleminger (1972) recorded *Sergestes similis* as food of albacore *T. albacares*, and in the same paper, recorded the foregut contents of *S. similis*. The latter was found to prey predominantly on copepod crustaceans, 42 species of these being listed. Predation on pelagic decapods by several fish species, including the Cape horse mackerel, two species of Cape hake, and kingklip, was recorded by Crawford et al. (1987). Smale & Cowley (1992), in a study of feeding in skates off the Cape, recorded predation on benthic decapods, including *Funchalia woodwardi* in *Raja clavata* Linnaeus, 1758, *Raja pullopunctata* Hulley, 1986, and *Raja wallacei* Hulley, 1970. [Although *F. woodwardi* was taken in only one station in the present series, *F. villosa* (Bouvier, 1908) was recorded from six stations, all in water from 500–1000+ m depth.]

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Appendix 1.—Species list and material by station, with bearings, depth (m), and duration of trawl (min). ov. = ovigerous.

|   | Males | Females | Juveniles |
|---|-------|---------|-----------|
| <b>A002001 33°38'S 13°35'E 197 m 40 min</b> |       |         |           |
| <i>AcanthePHYra quadrispinosa</i>           | —     | 3 ov.   | 4         |
| <i>Gennadas brevirostris</i>                | 1     | 1       | —         |
| <i>Gennadas incertus</i>                    | 1     | 2       | —         |
| <i>Sergestes armatus</i>                    | 6     | 13      | —         |
| <i>Sergia prehensilis</i>                   | 1     | 1       | —         |
| <i>Stylopandalus richardi</i>               | —     | —       | 1         |
| <i>Systellaspis debilis</i>                 | 1     | —       | —         |
| <b>A002002 33°38'S 13°35'E 100 m 50 min</b> |       |         |           |
| <i>Gennadas brevirostri</i>                 | 1     | —       | —         |
| <i>Gennadas scutatus</i>                    | —     | 1       | —         |
| <i>Sergestes armatus</i>                    | 2     | 1       | —         |
| <i>Sergestes pectinatus</i>                 | 2     | —       | —         |
| <i>Sergestes</i> sp.                        | —     | —       | 1         |
| <i>Sergia prehensilis</i>                   | 12    | 10      | —         |
| <i>Systellaspis debilis</i>                 | 1     | 2+2 ov. | 6         |
| <b>A002003 33°38'S 13°38'E 50 m 60 min</b>  |       |         |           |
| <i>Sergestes armatus</i>                    | —     | 1       | —         |
| <i>Sergestes atlanticus</i>                 | —     | 17      | —         |
| <i>Sergestes orientalis</i>                 | 4     | 6       | 1         |
| <i>Sergestes</i> sp.                        | —     | —       | 15        |
| <i>Sergia prehensilis</i>                   | —     | —       | 10        |
| <i>Stylopandalus richardi</i>               | —     | —       | 1         |
| <b>A002004 — — 197 m 22 min</b>             |       |         |           |
| <i>Sergestes atlanticus</i>                 | 1     | —       | —         |
| <i>Sergestes orientalis</i>                 | 1     | —       | —         |
| <i>Sergestes</i> sp.                        | —     | —       | 2         |
| <i>Sergia prehensilis</i>                   | —     | 1       | —         |
| <b>A002005 33°39'S 13°44'E 150 m 60 min</b> |       |         |           |
| <i>Gennadas scutatus</i>                    | —     | 2       | —         |
| <i>Sergestes armatus</i>                    | 1     | 1       | —         |
| <i>Sergestes atlanticus</i>                 | 1     | —       | —         |
| <i>Sergestes disjunctus</i>                 | 2     | 1       | —         |
| <i>Sergestes sargassi</i>                   | 1     | 1       | —         |
| <i>Sergia prehensilis</i>                   | 5     | 3       | 8         |
| <i>Stylopandalus richardi</i>               | —     | 1 ov    | —         |
| <i>Systellaspis debilis</i>                 | 2     | 1       | 8         |
| <b>A002006 33°40'S 13°48'E 75 m 60 min</b>  |       |         |           |
| <i>Sergestes armatus</i>                    | 4     | 3       | —         |
| <i>Sergestes atlanticus</i>                 | 3     | —       | —         |
| <i>Sergestes orientalis</i>                 | 1     | —       | 6         |
| <i>Sergestes sargassi</i>                   | 1     | —       | —         |
| <i>Sergestes</i> sp.                        | —     | —       | 22        |
| <i>Sergia prehensilis</i>                   | 14    | 6       | 5         |
| <i>Sergia scintillans</i>                   | 2     | —       | —         |
| <b>A002007 33°39'S 13°51'E 25 m 60 min</b>  |       |         |           |
| <i>Oplophorus</i> sp.                       | —     | —       | 1         |
| <i>Sergestes armatus</i>                    | —     | 1       | —         |
| <i>Sergestes orientalis</i>                 | 9     | 6       | 7         |

## Appendix 1.—Continued.

|                                      | Males | Females | Juveniles |
|--------------------------------------|-------|---------|-----------|
| <i>Sergestes</i> sp.                 | —     | —       | 21        |
| <i>Solenocera</i> sp.                | —     | —       | 2         |
| A002008 33°40'S 13°54'E 0 m 30 min   |       |         |           |
| <i>Sergestes</i> sp.                 | —     | —       | 3         |
| A002011 33°40'S 14°32'E 197 m 55 min |       |         |           |
| <i>Funchalia villosa</i>             | —     | 1       | —         |
| <i>Sergestes armatus</i>             | 1     | —       | —         |
| <i>Sergestes atlanticus</i>          | —     | 1       | —         |
| <i>Sergestes pectinatus</i>          | 1     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 8         |
| <i>Sergia prehensilis</i>            | —     | —       | 1         |
| <i>Sergia splendens</i>              | —     | —       | 1         |
| <i>Systellaspis debilis</i>          | 1     | 1       | 1         |
| A002012 33°39'S 14°37'E 100 m 60 min |       |         |           |
| <i>Oplophorus novaezeelandiae</i>    | —     | —       | 26        |
| <i>Sergestes armatus</i>             | 1     | 4       | —         |
| <i>Sergestes atlanticus</i>          | 4     | 3       | —         |
| <i>Sergestes orientalis</i>          | —     | 1       | —         |
| <i>Sergestes sargassi</i>            | 3     | —       | —         |
| <i>Sergia splendens</i>              | 1     | 1       | —         |
| <i>Stylopandalus richardi</i>        | 1     | 1       | 3         |
| <i>Systellaspis cristatus</i>        | —     | —       | 7         |
| <i>Systellaspis debilis</i>          | 1     | —       | —         |
| A002013 33°40'S 14°42'E 50 m 50 min  |       |         |           |
| <i>Sergestes atlanticus</i>          | 1     | 1       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 9         |
| A002014 33°38'S 14°43'E 150 m 60 min |       |         |           |
| <i>Sergestes atlanticus</i>          | 1     | 3       | —         |
| <i>Sergestes corniculum</i>          | —     | 2       | —         |
| <i>Sergestes disjunctus</i>          | 1     | —       | —         |
| <i>Sergestes orientalis</i>          | 1     | —       | —         |
| <i>Sergia prehensilis</i>            | —     | —       | 16        |
| <i>Systellaspis debilis</i>          | 1     | 1+1 ov  | 1         |
| A002015 33°38'S 14°49'E 75 m 60 min  |       |         |           |
| <i>Funchalia villosa</i>             | 3     | —       | —         |
| <i>Sergestes atlanticus</i>          | —     | 1       | —         |
| <i>Sergestes orientalis</i>          | 1     | —       | 7         |
| <i>Sergia prehensilis</i>            | —     | —       | 1         |
| A002017 33°40'S 14°54'E 0 m 30 min   |       |         |           |
| <i>Sergestes orientalis</i>          | —     | —       | 1         |
| A002019 33°34'S 15°28'E 197 m 60 min |       |         |           |
| <i>Acanthephyra quadrispinosa</i>    | 2     | 1       | —         |
| <i>Gennadas incertus</i>             | 1     | —       | 2         |
| <i>Gennadas scutatus</i>             | 1     | —       | —         |
| <i>Sergestes disjunctus</i>          | —     | 2       | —         |
| <i>Sergia prehensilis</i>            | 6     | 5       | 5         |
| <i>Systellaspis debilis</i>          | 1     | 2 ov    | 7         |
| A002020 33°38'S 15°30'E 100 m 60 min |       |         |           |
| <i>Sergestes armatus</i>             | —     | 1       | —         |

## Appendix 1.—Continued.

|                                      | Males | Females | Juveniles |
|--------------------------------------|-------|---------|-----------|
| <i>Sergestes orientalis</i>          | —     | 1       | —         |
| <i>Sergestes pectinatus</i>          | 2     | 1       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 18        |
| <i>Sergia prehensilis</i>            | 14    | 8       | 5         |
| <i>Sergia scintillans</i>            | —     | 2       | —         |
| <i>Stylopandalus richardi</i>        | 1     | 1 ov    | 1         |
| <i>Systellaspis debilis</i>          | —     | 1 ov    | 9         |
| A002021 33°37'S 15°37'E 50 m 60 min  |       |         |           |
| <i>Sergestes</i> sp.                 | —     | —       | 4         |
| <i>Sergia prehensilis</i>            | —     | —       | 13        |
| A002022 33°37'S 15°42'E 150 m 60 min |       |         |           |
| <i>Funchalia villosa</i>             | —     | 1       | —         |
| <i>Gennadas brevirostris</i>         | —     | 2       | —         |
| <i>Gennadas scutatus</i>             | —     | 1       | —         |
| <i>Sergestes armatus</i>             | 1     | 2       | —         |
| <i>Sergestes sargassi</i>            | 1     | —       | —         |
| <i>Systellaspis debilis</i>          | 3     | 4+1 ov  | 2         |
| A002023 33°36'S 15°45'E 75 m 60 min  |       |         |           |
| <i>Sergestes armatus</i>             | 1     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 2         |
| <i>Sergia prehensilis</i>            | —     | —       | 21        |
| A002026 33°41'S 16°30'E 150 m 30 min |       |         |           |
| <i>Acanthephyra quadrispinosa</i>    | 2     | 3       | 1         |
| <i>Gennadas brevirostris</i>         | —     | 1       | —         |
| <i>Gennadas incertus</i>             | —     | 1       | —         |
| <i>Gennadas scutatus</i>             | —     | 1       | —         |
| <i>Sergia prehensilis</i>            | —     | —       | 5         |
| <i>Sergia scintillans</i>            | —     | 1       | —         |
| A002027 33°42'S 16°37'E 100 m 60 min |       |         |           |
| <i>Gennadas clavicularis</i>         | —     | 1       | —         |
| <i>Gennadas scutatus</i>             | —     | 1       | —         |
| <i>Systellaspis debilis</i>          | —     | —       | 2         |
| A002028 33°40'S 16°45'E 75 m 60 min  |       |         |           |
| <i>Funchalia villosa</i>             | 1     | —       | —         |
| <i>Gennadas scutatus</i>             | 2     | 1       | —         |
| <i>Sergestes armatus</i>             | 1     | 1       | —         |
| <i>Sergestes orientalis</i>          | 3     | —       | —         |
| <i>Sergestes pectinatus</i>          | 2     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 16        |
| <i>Sergia prehensilis</i>            | 11    | 11      | 70        |
| <i>Sergia scintillans</i>            | —     | 9       | —         |
| <i>Systellaspis debilis</i>          | —     | 1 ov    | 14        |
| A002029 33°41'S 16°48'E 50 m 60 min  |       |         |           |
| <i>Sergestes atlanticus</i>          | 1     | 1       | —         |
| <i>Sergestes orientalis</i>          | 3     | 1       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 73        |
| A002030 33°41'S 16°51'E 25 m 60 min  |       |         |           |
| <i>Sergestes armatus</i>             | 1     | —       | —         |
| <i>Sergestes atlanticus</i>          | 2     | 1       | —         |
| <i>Sergestes orientalis</i>          | 5     | 1       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 15        |

## Appendix 1.—Continued.

|  | Males | Females | Juveniles |
|--|-------|---------|-----------|
| A002035 33°38'S 17°26'E 100 m 60 min               |       |         |           |
| <i>Chlorotocus crassicornis</i>                    | —     | 1       | —         |
| A002037 33°40'S 17°39'E 10 m 30 min (2000 m cable) |       |         |           |
| <i>AcanthePHYra pelagica</i>                       | 2     | —       | —         |
| <i>AcanthePHYra quadrispinosa</i>                  | 2     | —       | 1         |
| <i>Funchalia villosa</i>                           | 1     | —       | —         |
| <i>Gennadas gilchristi</i>                         | 5     | 4       | —         |
| <i>Gennadas kempfi</i>                             | —     | 4       | —         |
| <i>Sergestes armatus</i>                           | 2     | —       | —         |
| <i>Sergestes</i> sp.                               | —     | —       | 1         |
| <i>Sergia potens</i>                               | 1     | 2       | —         |
| <i>Sergia splendens</i>                            | —     | —       | 2         |
| <i>Systellaspis debilis</i>                        | —     | 1+2 ov  | 1         |
| A002049 30°00'S 16°29'E 100 m 60 min               |       |         |           |
| <i>Solenocera africana</i>                         | 2     | 1       | 4         |
| A002050 29°59'S 16°27'E 50 m 60 min                |       |         |           |
| <i>Pasiphae semispinosa</i>                        | —     | —       | 1         |
| A002051 29°57'S 16°24'E 25 m 60 min                |       |         |           |
| <i>Pasiphae semispinosa</i>                        | —     | —       | 2         |
| A002052 29°54'S 16°22'E 75 m 60 min                |       |         |           |
| <i>Pasiphae semispinosa</i>                        | —     | —       | 2         |
| A002053 29°52'S 16°18'E 10 m 60 min                |       |         |           |
| <i>Pasiphae semispinosa</i>                        | —     | —       | 5         |
| A002057 29°35'S 15°30'E 100 m 30 min               |       |         |           |
| <i>Solenocera africana</i>                         | 1     | —       | 3         |
| A002058 29°35'S 15°31'E 75 m 30 min                |       |         |           |
| <i>Solenocera africana</i>                         | 1     | 1       | 2         |
| A002059 29°32'S 15°25'E 50 m 30 min                |       |         |           |
| <i>Solenocera africana</i>                         | 1     | —       | 3         |
| A002060 29°32'S 15°23'E 25 m 30 min                |       |         |           |
| <i>Solenocera africana</i>                         | —     | 1       | —         |
| A002067 29°36'S 14°18'E 197 m 30 min               |       |         |           |
| <i>Gennadas brevirostris</i>                       | 1     | —       | —         |
| <i>Sergestes arcticus</i>                          | —     | 1       | —         |
| <i>Sergestes armatus</i>                           | 5     | 5       | —         |
| <i>Systellaspis debilis</i>                        | 1     | —       | —         |
| A002068 29°33'S 14°18'E 150 m 60 min               |       |         |           |
| <i>Gennadas brevirostris</i>                       | 20    | 37      | —         |
| <i>Gennadas clavicarpus</i>                        | 1     | 1       | —         |
| <i>Gennadas gilchristi</i>                         | —     | 1       | —         |
| <i>Gennadas scutatus</i>                           | 1     | —       | —         |
| <i>Gennadas tinayrei</i>                           | 1     | —       | —         |
| <i>Sergestes arcticus</i>                          | 1     | 3       | —         |
| <i>Sergestes armatus</i>                           | 10    | 24      | —         |
| <i>Sergestes disjunctus</i>                        | —     | 2       | —         |
| <i>Sergestes pectinatus</i>                        | 1     | 1       | —         |
| <i>Sergestes</i> sp.                               | —     | —       | 5         |

## Appendix 1.—Continued.

|                                      | Males | Females | Juveniles |
|--------------------------------------|-------|---------|-----------|
| <i>Sergia prehensilis</i>            | 1     | 1       | —         |
| <i>Systemaspis debilis</i>           | 1     | 1       | 4         |
| A002069 29°30'S 14°18'E 100 m 60 min |       |         |           |
| <i>Gennadas brevirostris</i>         | 46    | 35      | 12        |
| <i>Gennadas gilchristi</i>           | 1     | —       | —         |
| <i>Gennadas scutatus</i>             | 2     | 1       | —         |
| <i>Gennadas tinayrei</i>             | 1     | —       | —         |
| <i>Gennadas</i> sp.                  | —     | —       | 2         |
| <i>Sergestes armatus</i>             | 57    | 39      | —         |
| <i>Sergestes corniculum</i>          | —     | 8       | —         |
| <i>Sergestes disjunctus</i>          | 14    | 14      | 14        |
| <i>Sergestes pectinatus</i>          | —     | 3       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 2         |
| <i>Sergia prehensilis</i>            | 9     | —       | 11        |
| <i>Stylopandalus richardi</i>        | —     | —       | 1         |
| <i>Systemaspis debilis</i>           | —     | —       | 15        |
| A002070 29°27'S 14°14'E 25 m 60 min  |       |         |           |
| <i>Funchalia woodwardi</i>           | 1     | —       | —         |
| <i>Sergestes armatus</i>             | 5     | 8       | —         |
| <i>Sergestes pectinatus</i>          | 2     | 1       | —         |
| <i>Sergestes disjunctus</i>          | 3     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 2         |
| <i>Sergia prehensilis</i>            | —     | —       | 3         |
| A002071 29°25'S 14°13'E 75 m 60 min  |       |         |           |
| <i>Gennadas brevirostris</i>         | 16    | 4       | 40        |
| <i>Gennadas</i> sp.                  | 2     | —       | 1         |
| <i>Sergestes disjunctus</i>          | 5     | —       | 6         |
| <i>Sergestes sargassi</i>            | 1     | —       | —         |
| <i>Sergia prehensilis</i>            | —     | —       | 2         |
| A002072 29°22'S 14°12'E 50 m 60 min  |       |         |           |
| <i>Gennadas scutatus</i>             | —     | —       | 200+      |
| <i>Gennadas</i> sp.                  | —     | —       | 100+      |
| <i>Sergestes arcticus</i>            | 1     | 1       | —         |
| <i>Sergestes armatus</i>             | 9     | 15      | —         |
| <i>Sergestes atlanticus</i>          | 1     | —       | —         |
| <i>Sergestes corniculum</i>          | —     | 2       | —         |
| <i>Sergestes disjunctus</i>          | —     | 1       | —         |
| <i>Sergestes orientalis</i>          | 1     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 13        |
| <i>Sergia prehensilis</i>            | 5     | 10      | —         |
| <i>Systemaspis debilis</i>           | —     | —       | 10        |
| A002073 29°19'S 14°11'E 10 m 60 min  |       |         |           |
| <i>Gennadas</i> sp.                  | —     | —       | 1         |
| <i>Sergestes armatus</i>             | —     | 3       | —         |
| <i>Sergestes atlanticus</i>          | 7     | —       | —         |
| <i>Sergestes orientalis</i>          | 1     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 5         |
| A002075 29°12'S 14°09'E 150 m 30 min |       |         |           |
| <i>AcanthePHYra quadrispinosa</i>    | —     | —       | 1         |
| <i>Gennadas brevirostris</i>         | 10    | 12      | 2         |
| <i>Gennadas scutatus</i>             | 5     | 6       | —         |

## Appendix 1.—Continued.

|                                      | Males | Females | Juveniles |
|--------------------------------------|-------|---------|-----------|
| <i>Sergestes arcticus</i>            | 2     | —       | —         |
| <i>Sergestes armatus</i>             | 1     | 3       | —         |
| <i>Sergestes disjunctus</i>          | 1     | —       | —         |
| <i>Sergestes sargassi</i>            | 1     | —       | —         |
| <i>Sergia splendens</i>              | —     | 1       | —         |
| <i>Systellaspis debilis</i>          | 1     | —       | 3         |
| A002077 29°35'S 13°30'E 197 m 30 min |       |         |           |
| <i>Sergestes arcticus</i>            | 2     | 1       | —         |
| <i>Sergestes armatus</i>             | 7     | 4       | —         |
| <i>Sergestes corniculum</i>          | —     | 1       | —         |
| <i>Sergestes disjunctus</i>          | —     | —       | 4         |
| A002078 29°32'S 13°25'E 150 m 60 min |       |         |           |
| <i>Acanthephyra quadrispinosa</i>    | —     | 1       | 1         |
| <i>Gennadas brevirostris</i>         | 4     | 7       | 8         |
| <i>Gennadas gilchristi</i>           | 11    | 8       | —         |
| <i>Gennadas tinayrei</i>             | 1     | —       | —         |
| <i>Sergestes arcticus</i>            | 1     | 1       | —         |
| <i>Sergestes armatus</i>             | 5     | 6       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 17        |
| <i>Systellaspis debilis</i>          | —     | 1       | 2         |
| A002079 29°30'S 13°20'E 100 m 60 min |       |         |           |
| <i>Gennadas brevirostris</i>         | 3     | 3       | —         |
| <i>Gennadas clavicarpus</i>          | —     | 1       | —         |
| <i>Gennadas gilchristi</i>           | —     | 1       | —         |
| <i>Gennadas tinayrei</i>             | —     | 1       | —         |
| <i>Gennadas</i> sp.                  | —     | —       | 3         |
| <i>Sergestes armatus</i>             | 6     | 4       | —         |
| <i>Sergestes corniculum</i>          | —     | 1       | —         |
| <i>Sergestes orientalis</i>          | —     | 2       | —         |
| <i>Sergestes sargassi</i>            | 1     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 2         |
| <i>Sergia splendens</i>              | —     | —       | 30        |
| A002080 29°27'S 13°16'E 25 m 60 min  |       |         |           |
| <i>Sergestes armatus</i>             | 3     | 6       | —         |
| <i>Systellaspis debilis</i>          | 1     | 1+1 ov  | 3         |
| A002081 29°24'S 13°13'E 75 m 60 min  |       |         |           |
| <i>Gennadas brevirostris</i>         | 4     | 8       | 2         |
| <i>Sergestes arcticus</i>            | 1     | —       | —         |
| <i>Sergestes armatus</i>             | —     | 1       | —         |
| <i>Sergestes disjunctus</i>          | 2     | —       | —         |
| <i>Sergestes sargassi</i>            | 3     | —       | —         |
| <i>Sergia prehensilis</i>            | 1     | —       | —         |
| A002082 29°21'S 13°09'E 50 m 60 min  |       |         |           |
| <i>Sergestes armatus</i>             | —     | 3       | —         |
| <i>Sergestes pectinatus</i>          | 1     | —       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 4         |
| A002083 29°19'S 13°06'E 10 m 30 min  |       |         |           |
| <i>Sergestes atlanticus</i>          | 5     | 3       | —         |
| A002085 32°04'S, 15°52'E 75 m 60 min |       |         |           |
| <i>Sergestes atlanticus</i>          | —     | —       | 15        |
| <i>Sergestes</i> sp.                 | —     | —       | 1         |

## Appendix 1.—Continued.

|                                      | Males | Females | Juveniles |
|--------------------------------------|-------|---------|-----------|
| <i>Sergia prehensilis</i>            | —     | —       | 16        |
| A002086 31°59'S 15°49'E 50 m 60 min  |       |         |           |
| <i>Sergestes atlanticus</i>          | 1     | 3       | —         |
| <i>Sergia scintillans</i>            | —     | 30      | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 11        |
| A002088 33°32'S 16°51'E 197 m 30 min |       |         |           |
| <i>Gennadas parvus</i>               | —     | 1       | —         |
| <i>Gennadas scutatus</i>             | 1     | —       | —         |
| <i>Sergestes pectinatus</i>          | 1     | —       | —         |
| <i>Sergia prehensilis</i>            | —     | —       | 20        |
| A002089 33°34'S 16°55'E 150 m 30 min |       |         |           |
| <i>Gennadas brevirostris</i>         | 2     | 1       | —         |
| <i>Gennadas gilchristi</i>           | —     | 1       | —         |
| <i>Gennadas</i> sp.                  | —     | —       | 3         |
| <i>Sergestes pectinatus</i>          | —     | 1       | —         |
| <i>Sergia prehensilis</i>            | 6     | 3       | 12        |
| <i>Systellaspis debilis</i>          | 2     | —       | —         |
| A002090 33°35'S 16°56'E 100 m 60 min |       |         |           |
| <i>Gennadas clavicularpus</i>        | 1     | 1       | —         |
| <i>Gennadas scutatus</i>             | 2     | 2       | 4         |
| <i>Gennadas tinayrei</i>             | 2     | —       | —         |
| <i>Sergestes armatus</i>             | 1     | 1       | —         |
| <i>Sergestes pectinatus</i>          | 3     | 3       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 6         |
| <i>Sergia prehensilis</i>            | 4     | 1       | 12        |
| <i>Sergia splendens</i>              | 1     | —       | —         |
| <i>Systellaspis debilis</i>          | —     | 1       | —         |
| A002091 33°37'S 17°00'E 75 m 60 min  |       |         |           |
| <i>Funchalia villosa</i>             | 1     | 1       | —         |
| <i>Oplophorus</i> sp.                | —     | —       | 2         |
| <i>Sergestes orientalis</i>          | 1     | 1       | —         |
| <i>Sergestes pectinatus</i>          | 1     | 2       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 3         |
| <i>Sergia prehensilis</i>            | —     | —       | 42        |
| <i>Stylopandalus richardi</i>        | —     | —       | 3         |
| <i>Systellaspis debilis</i>          | —     | —       | 9         |
| A002092 33°40'S 17°04'E 50 m 60 min  |       |         |           |
| <i>Sergestes atlanticus</i>          | 1     | —       | —         |
| <i>Sergestes prehensilis</i>         | —     | 1       | —         |
| <i>Sergestes</i> sp.                 | —     | —       | 2         |
| <i>Sergia scintillans</i>            | —     | 16      | —         |