

## FENNEROSQUILLA, A NEW GENUS OF STOMATOPOD CRUSTACEAN FROM THE NORTHWESTERN ATLANTIC

Raymond B. Manning and David K. Camp

*Abstract.*—A new genus, *Fennerosquilla*, is recognized for *Chloridella heptacantha* Chace, 1939, a species previously assigned to the genus *Squilla*. This new genus can be distinguished from *Squilla* by the presence of seven teeth on the dactylus of the claw and by the strongly bilobed lateral process of the sixth thoracic somite.

The unusual morphological features of the northwestern Atlantic *Chloridella heptacantha* Chace (1939:52), subsequently assigned to the genus *Squilla* Fabricius, 1787, have been recognized for some time (Manning 1969:147; 1978b:40). It is the only species now assigned to *Squilla* with seven teeth on the dactylus of the claw and a strongly bilobed lateral process of the sixth thoracic somite. Recent collections of this species (Camp 1983) led us to reevaluate its generic status. We believe that it is sufficiently distinct from other species assigned to *Squilla* to warrant the recognition of a new, monotypic genus. Descriptors used to indicate body size and eye size follow definitions given by Manning (1978b:2).

### *Fennerosquilla*, new genus

Fig. 1

*Definition.*—Size moderate, total lengths of adults less than 100 mm. Body generally smooth, surface slightly punctate; carinae well developed, sides eroded. Anterior margin of ophthalmic somite rounded or faintly emarginate, unarmed. Eye small to very small, cornea bilobed, set obliquely on stalk. Ocular scales subquadrate to emarginate, separate. Rostral plate elongate, triangular, with median carina. Carapace with normal complement of carinae (median, intermediates, laterals, reflected marginals), median with well-developed anterior bifurcation. Mandibular palp present. Four epipods present. Dactylus of claw with 7 teeth. Lateral process of fifth thoracic somite a single broad lobe, directed laterally. Lateral process of sixth thoracic somite strongly bilobed, subtriangular anterior lobe almost as large as posterior. Lateral process of seventh thoracic somite bilobed, triangular anterior lobe smaller than posterior. Abdomen with 8 carinae (paired submedians, intermediates, laterals, and marginals) on each of anterior 5 somites, intermediates and laterals strongly developed. Telson inflated basally, dorsal surface with median carina and carinae of marginal teeth, lacking supplementary dorsal carinae or tubercles; 3 pairs of marginal teeth present, submedians with fixed apices; prelateral lobes present. Basal prolongation of uropod produced into 2 strong spines, inner longer; inner margin crenulate, unarmed.

*Type-species.*—*Chloridella heptacantha* Chace, 1939, herein designated. The genus is monotypic.

*Etymology.*—We believe it is appropriate to dedicate this genus to Fenner A. Chace, Jr., who originally described the type-species. The gender is feminine.

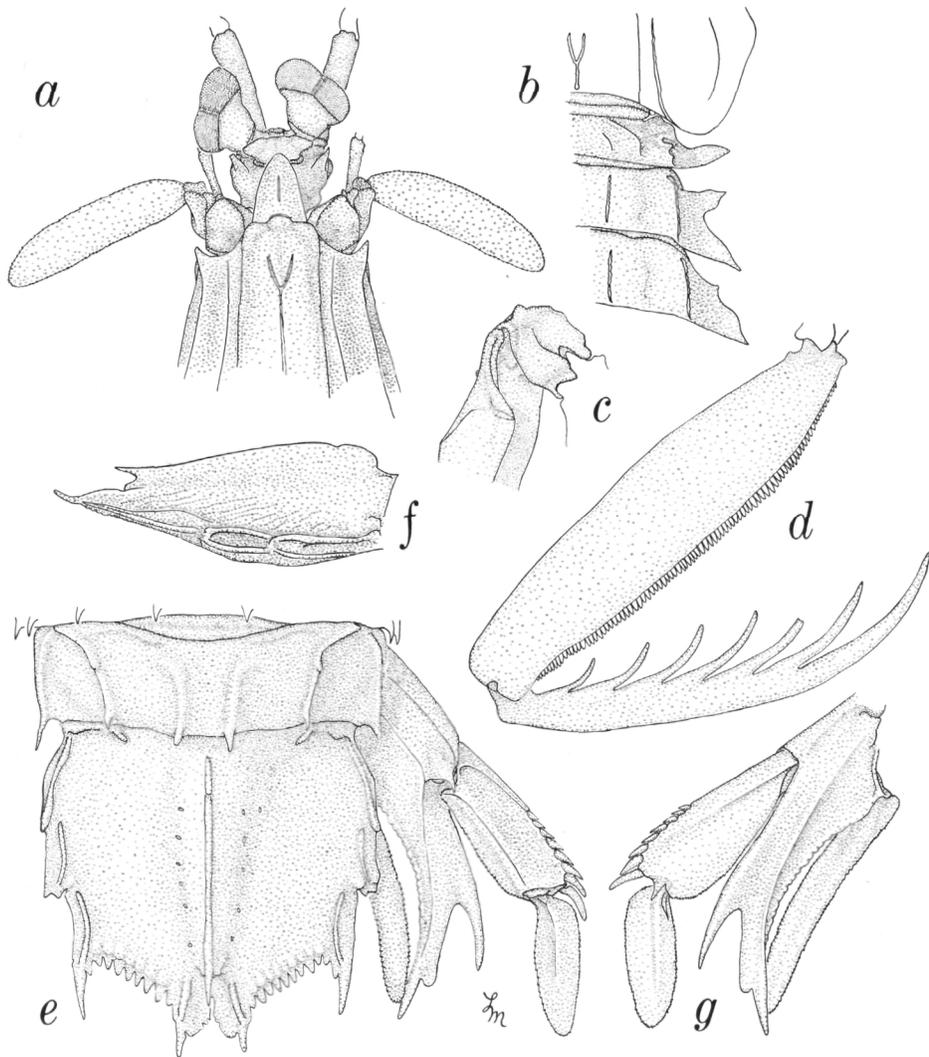


Fig. 1. *Fennerosquilla heptacantha*, female, total length 74.5 mm, USNM 126025. a, Head and anterior part of carapace; b, Exposed thoracic somites 5-7; c, Carpus of raptorial claw; d, Propodus and dactylus of raptorial claw; e, Sixth abdominal somite, telson and right uropod, dorsal view; f, Telson, right lateral view; g, Right uropod, ventral view.

*Remarks.*—Until now, 25 genera had been recognized in the family Squillidae (see Manning 1980:367 for a list of 24 of these genera and original references, and Manning and Lewinsohn 1982:352), most having been separated from the genus *Squilla* in the last two decades (Manning 1968, 1972, 1976, 1977, 1978a, b). Of the 26 genera now assigned to the Squillidae, eleven are distinguished by the presence of movable apices on the submedian teeth of the telson in adults; in the remaining 15 genera (including *Fennerosquilla*), the apices of the submedian teeth are fixed in adults, although they may be movable in postlarvae and early juvenile

stages. Of these latter 15 genera, only five have single lateral processes on the fifth thoracic somite: *Anchisquilla*, *Lenisquilla*, *Squilloides*, *Squilla*, and *Fennerosquilla*. The first two of these genera completely lack the median carina of the carapace. *Squilloides* lacks a mandibular palp and has but four teeth on the dactylus of the claw. Thus, *Fennerosquilla* might be confused only with members of the genus *Squilla*.

*Fennerosquilla* can be readily distinguished from *Squilla* by the following distinctive features: elongate, triangular rostral plate; seven teeth on the claw; reduction of number of epipods to four; and large anterior lobe of the sixth thoracic somite. Other features characteristic of *Fennerosquilla heptacantha* serving to distinguish it from *Squilla* include: long, slender antennular peduncles, longer than the carapace and rostral plate combined; extremely narrow, elongate carapace, with the anterior width less than half the median length; long, slender propodus of the raptorial claw (the claw, when folded, exceeds the anterior margin of the ophthalmic somite); strongly flattened, strongly carinate abdomen; basally inflated telson, with the median carina appearing convex anteriorly, concave posteriorly in lateral view; and relatively large rounded lobe on the outer margin of the inner spine of the basal prolongation of the uropod. Finally, the eyes are small relative to body size (Table 1); eyes of the smallest *F. heptacantha* are similar in relative size to those of the largest specimens of *Squilla* (except possibly *S. surinamica*, a much smaller species than *F. heptacantha* and most other species of *Squilla*).

We suspect that the presence of a strongly bilobed lateral process of the sixth thoracic somite in *F. heptacantha* is not an indication of affinity with Indo-West Pacific stocks of squillids, most of which share this feature, but is an independent development. *Fennerosquilla* may represent an offshoot of the genus *Squilla*.

The importance of shape of lateral processes of the exposed thoracic somites in distinguishing groups of species within the Squillidae has been recognized since Kemp (1913:20, 21) divided the long-recognized, heterogeneous *Squilla* into two broad groups based solely on shape of the lateral process of the fifth thoracic somite. In a later revision of the Squillidae (see Manning 1968), the nature of differences in shape of the lateral process of the fifth thoracic somite among various squillid species was thoroughly discussed. At that time, two basic forms of the lateral process were recognized, and the difference between them was believed to indicate a fundamental difference between two stocks within the family. One form was expressed as a bilobed process of the fifth thoracic somite; the two lobes were either on the same horizontal plane, as in *Alima*, or almost so, and consequently there was no ventral spine on that somite. In the second form, the anterior lobe had rotated ventrally in relation to the posterior lobe, was no longer basally connected with the posterior lobe, and formed a separate ventral spine. Thus, the posterior lobe projected laterally or anterolaterally from the body, but the anterior lobe projected more ventrally and often was obscured from dorsal view because of its position on the body. Based on this fundamental difference, as well as other considerations, several new genera were erected to contain species formerly assigned to *Squilla* and having a bilobed lateral process of the fifth thoracic somite. Species retained in *Squilla* had a ventral spine and a single-lobed lateral process of the fifth thoracic somite. One of the genera then recognized, *Oratosquilla* Manning, 1968, received the greatest number of species

Table 1.—Representative corneal indices (CI = carapace length divided by cornea width, multiplied by 100) of several species of *Squilla* compared with those of *F. heptacantha*.

| Species   | Known range of CI |
|---|-------------------|
| <i>Squilla lijdingi</i> Holthuis, 1959          | 260–363           |
| <i>S. rugosa</i> Bigelow, 1893                  | 270–424           |
| <i>S. empusa</i> Say, 1818                      | 296–491           |
| <i>S. deceptrix</i> Manning, 1969               | 311–446           |
| <i>S. caribaea</i> Manning, 1969                | 315–405           |
| <i>S. intermedia</i> Bigelow, 1893              | 316–400           |
| <i>S. chydæa</i> Manning, 1962                  | 328–413           |
| <i>S. edentata edentata</i> (Lunz, 1937)        | 338–492           |
| <i>S. obtusa</i> Holthuis, 1959                 | 350–421           |
| <i>S. cadenati</i> Manning, 1970                | 352–468           |
| <i>S. brasiliensis</i> Calman, 1917             | 354–492           |
| <i>S. discors</i> Manning, 1962                 | 361–439           |
| <i>S. neglecta</i> Gibbes, 1850                 | 369–498           |
| <i>S. edentata australis</i> Manning, 1969      | 370–447           |
| <i>S. mantis</i> (Linnaeus, 1758)               | 381–433           |
| <i>Fennerosquilla heptacantha</i> (Chace, 1939) | 412–576           |
| <i>S. surinamica</i> Holthuis, 1959             | 441–469           |

having a bilobed process. Species of *Squilla* sensu stricto were then restricted to the Atlanto-East Pacific, whereas species of *Oratosquilla* were confined almost exclusively to the Indo-West Pacific region [except *O. massavensis* (Kossmann, 1880), an immigrant to the eastern Mediterranean Sea through the Suez Canal (Lewinsohn and Manning 1980:11)].

Differences in shape of the lateral processes of the sixth and seventh thoracic somites were not stressed in the 1968 revision of the Squillidae, although it was suggested that those features “may prove to be of some importance in classification at the generic level” (Manning 1968:118). All of the species transferred to *Oratosquilla* in 1968 share a strongly bilobed lateral process of the sixth thoracic somite, whereas only one of the species then retained in *Squilla*, *S. heptacantha*, has a strongly bilobed process on that somite (Manning 1969: fig. 47d; Fig. 1b, herein). In that species, the anterior lobe of the process of the sixth thoracic somite is almost as large as the posterior lobe. In other species retained in *Squilla*, the lateral process of the sixth thoracic somite is either a single lobe, or the anterior lobe is distinctly smaller than the posterior one. Further, most species transferred to *Oratosquilla* in 1968 have a bilobed lateral process of the seventh thoracic somite as well, and the anterior lobe of that process is relatively large. Species retained in *Squilla* have either a simple process of the seventh thoracic somite or a bilobed process with the anterior lobe greatly reduced.

After the 1968 revision of the Squillidae and a subsequent monograph of the West Atlantic species were completed (Manning 1969), more detailed studies were begun on species of *Oratosquilla*, and the genus was found to comprise several morphologically heterogeneous groups of species (Manning 1971). As more specimens became available and additional information on their morphology was obtained, several new genera were recognized for species previously assigned to *Oratosquilla*. In some of these genera, basic distinctions from *Oratosquilla* in-

cluded different configurations of the lateral processes of the exposed thoracic somites and different numbers of teeth on the dactylus of the claw. For example, *Busquilla* Manning, 1978a, was erected for *O. quadraticauda* (Fukuda, 1911) (not seen by Manning in 1968) and another, previously undescribed species. The lateral process of the fifth thoracic somite in these species, although appearing in dorsal view to be bilobed with both lobes in almost the same plane, is actually somewhat similar to the lateral process found in species of *Squilla*; the two lobes are separate and in different planes as well. Furthermore, in *Busquilla* species the anterior lobes of the lateral processes of the sixth and seventh somites are proportionally smaller than those seen in most species of *Oratosquilla*, and their claws have five rather than six teeth on the dactylus.

Later, *Kempina* Manning, 1978b, was erected for *O. mikado* (Kemp and Chopra, 1921) and two other species having lateral processes with separated lobes in different planes on the fifth thoracic somite and strongly bilobed processes on the sixth and seventh somites. Like species of *Oratosquilla*, species of *Kempina* have six teeth on the dactylus of the claw. *Natosquilla* Manning, 1978b, erected for *O. investigatoris* (Lloyd, 1907), also has separate lobes in different planes on the fifth somite, but the anterior lobes of the lateral processes of the following two somites are reduced in size. *Natosquilla* further differs from *Oratosquilla* in having 10–18 rather than six teeth on the dactylus of the claw.

These findings have clarified the usefulness of shapes of lateral thoracic processes as generic characters. First, the concept that two distinct stocks within the Squillidae can be distinguished by the shape of the lateral process of the fifth thoracic somite is still valid but requires modification. The principally Indo-West Pacific stock, plus the wide-ranging *Alima*, can no longer be characterized as having both lobes of the lateral process of the fifth thoracic somite basally connected and in the same or almost the same horizontal plane. However, this stock can be differentiated from the principally Atlanto-East Pacific stock, comprising *Squilla* and its allies, by whether or not the two lobes are visible in dorsal view. In the latter group, the posterior lobe always obscures the ventrally rotated anterior lobe, whereas in the former group, even though the anterior lobe may be ventrally rotated, it is still visible in dorsal view. Second, as demonstrated by *Busquilla* and *Fennerosquilla*, shape of the lateral process of the sixth thoracic somite may be an important generic character (in combination with other characters), as suggested in 1968. Finally, shape of the process of the seventh somite alone is not necessarily important at the generic level, as shown by some species of *Oratosquilla*. In *O. asiatica* Manning, 1978, *O. pentadactyla* Manning, 1978, *O. quinquentata* (Brooks, 1886), and *O. woodmasoni* (Kemp, 1911), the anterior lobe of the lateral process of the seventh thoracic somite is proportionally much smaller than in other species of the genus.

Since 1968, when *Squilla* was restricted to its Atlanto-East Pacific components, several other features have emerged as important characters at the generic level within the Squillidae, including number of epipods, presence or absence of the mandibular palp, and number of teeth on the dactylus of the claw. As a general rule, these features are constant at the generic level. One possible exception occurs among species assigned to *Clorida*, where, so far as is known, all of these features vary. That genus, however, also requires revision.

We plan to reevaluate these characters in species now assigned to *Squilla*, in

which two species (*S. neglecta* Gibbes, 1850, and *S. parva* Bigelow, 1891) lack the mandibular palp, three species (*S. aculeata* Bigelow, 1893, *S. prasinolineata* Dana, 1852, and *S. grenadensis* Manning, 1969) have four rather than five epipods, and another species (*S. decimdentata* Manning, 1970) has 10 rather than six teeth on the claw. Two of these species, *S. neglecta* and *S. prasinolineata*, have but five teeth on the claw.

#### Acknowledgments

We thank Lilly King Manning for preparing the illustrations, and W. G. Lyons, J. F. Quinn, Jr., and E. W. Truby of the Florida Department of Natural Resources, Marine Research Laboratory, for their comments on the manuscript.

#### Literature Cited

- Camp, D. K. 1983. Occurrence of *Squilla heptacantha* (Chace, 1939) (Crustacea: Stomatopoda: Squillidae) in the northeastern Gulf of Mexico.—*Northeast Gulf Science* 6(1):55–57.
- Chace, F. A., Jr. 1939. Preliminary descriptions of one new genus and seventeen new species of decapod and stomatopod Crustacea. Reports on the scientific results of the first Atlantis expedition to the West Indies, under the joint auspices of the University of Havana and Harvard University.—*Memorias de la Sociedad Cubana de Historia Natural* 13(1):31–54.
- Kemp, S. 1913. An account of the Crustacea Stomatopoda of the Indo-Pacific region, based on the collection in the Indian Museum.—*Memoirs of the Indian Museum* 4:1–217.
- Lewinsohn, Ch., and R. B. Manning. 1980. Stomatopod Crustacea from the eastern Mediterranean.—*Smithsonian Contributions to Zoology* 305:1–22.
- Manning, R. B. 1968. A revision of the family Squillidae (Crustacea, Stomatopoda), with the description of eight new genera.—*Bulletin of Marine Science* 18(1):105–142.
- . 1969. Stomatopod Crustacea of the western Atlantic.—*Studies in Tropical Oceanography* 8:viii + 380 pp.
- . 1971. Keys to the species of *Oratosquilla* (Crustacea: Stomatopoda), with descriptions of two new species.—*Smithsonian Contributions to Zoology* 71:1–16.
- . 1972. Notes on some stomatopod crustaceans from Peru.—*Proceedings of the Biological Society of Washington* 85:297–307.
- . 1976. Redescriptions of *Oratosquilla indica* (Hansen) and *Clorida verrucosa* (Hansen), with accounts of a new genus and two new species (Crustacea, Stomatopoda).—*Beaufortia* 25(318):1–13.
- . 1977. Preliminary accounts of five new genera of stomatopod crustaceans.—*Proceedings of the Biological Society of Washington* 90:420–423.
- . 1978a. New and rare stomatopod Crustacea from the Indo-West-Pacific region.—*Smithsonian Contributions to Zoology* 264:1–36.
- . 1978b. Further observations on *Oratosquilla*, with accounts of two new genera and nine new species (Crustacea: Stomatopoda: Squillidae).—*Smithsonian Contributions to Zoology* 272:1–44.
- . 1980. The superfamilies, families, and genera of Recent stomatopod Crustacea, with diagnoses of six new families.—*Proceedings of the Biological Society of Washington* 93:362–372.
- , and Ch. Lewinsohn. 1982. *Rissooides*, a new genus of stomatopod crustacean from the East Atlantic and South Africa.—*Proceedings of the Biological Society of Washington* 95:352–353.

(RBM) Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560; (DKC) Florida Department of Natural Resources, Marine Research Laboratory, 100 Eighth Avenue S.E., St. Petersburg, Florida 33701.