

Average measurements of different Mysis stages in mm.

Mysis stage:	I	II	III	IV	V
Total length.....	10	12	15	22	27
Carapace.....	4 × 3	5 × 4	6 × 4.5	10 × 6	11 × 7
Rostrum.....	1.5	2	2.5	3	4
Abdomen.....	2.5	3	4	6	8
Telson.....	2	2	2.5	3	4

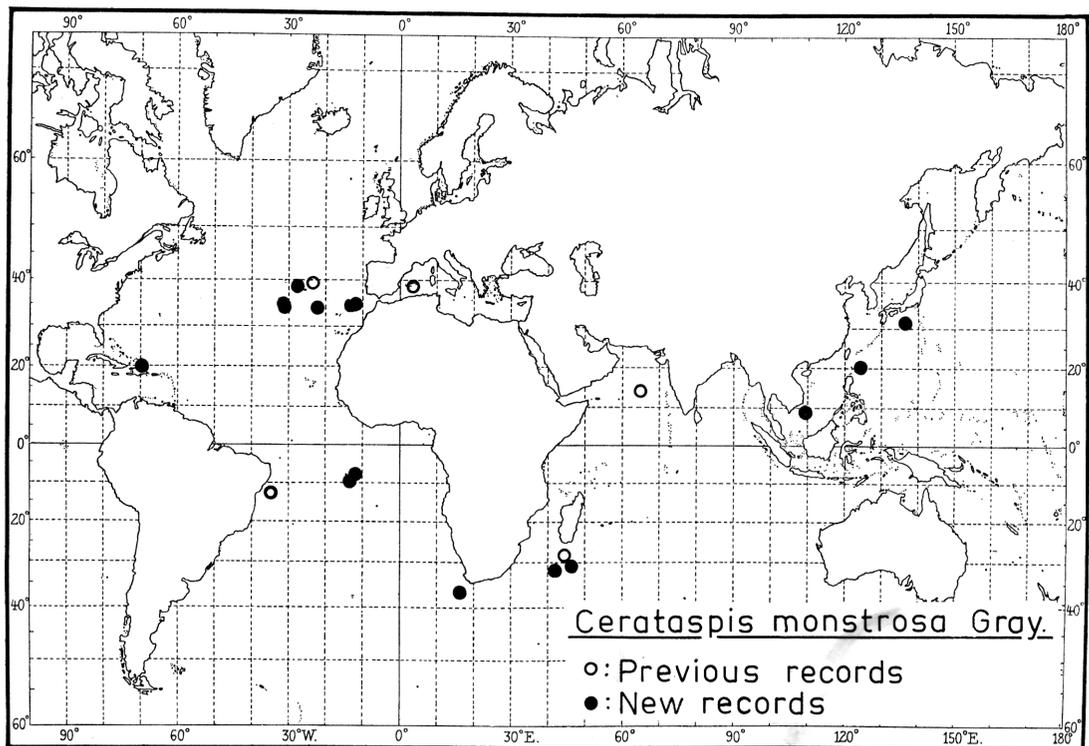
**Distribution.**

Fig. 295.

The species *Cerataspis monstrosa* seems to be a little more common than *C. petiti*. Whilst *C. petiti* only is known from one locality in the Indian Ocean and in two records without locality, we know *C. monstrosa* from five different localities. The first is GRAY's from the coast of Brazil, then LATREILLE's from the Mediterranean, and later it has been recorded from the Azores (CHAVES), the Indian Ocean (DOHRN) and south of Madagascar (BOAS). In this paper 16 new localities are added, which in general are in line with the previously known five localities.

To the Azores are added 6 new localities in the Eastern Atlantic off Gibraltar. Further are one record from the West-Indies and two from near St. Helena, i.e. on nearly the same latitude as GRAY's locality at the coast of Brazil. Two records from south of Madagascar and one from South African waters can be added to the one from BOAS's description. Of new localities are three from the western Pacific Ocean: one from the South China Sea, one from north of the Philippines and one from south of Japan.

These localities together indicate a circum-aequatorial distribution with possibly a little further spreading north and south than for *C. petiti*, but this wider range to the north and south may be just accidentally, caused by the number of records being considerably larger for *C. monstrosa* than for *C. petiti*.



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Fig. 295. Map of distribution.

DIAGNOSIS FOR THE LARVAE OF *CERATASPIDES*

Large penaeid Mysis larvae, much elongated, with a long, spiny rostrum and abdomen and with the exopods of the uropods developed as large buoyancy organs. One pair of dorsal tubercles. Carapace with smaller lateral swellings and spines, but no post-orbital or pterygostomial spines. Gills only non-lobose or lobose only in first order in older larvae. Abdomen with at least dorsal spines. Telson with open cleft and seven setae on each side of the furca. First antenna lateral flagellum in the older larvae in two sections: wider basal part, slender distal part. Eyes large; first and second antennae much elongated; antennal scale with lateral spine and a square-cut tip. Mandible with longer distance between single incisor tooth and molar part, the last very small. Three-jointed mandibular palp. Maxillipedes and thoracopods with long, stiff spines pointing forward shaping a trapping, catching and filtering basket. Chelae on the three first pereopods first starting to develop in fifth Mysis.

*Cerataspides longiremis* (DOHRN).

Fig. 296-345.

*Cerataspis longiremis*, DOHRN 1871, pp. 366-372, pl. 29, 30, Figs. 48-67.*Cerataspis longiremis*, BOAS 1880, pp. 42-45, pl. 1, Fig. 1, 37, 38, pl. 2, Fig. 7, pl. 3, Fig. 100.*Peteinura gubernata*, BATE 1888, p. 323, Pl. 53.*Cerataspides longiremis*, BONNIER 1899, pp. 48-49.

Decapodenlarve, PESTA 1916, p. 80, Fig. 14.

## Localities.

**Mysis I.**

25° N-35°30' W. ANDRÉA, 1862, C.Z.M. 12.1893, 1 spec.

**Mysis II.**

Atlantic Ocean, COLLIN, C.Z.M., 1 spec.

23°30' N-35°30' W. ANDRÉA, 1862, C.Z.M. 12.1893, 2 spec.

**Mysis III.**

30° N-33° W. HYGOM, C.Z.M. 12.1893, 1 spec.

24° N-32° W. IVERSEN, 10.9.1833, C.Z.M. 12.1893, 1 spec.

25° N-31° W. IVERSEN, 10.9.1833, C.Z.M. 12.1893, 1 spec.

25° N-35°30' W. ANDRÉA, 1862, C.Z.M. 12.1893, 1 spec.

27°24' N-34°0' W. ANDRÉA, 1862, C.Z.M. 12.1893, 1 spec.

**Mysis IV.**

24° N-32° W. IVERSEN, 10.9.1833, C.Z.M. 12.1893, 1 spec.

25° N-31° W. IVERSEN, 10.9.1833, C.Z.M. 12.1893, 4 spec.

28° N-25° W. IVERSEN, 10.9.1871, C.Z.M. 12.1893, 1 spec.

27° N-27°40' W. ANDRÉA, 1864, C.Z.M. 12.1893, 1 spec.

26° N-28° W. ANDRÉA, 1864, C.Z.M. 12.1893, 1 spec.

**Mysis V.**

25° N-31° W. IVERSEN, 10.9.1871, C.Z.M. 12.1893, 2 spec.

## Description.

### Mysis I.

Figs. 296, 301-314.

#### Carapace.

No younger stage than the first Mysis is known. The carapace of *Cerataspides* shows closer relation to *Solenocera* than that of *Cerataspis*, as also more of the for *Solenocera* characteristic spines on the carapace are found here. The rostrum is of an enormous length about twice the length of the carapace proper. The rostrum is flattened, furnished with thin spines at its two lateral edges and tipped with three large spines, two lateral and one medial one, the medial one is the largest. Near the base of the rostrum is a dorsally placed single spine. The anterior dorsal organ is rather small, the posterior organ is much larger. At the side of rostrum is a pair of curved supra-orbital spines and latero-posteriorly of them a pair of post-antennal spines which not emerge from the margin of the carapace like the supra-orbital spines. The margin has a small forward pointing lobe where the antennal spines should have been if present. Behind the anterior dorsal organ is a pair of small dorsal tubercles. Further back on the carapace and laterally is on each side a large, pear-shaped tubercle with the narrow part pointing forward. On the surface of this lateral tubercle are placed a few larger and smaller spines, anteriorly is a pair of hepatic spines close together, and with the dorso-anterior of them being the largest, and increasing still more in size during the following stages, soon making the second spine of the pair only an accessory spine. Posteriorly are two cardiac spines, a latero-cardiac and a ventro-cardiac. Contrary to what is the case for the hepatic spines it is here the ventral spine which is the largest, and it becomes in the later stages the largest spine of the carapace except for the rostrum, but the latero-cardiac, although smaller, never becomes only an accessory spine, it remains in all stages one of the larger spines. Both these spines are pointing posteriorly with their apices. The margin of the carapace is smooth, nothing can be seen of the dentated filaments so characteristic for the Protozoa of the *Solenocera* and which in *Solenocera* remained in parts also through the Mysis stages.

#### Abdomen and Telson.

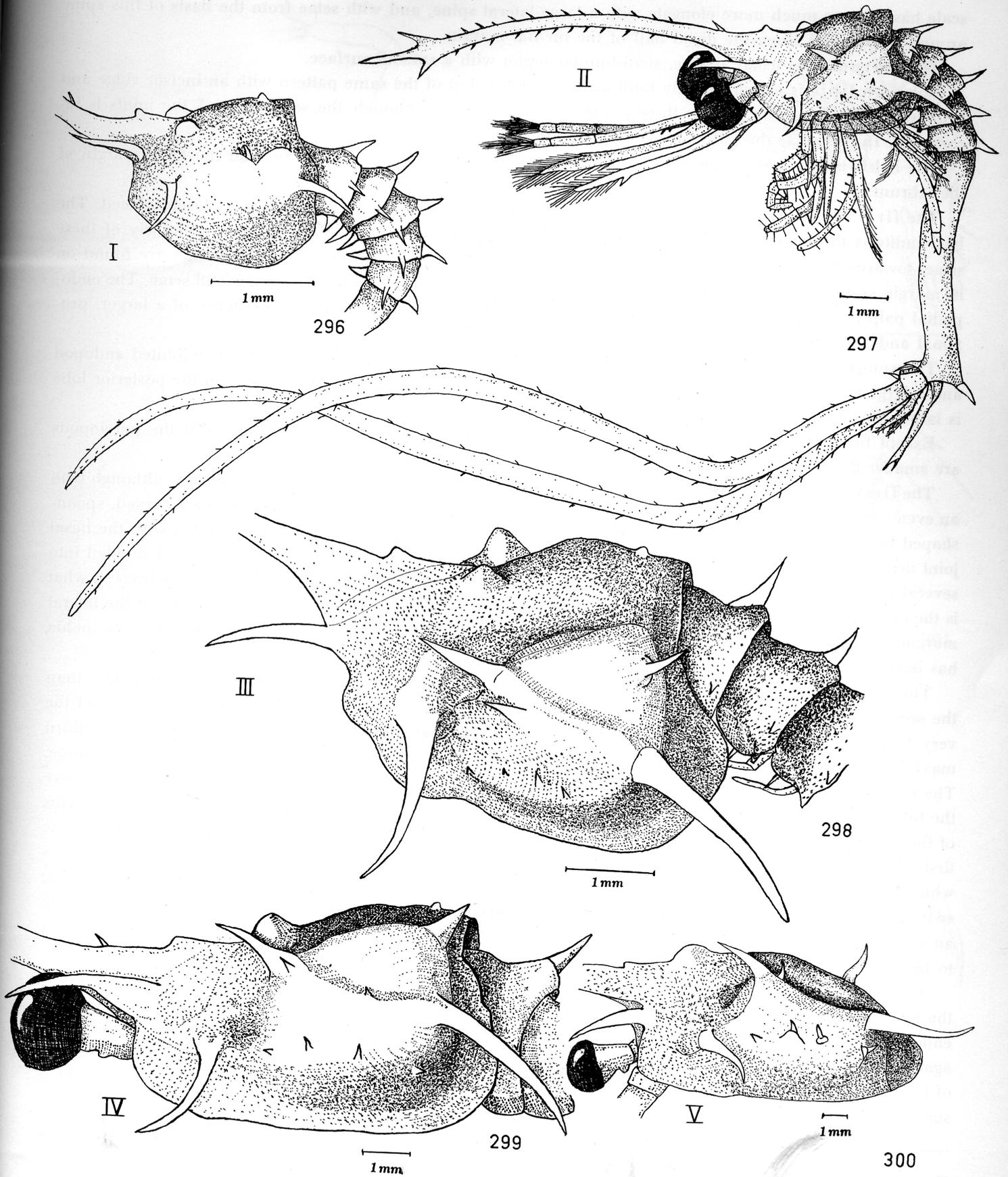
The abdomen has the normal six segments of which the first five are of about equal size, but the sixth segment is very long, about one and a half the length of the preceding five segments together. On each segment are placed a large dorso-posteriorly pointing dorsal spine, a smaller lateral spine and a ventral spine of medium size.

The telson is rather long with its smallest width near the middle of its length. From the place where the width is smallest the telson forks like a swallow-tail, showing a very open furca. Each of the two branches of the furca terminates with a spine and has along its inner margin seven setae. On the outer margin are the usual three spines: two small ones near the tip and the third one anteriorly of a line through the bottom of the furcal cleft.

#### Appendages.

The first antenna is—as also the second one—very long reaching far in front of the eyes, nearly to the three-forked tip of the strongly elongated rostrum. It has a four-jointed peduncle, but the first joint is not clearly defined. On the ventro-medial margin of the second, longest, joint is a forward pointing spine or hook. The third joint is a little more than half the length of the second, and the fourth joint is a short, nearly squarish joint, wider distally than proximally. On its distal margin are the lobes for the coming flagella together with a brush of stiff setae. The olfactory, lateral flagellum is the largest, contrary to what was found in the two species of *Cerataspis*. The olfactory flagellum has already started to be annulated with a large basal ring followed by half a dozen smaller rings. The medial flagellum is only short and not annulated.

The second antenna is also very elongate. Its short protopod has on the medial surface a small, circular bud. The endopod is already a small beginning flagellum with almost a dozen rings. The exopodial antennal



Figs. 296-300. *Cerataspides longiremis*. Fig. 296, first Mysis. — Fig. 297, second Mysis. — Fig. 298, third Mysis. — Fig. 299, fourth Mysis. — Fig. 300, fifth Mysis.

scale has become much more elongate with a large lateral spine, and with setae from the basis of this spine around the tip and along the distal half of the medial margin.

The labrum is as usual a large, semi-lunular organ with a smooth surface.

The mandible is not so strongly built as in *Cerataspis* but of the same pattern with an incisor ridge and a folded molar part. The palp is three-jointed as in *Cerataspis* although the separation of the joints is incomplete. In this stage the palp is only tipped with a few short setae.

The labium has a short peduncle and two rounded lobes reaching a little beyond the front margin of the labrum.

The first maxilla is with its lobes not much longer than the labium to which it is closely placed. The basi-endite is the largest endite and furnished with tooth-like setae at its distal margin, anteriorly of these setae, towards the endopodial palp, are two more seta-like bristles. Thinner, hair-like bristles are found on its margin and lateral surface. The coxa-endite is much smaller and provided with a few stiff setae. The endopodial palp is unjointed, but its shape and the placement of its setae indicate the existence of a larger, proximal and a smaller, distal joint in an earlier stage.

The second maxilla is of the normal shape with four protopodial endites, a still five-jointed endopod and a large exopod with both an anterior and a posterior lobe. The most posterior seta on the posterior lobe is larger than the others as is the case also for *Solenocera*.

Except for the first maxillipede the differences in shape between the maxillipedes and the pereopods are smaller than is the case in *Cerataspis*.

The first maxillipede is rather small, but otherwise reminding much of that in *Cerataspis*, although with an even less clear division between the joints in the protopod. The protopod is shaped like a curved, spoon-shaped leaf with short, stiff setae along the whole medial margin. The endopod is five-jointed with the basal joint nearly half as long as the endopod. The exopod is somewhat longer than the endopod and divided into several joints, most of them with a vestigial seta on both the medial and lateral margins. But contrary to what is the case in *Cerataspis* the exopod has no lunular lobe fringed with setae on the proximal half of the lateral margin. The number of joints in the exopod is much higher than in *Cerataspis*. A large double mastigobranchia has developed in *Cerataspides* as also in *Cerataspis*, but there is still no arthrobranchia.

The second and third maxillipedes are almost equal in size with the third only a little longer than the second, whereas in *Cerataspis* the second was short but very massive and strong, and the third had the very long-reaching endopod reminding of the same appendage in *Solonecera*. Both the second and third maxillipedes have a coxa and a basis, basis is nearly twice as long as coxa, which has a more squarish shape. The endopod is five-jointed with the first joint rather short and the second joint the longest, and from there the following joints decrease in length, the fifth most distal joint being the shortest. Along the medial margins of the protopod and the endopod are lines of long, stiff setae. These setae form together with the setae of the first two, partly three, thoracopods a catching basket or sieve for smaller planktonic animals or detritus which are to serve as food for the larva. The exopods on both the second and the third maxillipedes are strong swimmerets, although that of the third maxillipede only is small. The mastigobranchia is double with both an anterior and a posterior leaf-shaped lobe. One of these lobes will later be transferred proximally on coxa to become the filiform podobranchia, which in *Cerataspis* from the beginning had the filiform shape.

The first three pairs of thoracopods—but mainly the first two pairs—are shaping the posterior half of the filtering and catching basket of the limbs. They have the normal two-jointed protopod and a five-jointed endopod of which the first joint is shorter than the second and third joints, the two most distal joints are again short. On the medial margin of the endopods, but not of the protopod as on the maxillipedes, is a series of long and very stiff setae which, when the legs are bent forward with their tips towards each other, together shape the basket through which only small particles can escape. It is of special interest to note the complete

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Figs. 301-314. *Cerataspides longiremis*. First Mysis. Fig. 301, tip of sixth abdominal segment with telson and part of uropods. — Fig. 302, first antenna. — Fig. 303, second antenna. — Fig. 304, mandible. — Fig. 305, first maxilla. — Fig. 306, second maxilla. — Figs. 307-309, first, second and third maxillipedes. — Figs. 310-314, first to fifth pereopods.