

Additions to the Pycnogonida of Georgia

by

FRANZ KRAPP

Zoologisches Forschungsinstitut und Museum Alexander Koenig

and

JOHN N. KRAEUTER

Virginia Institute of Marine Science, Eastern Shore Laboratory

Introduction

Recently, Kraeuter (1973) reported on twelve species of Pycnogonida from the continental shelf off Georgia and included information from McCloskey (1967) and several other studies from the Atlantic coast of the United States. Other papers, which were in preparation and appeared since Kraeuter (1973), are McCloskey (1974) and Stock (1975 a + b). The 1975 a paper, treating the western tropical Atlantic and the eastern Pacific, is of special importance to Georgia and south Atlantic states because the Gulf Stream is likely to transport species from the West Indies, the faunistically richest region in terms of Pycnogonida, to the area. Kraeuter (1973) did not cite any of Stock's papers relating to West Indian Pycnogonids, so his identifications needed to be confirmed. Within this paper Kraeuter (1973) listed *Tanystylum calicirostre* as a questionable species. Krapp (1973) in a revision reported on the discrimination between *T. orbiculare* and *T. conirostre*, and he wished to see these specimens. Further analysis showed they were not *Tanystylum*, but *Achelia sawayai* Marcus. We then decided to revise the entire collection.

Systematic Account

For the sake of convenience we follow the same succession as Kraeuter (1973) did after Hedgpeth's (1948) example.

Nymphonidae

Nymphon floridanum Hedgpeth, 1948: 196—199, fig. 17 (p. p., only the longnecked form); Stock, 1955: 215, fig. 1 a (p. p., only the long-necked form); Stock, 1975 a: 994—998, fig. 14 + 15.

Material: 8.6.63, 31°20'17" N, 80°04'44" W. The same specimen as in Kraeuter, an ovigerous ♂.

Remarks: The range record remains as indicated in Kraeuter (1973), the specimen needed reconfirming in view of the recent description of a sibling species, *Nymphon aemulum* Stock, 1975. Stock (1975 a) stressed morphological differences and found that Hedgpeth (1948, p. 197, line 8 from bottom) wrote: "... third and fourth joints ..." instead of "... third and fifth joints ..." of the palp, (see also fig. 17 d). The proboscis shape may be expressed by the formula D "' : 1 in the nomenclature designed by Fry & Hedgpeth (1969) for the paratype figured by Hedgpeth (1948), as well as for the holotype by Stock (1975 a), and our present specimen.

"Callipallenidae" (see concluding remark)

Pallenopsis candidoi Mello-Leitao, 1949, 299—305, est. IX—X; Stock 1957, 102 (in key), 104—105, Abb. 19—20. Stock 1966, 393. Stock 1975 a, 1018 (in key), 1030.

Material: 7.23.63. 30°52'02" N, 80°01'44" W, 53 m (2 ex.)

Remarks: Originally, Kraeuter (1973) indentified these specimens as *P. forficifer* Wilson, 1881, which is a different form from considerably deeper water.

This is the first record of this species in North American waters. In addition to the typical locality on the Coast of Brazil (Ilha Santa Catarina; Mello-Leitao, Stock, 1957) it was found farther north (states Rio de Janeiro and Espirito Santo; Stock, 1966) as well as on the coast of Surinam (Stock, 1975 a) in numerous localities. Stock (l. c., p. 1016) included *Pallenopsis* into the following family.

Phoxichilidiidae

The following species was found after the publication of Kraeuter (1973):

Anoplodactylus iuleus Stock, 1975 a, 1069—1072, figs. 51—52.
? *Anoplodactylus maritimus* Hodgson, s. Hedgpeth (1948), 230, fig. 29 d—e.

Material: 9.10.63. 30°40,3' N, 79°05' W, Station 52, 245 m, 2 ♀.

Remarks: This is the third record of this species which is known by only 4 specimens (1 ♀ off Habana, Cuba: Hedgpeth, 1948, 1 ♂ holotype off Florida: Stock, 1975 a), it also constitutes a range extension from Florida to Georgia.

Anoplodactylus insignis (Hoek, 1881). *Phoxichilidium insigne* Hoek, 1881, 82—84, pl. 14, figs. 5—7. Loman, 1912, fig. E. *Anoplodactylus insignis*: Marcus 1940: 58—60, Hedgpeth, 1948: 226—228, fig. 28 d—g, Cerame-Vivas & Gray, 1966: 263, Stock, 1975 a: 1056—1058, fig. 54.

Material: 7.30.1963: 4 miles at 335° from Sapelo Whistle buoy, 21 m, 2 ♀. 2.7.1963: 5 miles at 340° from Sapelo Whistle buoy, from *Ircinia*, 21 m, 1 ♂.

Remarks: The male was still completely red with the exception of the middle parts of femora and tibiae. All processes and protuberances were more pointed than on the corresponding females, the "genital spurs" on all four pairs of second coxae decrease from rear to front legs. Two of four samples from Kraeuter (1973) were re-examined (F. K.) and their identifications were confirmed. This should be borne in mind, as the new species *A. insigniformis*, *A. massiliformis* and *A. simulator* recently described by Stock (1975 a) were accordingly unknown to J. N. K. when writing his previous paper (1973), so they might be represented among the remaining four specimens.

Anoplodactylus lentus Wilson, 1878, 200. Synonymy and references: see Stock (1975 a), 1055.

Material: 11.8.61: 3 miles at 342° from Sapelo Whistle, 18 m, 2 ♂, 1 ♀. — 12.6.61: Blackbeard Island 6 ♂ (5 with ovigers bud-shaped), 5 ♀ (3 immatures). 10.21.64: 31°22' N, 80°50' W, 19 m 1 immature ♂ (ovigers budshaped).

Since Stock (1975 a) described several new species of this complex and only two out of ten samples were sent to and examined by F. K., the remaining ones may contain other species. The immature male identified by Kraeuter (1973) as *A. parvus* proved to be most probably *A. lentus* (last specimen in this material list). We sent it for identification to Prof. Stock, Amsterdam, who answered (in litt., 29 June 1975): "Judging from the absence of the propodal lamina, from the rather lengthy 2nd spine on the propodal heel, and especially from the shape of the chela, and the absence of any tubercles, spurs, etc. on the legs, I identified this specimen tentatively as *Anopl. lentus*." — For some characters mentioned see Fig. 1. The cement-gland slit need not be continuous (Fig. 1 c), but may consist of two slits.

Anoplodactylus petiolatus (Krøyer, 1834), 123. Synonymy and references: see Kraeuter (1973), 495, and Stock (1975 a).

Material: 2.7.63: 1.5 miles at 103° from Doboy sea buoy, 13—15 m, 2 ♂. 5.6.63: 30°53' N, 80°01'30" W, 49 m, 1 juv. 8.6.63: 31°20'22" N, 80°00'26" W, 40 m, 1 ♀. 8.6.63: 31°20'15" N, 80°06'57" W, 40 m, 1 ♂. 8.6.63: 31°20'21" N, 80°02'22" W, 43 m, 1 ♂ ovigerous. 8.6.63: 31°20'35" N, 79°52'28" W, 52 m, 1 ♂. 8.6.63: 31°31'27" N, 80°00'32" W, 37 m, 1 ♂.

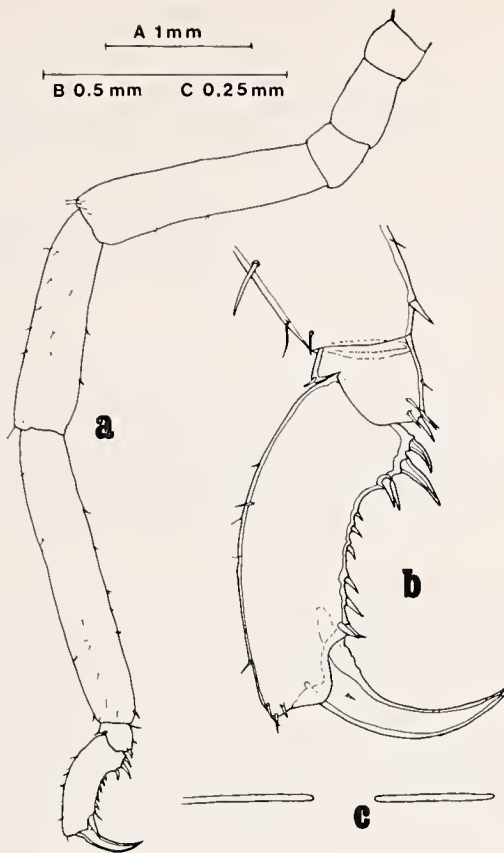


Fig. 1: *Anoplodactylus lentus* Wilson, 1879, ♂

a) Leg 3, b) tarsus and propodus of same, c) cement-gland slit of same (free-hand sketch) to show the aberrant discontinuity manifest in one specimen.
a to scale A, b to scale B.

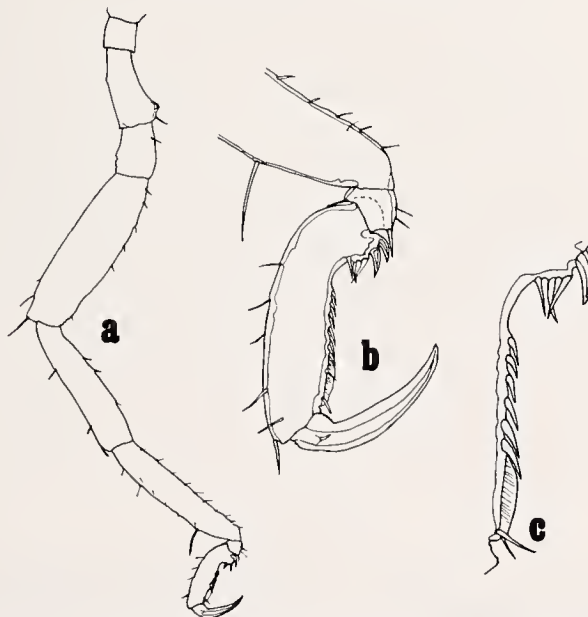


Fig. 2: *Anoplodactylus petiolatus* (Krøyer, 1834), ♀

a) Leg 3, b) tarsus and propodus of same, c) sole of propodus, further enlarged to show cutting lamina and spines.
a to scale A, b to scale B, c to scale C. (Fig. 1)

8.6.63: 31°20'17" N, 80°04'44" W, 43 m, 1 ♂. 8.21.63: 31°37'12" N, 80°54'59" W, 16 m, 1 ♂ immat. 8.21.63: 31°37'12" N, 80°54'59" W, 18 m, 1 ♀. 9.12.63: 30°42'30" N, 80°04'03" W, 67 m, 1 juv.

In addition to specimens listed by Kraeuter (1973) and re-examined and confirmed by Krapp, two more specimens have been found in the Sapelo collections, viz.

10.21.64: 31°22' N, 80°50' W, 19 m, 1 ♀. 8.21.63: 31°44'30" N, 80°45'52" W, 15 m, 1 ♀.

The first of these records is the female in the sample identified as *A. parvus* by Kraeuter (1973), for the accompanying male, see the preceding species. Both specimens were confirmed by Prof. Stock.

Anoplodactylus viridintestinalis (Cole, 1904). Synonymy and references: see Stock (1955), 239.

Material: 10.24.61: Marsh Landing, Sapelo Island, Georgia, 1 ♀.

Remarks: This specimen was classified as *A. pygmaeus* by Kraeuter (1973), though with some hesitation. A short description will aid in clarifying the identification: A Phoxichilidiid with compact habitus, which has the first three crurigers contiguous, the fourth one widely separated and directed backwards at an angle of about 70–80°. A clear intersegmental line is to be seen between body segments 3 and 4 only, the anterior ones obliterated. Each cruriger bears a little tubercle with a setule (thence a similarity with *A. pygmaeus*). The neck is very short and broad, the eye tubercle is as high as the abdomen, pointed, situated on the front margin of the cephalon. The proboscis shape may be given by D''': 1 in the terminology of Fry & Hedgpeth (l. c.), although this is true for the dorsal view only. From the ventral aspect, or more clearly in side view, the contour bulges more ventrally. The cheliphore scape is swollen distally, the fingers short, curved and apparently toothless. The widely separated 4th crurigers of this specimen correspond with those on Cole's type. A comparison with a topotypical pair from Monterey, California (which was registered in the National Museum under USNM 80 813, now in F. K.'s collection) assured morphological identity.

This species was previously known only from the U.S. West Coast and this find constitutes the first record from the Atlantic Ocean.

Ammotheidae

Ascorhynchus castelli (Dohrn, 1881), 123–129, pl. I, figs. 1–16, pl. II, fig. 1. Synonymy and references: see Stock (1975 a), 966; description 966–968, fig. 1.

Material: 9.12.1963 (Tumbler dredge): 30°40'43" N, 80°06'07" W, 50—59 m, 1 ♂. 7.23.1963 (Tumbler dredge): 30°52'02" N, 80°01'14" W, 53 m, 1 ♀.

Kraeuter (1973) identified these as *A. colei*, he relied only on Hedgpeth's key (1948) and did not cite Stock's (1957) revision of the *Ascorhynchus* species.

The two specimens do not resemble *A. colei* Hedgpeth, 1943, which is well differentiated from our material by its longer chela, its palp and oviger each possessing 9 articles instead of 10 (in both sexes) and *A. colei* is twice the size of our specimens. Our material has open genital apertures and measures ± 5 mm, it resembles Dohrn's species *A. castelli*.

Remarks: In the male specimen the lateral processes are separated by about their own diameter, and this distance is slightly longer in the female, but this may be due to different degrees of contraction. The trunk is slender, and the cephalon has two little bosses at origin of cheliphores. The scapes are rather swollen and angular in the dorsal contour, but the ventral contour is straight. This is in opposition to the form given for the scape of *A. castellioides* Stock, 1957, which is bent like a knee (original description, p. 82, fig. 2 e on p. 83). Chela is reduced to a small knob. Eye tubercle is situated in the middle of cephalon and is higher than any of the four middorsal tubercles, which are situated near the well-marked intersegmental lines. The abdomen is separated by a clear suture and has a slight downward curve. The middorsal tubercles, the last being smallest, each support setules. Lateral processes are glabrous. Palps are normal and doubly bent, as are the ovigera, and both are 10-jointed. Insertion more like fig. 2 a in Stock (1957), p. 83, than fig. 4 b in Stock (1975 a). Ovir-joints 7—10 bearing specialized spines in two series, a primary one (larger spines) according to the formula 7:5:4:7, a secondary one (smaller spines) 6:6:4:5. Terminal claw simple, short. Legs: Coxae II ventro-distally supporting a slight swelling, which bears numerous hairs and is perforated by the genital openings. Femur and tibia I dorsodistally terminating in a spurlike process, tibia II without such. The tarsus is very short; propodus slightly arched, sole armed with uniform setules only, and the terminal claw about $\frac{1}{4}$ the length of propodus. Proboscis rather long, moderately pointed, reaching to beyond intersegmental line between segments 2 and 3.

Our specimens agree with *A. castelli* in the following characters: Dimension, presence of large spurs on distal ends of femur and tibia I. These are

less pronounced than in Stock's figures (1975 a, fig. 4 b), however, the more obtuse proboscis and the low middorsal tubercles are morphologically similar to those of *A. castellioides*, while the lateral processes are more or less intermediate between *A. castelli* and *castellioides*.

Ascorhynchus pyrginospinum McCloskey, 1967, 125—128, fig. 12—17.

Material: 8.6.63: Bucket dredge, 31°22'09" N, 79°43'08" W, 123 m, 1 ♂. 8.6.63, 31°33'44" N, 79°37'49" W, 75 m, 2 ♀, 1 ♂.

Remarks: This and Kraeuter (1973) are the second published records of the species.

Nymphopsis duodorsospinosa Hilton, 1942, 303—305, pl. 45. Ref. Hedgpeth, 1948, 250—252, fig. 40.

Material: 7.23.63: Tumbler dredge, 30°52'02" N, 80°01'02" W, 53 m, 1 ♂ ovigerous. 4.10.63: Sapelo Sound, Georgia, 16—26, 1 ♂. 2.15.63: Sapelo Sound, Georgia, 12—21 m, 1 chelate.

Remarks: In the chelate specimen (not mentioned by Kraeuter, 1973) the two dorsal spiniferous tubercles are perceptibly higher than the ocular tubercle, thus the key characters are not exact; however, we feel there is no doubt about the specific identity.

Achelia sawayai Marcus, 1940, 81—86; 10 a—f, 17 a—k; Hedgpeth (1948) 244—245, 38 e; Fage (1949) 28,4; Sawaya (1951), 274 (in key); Hedgpeth (1954) 427; Stock (1954 a), 47; Stock (1954 b), 117; *Achelia sawayai f. typica*, Stock (1955 a), 245—246, 16; *Achelia (Pigrolavatus) sawayai*, Fry & Hedgpeth (1969) figs. 152, 153, 155, tab. 13—14; *Achelia sawayai*, Stock (1975 a), 104.

The specimens reported as *Tanystylum calicrostre* which have been reassigned to *A. sawayai* are as follows:

3.26.63: 21 miles at 75° from Sapelo sea buoy, 24 m, 1 ♂, 1 ♀. 7.23.63: 30°55'04" N, 80°08'01" W, 40 m, 1 ♀, 1 juv. 9.12.63: 30°48'47" N, 80°08'30" W, 44 m, 1 ♀.

Additional *A. sawayai* were found in the following sample:
12.27.65: Cabretta Island, on float, 1 ♂, 1 ♀.

Remarks: The additional material lot was mixed in with *T. orbiculare* and thus establishes *A. sawayai* as a member of the estuarine as well as the oceanic fauna of Georgia. Hedgpeth (1948) listed *A. sawayai* from Albatross station 2374—79, Feb. 1885, Gulf of Mexico, south of Cape St. George, about 25 fathoms. This station does not appear in either the

appendix table 1, p. 297 or chart 3, p. 294. Townsend (1901) listed the following data for stations 2374—2379:

Station	Lat. N	Long. W	Depth (fathoms)	Date
2374	29 11 30	85 29 00	26	Feb. 7, 1885
2375	29 10 00	85 31 00	30	Feb. 7, 1885
2376	29 03 15	88 16 00	324	Feb. 11, 1885
2377	29 07 30	88 08 00	210	Feb. 11, 1885
2378	29 14 30	88 09 30	68	Feb. 11, 1885
2379	28 00 15	87 42 00	1467	Mar. 2, 1885

From these data and the information provided by Hedgpeth (1948) the specimens came from either station 2374 or 2375 and most probably 2374.

Stock (1955) and Fry & Hedgpeth (1969) expressed different views on the nominal species *Achelia besnardi*: While to Stock this is a mere "forma", Fry & Hedgpeth judged it to be a full species. We believe our specimens are of the nominal form, but we have provided new illustrations of some morphological details (see Fig. 3). In the meantime, Stock (1975 b) revised his opinion and regards *A. besnardi* Sawaya, 1951 as being a species different from *A. sawayai* Marcus, 1940. His figures (Stock, 1975 b, figs. 1—9) allow an easy morphological distinction when confronted with our fig. 3. These specimens extend the range of *A. sawayai* from south Florida to mid Georgia.

Tanystylum orbiculare Wilson, 1878, 5—7, pl. 2, fig. 2 a—f. Synonymy and references: see Kraeuter (1973), 496; Krapp (1973), 60—63, 64, fig. 4; Stock (1975 a), 985.

Material: 3.28.66: Cabretta Creek on float (on *Bougainvillia*) 5 (3 ovigerous) ♂, 6 ♀. 12.27.65: Cabretta Island on float (from hydroids and algae) 19 (4 ovigerous) ♂, 17 ♀, 25 immatures, 11 juveniles, 2 sex. ?, 3 post-larvae.

Remarks: All these specimens conform to the emended description given by Krapp (1973) (see also the preceding species).

Discussion

Kraeuter (1973) justly emphasized the southern influence in the faunal composition of Georgia pycnogonids. The identifications of five systematic categories in Kraeuter (1973) have been changed: *Pallenopsis candidoi* (for *P. forficifer*), *Ascorhynchus castelli* (for *A. colei*), *Achelia sawayai* (for

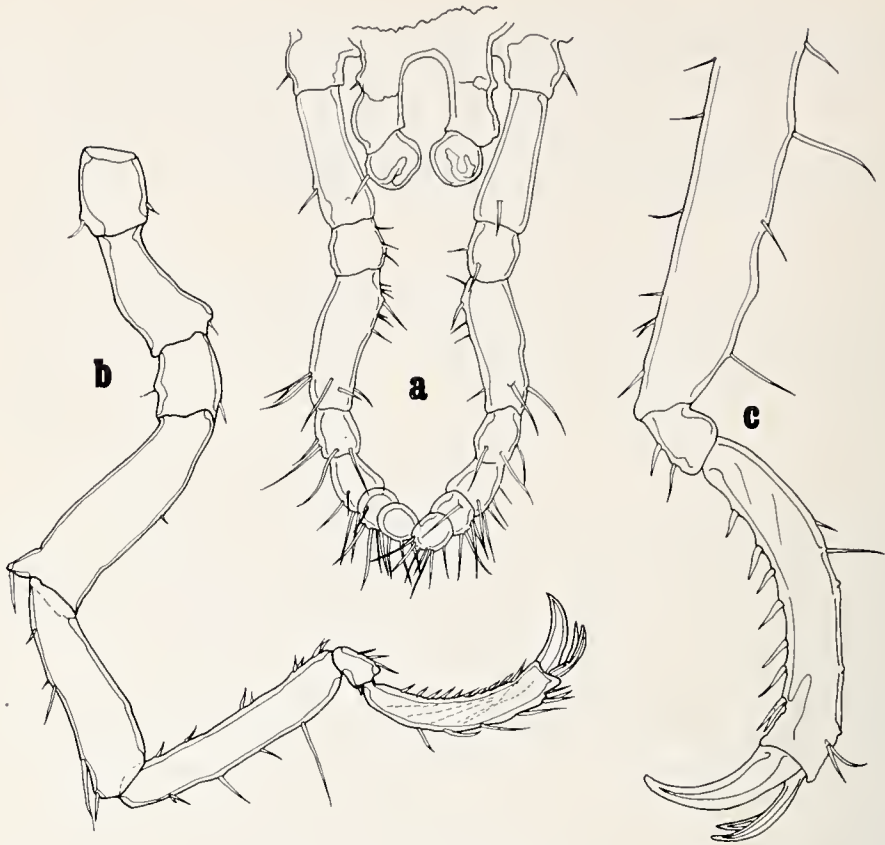


Fig. 3: *Achelia sawayai* Marcus, 1940

- a) Cheliphores and palps of ♂ in dorsal view, b) leg 3 of same specimen, c) distal joints of a ♀ leg 3.
a + c to scale C, b to scale B. (Fig. 1)

Tanystylum calicrostre (sic! *calicrostre* in Kraeuter, 1973), while the sample identified as *Anoplodactylus parvus* proved to be an immature male of *A. cf. lentus* and a female of *A. petiolatus*. Finally, *Anoplodactylus pygmaeus* is in reality the first record of *A. viridintestinalis* in the Atlantic Ocean. A further *Anoplodactylus* species, *A. iuleus* Stock, 1975 was collected after the printing of Kraeuter (1973) in Georgia waters. The known ranges of *P. candidoi*, *A. iuleus*, *Ascorhynchus castelli*, and *Achelia sawayai* are extended northward. *Callipallene brevirostris* should be added (McCloskey, 1973; Stock, 1975 a) to the list of species which occur both north and south of Georgia.

Z u s a m m e n f a s s u n g

Die von Kraeuter (1973) publizierte Sammlung von Pantopoden (Pycnogonida) vom Schelf von Georgia, USA, wird um einige Neufunde bereichert und revidiert. Folgende Arten sind vertreten (in Klammern Kraeuters ursprüngliche Bestimmungen): *Nymphon floridanum*, *Pallenopsis candidoi* („*P. forcifer*“), *Anoplodactylus iuleus* (Neufund!), *A. insignis*, *A. lentus*, *A. petiolatus*, *A. viridintestinalis* („*A. pygmaeus*“), *Ascorhynchus castelli* („*A. colei*“), *A. pyrginospinum*, *Nymphopsis duodorsospinosa*, *Achelia sawayai* („*Tanystylum calicirostre*“), *Tanystylum orbiculare*. Kraeuters *Anoplodactylus parvus* beruht auf einem ♀ von *A. petiolatus* und auf einem ♂, das wahrscheinlich zu *A. lentus* zu stellen ist. Bedeutende Erweiterungen des bekannten Areals: *Anoplodactylus viridintestinalis* neu für den Atlantischen Ozean, neu für Nordamerika *Pallenopsis candidoi* und *Ascorhynchus castelli*, erstmals nördlich von Florida *Nymphon floridanum*, *Anoplodactylus iuleus* und *Achelia sawayai*.

R e f e r e n c e s

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Anschrift der Verfasser: Dr. Franz Krapp, Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 150—164, D—5300 Bonn. — Dr. John N. Kraeuter, Virginia Institute of Marine Science, Eastern Shore Laboratory, Wachapreague, Virginia 234 80, USA.