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A RANGE EXTENSION FOR *MANAYUNKIA AESTUARINA* (BOURNE, 1883) (POLYCHAETA: SABELLIDAE) TO THE GULF COAST OF THE UNITED STATES WITH A REVIEW OF PREVIOUS HABITAT INFORMATION

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ABSTRACT The sabellid polychaete *Manayunkia aestuarina* (Bourne, 1883) is reported for the first time from the Gulf coast of the United States and from a *Juncus roemerianus* marsh. Individuals were collected from a brackish *J. roemerianus* marsh in St. Louis Bay, Mississippi, (30°22'N, 89°15'W) during the period of June 1979 to May 1980. Adults with eggs were first noted in early January and increased in number through May. Brooded young were observed from late January through May. Habitat comparisons are made between this and other North American and European populations. The present population is associated with lower salinities, more sandy sediments, and much less frequent tidal inundation than the others. A brief taxonomic discussion is presented.

INTRODUCTION

Two species of the sabellid polychaete genus *Manayunkia* (subfamily Fabricinae) have been reported from the North American continent. *Manayunkia speciosa* Leidy, 1858, has been collected from all coasts of the United States, the Great Lakes region, and from unnamed lakes in northern Alaska (for a review of existing records see Brehm 1978). A second species, *Manayunkia aestuarina* (Bourne, 1883), has been infrequently collected in North America. This species was initially reported on the Atlantic coast by Teal (1962) from Sapelo Island, Georgia, *Spartina alterniflora* marshes where it was the most abundant polychaete. Light (1969), apparently being unfamiliar with Teal's (1962) work, mistakenly claimed that his collection of *M. aestuarina* from mudflats near Vancouver, British Columbia, was the first North American record for the species. Light (1969) suggested that *M. aestuarina* could probably be considered a circumarctic and circumboreal estuarine inhabitant but that a lack of intensive sampling or improper technique had resulted in the true extent of its range remaining unknown. Since the time of Light's (1969) prediction, the occurrence of *M. aestuarina* has been redocumented for the southeastern coast of the United States (Bell and Coull 1978) and for the Pacific coast (Eckman 1979). Bell and Coull (1978) found *M. aestuarina* in the North Inlet estuary, Georgetown, South Carolina, and Bell (1982) subsequently reported on the population biology of *M. aestuarina* from that area (see also Bell 1979, 1980, 1983). Kneib and Stiven (1982) reported effects of predator size on a population of *M. aestuarina* (and other infauna) at Tar Landing marsh in the vicinity of Beaufort, North Carolina. Eckman (1979, 1983) studied the small-scale distribution and recruitment patterns of *M. aestuarina* and other benthos in Skagitt Bay, Washington. The present paper is the first Gulf coast record of a population of *M. aestuarina* and is the first time the species has been found associated with a *Juncus roemerianus* marsh. It is logical to expect that with the current increase of interest in meiofaunal assemblages on all coasts, the presence of *M. aestuarina* will be reported from more localities. Indeed, Heard (1982) suggests but does not confirm the presence of additional populations of *M. aestuarina* in other Gulf estuaries.

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TAXONOMIC REVIEW

Manayunkia aestuarina is a typical representative of the sabellid subfamily Fabricinae Rioja, 1917, which is characterized by minute forms that show a high degree of adaptability to a wide range of intertidal and salinity conditions (Hartman 1951).

This species was first described by Bourne (1883) who erected the new genus *Haplobranchus* for it. McIntosh (1923) alluding to earlier work by Leidy (1858) on *Manayunkia speciosa* cited numerous similarities between the two species and subsequently placed *Haplobranchus aestuarinus* Bourne, 1883, in the genus *Manayunkia*.

Light, in his 1969 report of *Manayunkia aestuarina* from British Columbia, lists two synonyms (*M. polaris* Zenkewitsch, 1935, and *Haplobranchus balticus* Karling, 1934) for this species, at least one of which seems very doubtful. In her work on the Pacific Fabricinae, Hartman (1951) states that *M. polaris* is near *M. aestuarina* but does not explicitly state that the two should be equated. In discussing *H. balticus* however, Hartman (1951) points out that due to differences in number of body segments and setal arrangements this species is not referrable to any named genus in the subfamily. It would seem that because of her extensive work with the group Hartman's view should be given acceptance and *H. balticus* should not be used as a synonym of *M. aestuarina*. That however is simply this author's opinion and any final resolution of the matter will be left to the more qualified professional taxonomists.

TABLE 1

Minimum densities of *Manayunkia aestuarina* and associated environmental data from St Louis Bay, Mississippi

Collection Date	Temperature (°C)			Salinity (ppt)		Sediment		*M. aestuarina*
	Air	Water	Soil	Water	Soil	pH	% Organics	No./m^2
06-29-79	40.0	30.0	24.5	2.0	5.0	4.5	13.22	3
07-30-79	26.5	31.5	25.5	1.0	1.0	4.5	8.10	47
08-23-79	30.0	29.0	25.0	6.0	3.0	5.5	14.96	6
09-23-79	24.0	23.0	23.0	3.0	6.0	6.0	9.51	9
10-29-79	21.0	19.0	14.5	6.0	11.0	5.5	9.02	0
11-30-79	13.0	10.0	8.5	2.0	10.0	6.5	10.47	9
01-04-80	11.0	11.0	9.0	6.0	9.0	6.5	9.48	70
01-26-80	16.0	15.0	13.0	0.0	4.0	6.5	10.63	32
02-23-80	16.0	16.0	15.5	6.0	5.0	6.5	9.07	32
03-22-80	21.5	17.0	13.5	0.0	5.0	6.5	9.90	58
04-26-80	31.0	28.0	23.0	0.0	4.0	6.5	10.85	105
05-23-80	33.0	29.0	24.5	1.0	3.0	6.5	15.30	64

Specimens of *Manayunkia aestuarina* collected from the Mississippi population and deposited with the United States National Museum of Natural History (USNM No. 097391) agree with the detailed descriptions given for the species (Bourne 1883, McIntosh 1923, Fauvel 1927, Light 1969) except for the possibility of a few additional rows of teeth located above the main fang of the thoracic uncini (Fitzhugh personal communication). To avoid repetition, the reader is referred to Bourne (1883) (and the other papers cited) for characteristics and drawings of *M. aestuarina.*

COLLECTION DATA

Specimens of *Manayunkia aestuarina* were collected incidentally during a study of the Mollusca associated with a *Juncus roemerianus* marsh (Bishop 1981). The study was conducted on a small marsh island (30°22′N, 89°15′W) on the western side of St. Louis Bay, Mississippi, during the period June 1979 to May 1980. The marsh was adjacent to tidally influenced Catfish Bayou and the nearby Jourdan River. Considerable information on the study area and past work there is reviewed by Hackney and de la Cruz (1982).

Sampling techniques of the study (Bishop 1981) were designed to quantify macrofaunal organisms and not those species in the meiofaunal size range such as *Manayunkia aestuarina.* Therefore, the numbers of organisms collected should be viewed as minimum estimates only and are presented in Table 1 along with environmental data from each sample date. Bell (1980, 1982) used first setiger width as a measure of size class (i.e. body length) of *M. aestuarina.* In the present study, small individuals (first setiger width $\leqslant$ 0.14 mm) and large *M. aestuarina* (first setiger width $\geqslant$ 0.15 mm) were present in approximately equal numbers in all seasons. Adults with eggs (Berrill 1977) were first noted in the early January sample. The percentage of adults with eggs was greatest in April and May (17% and 27%, respectively). Brooded young were observed from late January through May.

DISCUSSION

Although no quantitative comparisons can be drawn between this population and those of other studies, differences in reported habitat types do emerge. A summary of habitat similarities and differences taken from the literature is presented in Table 2. Entries for European populations represent summaries compiled from a number of sources while East coast (U.S.) information is mainly from the work of Bell (see Table 2 for publication dates).

In Europe, most reports of *Manayunkia aestuarina* give its habitat as unvegetated mudflats from the high intertidal to well within the subtidal zone. It may be present in brackish and low salinity areas, but according to Shütz (1965) it does not occur naturally in areas that lack a marine influence. It is unclear if "does not occur naturally" means total absence or presence only after introduction to such an area. The habitat for *M. aestuarina* as reported by Light (1969) and Eckman (1979, 1983) for Pacific coast populations is the same as for European ones. Both Bell (1982) and the present study indicate that *M. aestuarina* may also be found in vegetated zones of the high intertidal, and Teal (1962) collected many specimens from streamside and levee areas vegetated with *Spartina alterniflora.* The habitat distinctions of vegetated streamside-levee and high intertidal marsh versus unvegetated, intertidal mudflats may represent a lack of collecting in reciprocal areas on these coasts, differences in sampling techniques (e.g. sieve mesh size, lack of staining, etc.), oversight of such a small species or possibly misidentification, and not true habitat differences. Further collections will be required to determine the true range of the spatial distribution of *M. aestuarina.*

The Mississippi population was found to be associated with consistently lower salinities than those reported for other areas (Table 2) and was frequently exposed to bay salinities $\leqslant$ 3.0 ppt (Table 1). Although *Manayunkia aestuarina* is known to exist in areas where brackish to oligohaline conditions persist for short periods of time, such as during

TABLE 2

Habitat comparisons for *Manayunkia aestuarina* from European and North American coastal regions.

Geographic Region	Estimated Density (m^{-2})	Habitat Description	Salinity Regime	Sediment Composition
EUROPE				
Kendall (1979) Muus (1967) Shütz (1965) Light (1969) Zenkewitsch (1957)	From 1.0×10^4 to 1.0×10^6	Mid to high intertidal unvegetated mud flats to 20 m subtidal.	33 ppt (Kendall 1979). Brackish to low salinity but always with marine access. 5–50 ppt (Light 1969).	Mud or muddy with mean grain size of 8 μm. Thin layer of sand in Kendall (1979).
NORTH AMERICA				
Pacific Coast				
Light (1969)	"Many"	Exposed flats.	5.0 ppt when collected.	Mud.
Eckman (1979)	5.0×10^5	Flats 2 m above MLLW.		Thin mud veneer over sand.
East Coast				
Teal (1962) Bell and Coull (1978)	3.0×10^4	*S. alterniflora* levee marsh.	20–30 ppt.	Undetermined.
Bell (1979) Bell (1980) Bell (1982)	1.0×10^5	High intertidal *S. alterniflora* marshes.	"High-salinity estuary."	60–80% silt-clay. 5–10% sand.
Gulf Coast				
Present Report	Undetermined	*J. roemerianus* mid-high marsh.	0–6.0 ppt Bay. 1.0–11.0 ppt Soil.	36.5% sand, 17.5% silt, 46% clay.

spring runoff (Light 1969), the effects of long term exposure to lowered salinities are unknown. Soil salinities in the *Juncus roemerianus* marsh were higher than bay salinities on nine sample dates (Table 1) and could have provided a refuge closer to the more marine salinities reported for *M. aestuarina* (Table 2).

The *Juncus roemerianus* marsh studied is flooded only 12 percent of the time (Hackney and de la Cruz 1978) compared to approximately 25 percent of the time (3–4 hr per tidal cycle) for the South Carolina marsh (Bell 1982) and presumably for other coastal areas experiencing semidiurnal tidal regimes. Since *Manayunkia aestuarina* is a deposit and suspension feeder (Fauchald and Jumars 1979), potential feeding time would be reduced on the irregularly flooded *J. roemerianus* marsh. The effects of such a stress on the abundance, reproductive activity, and general physiological condition of the Mississippi population are unknown and intriguing.

Most reports of *Manayunkia aestuarina* populations are from areas with muddy sediments (but see Eckman 1979, 1983). The soil in the *Juncus roemerianus* marsh was more sandy compared to other studies providing data on sediment composition. Kendall (1979) suggests that *M. aestuarina* is capable of incorporating sand grains in tube construction.

Bell (1982) gives the only data on seasonal recruitment of juveniles for a U.S. population of *Manayunkia aestuarina.* She states that the South Carolina population, unlike European counterparts, exhibits discontinuous recruitment. Also, Bell (1982) states that recruitment of juveniles did not take place in the winter in South Carolina. From observations of brooded juveniles and adults with eggs, recruitment and reproduction in the Mississippi population was also discontinuous but did take place in the winter months. However, adults with eggs were more common in April and May. Early onset of reproduction in the Mississippi population may reflect latitudinal differences between it and the South Carolina population. Increases of soil, air, and water temperatures (Table 1) coincided with the first evidence of juveniles in the *Juncus roemerianus* marsh. Reproductive activity may be triggered in this population by a seasonal warming trend. This type of pattern was also observed (especially in the late spring and summer increases) in the South Carolina population (Bell 1982).

Manayunkia aestuarina is a numerically and perhaps functionally important component of the annelids from this irregularly flooded, low salinity, *Juncus roemerianus* marsh (Bishop 1983). Its ability to survive oligohaline conditions and infrequent inundation is potentially important because such marshes are generally faunally depauperate. The differences noted between the St. Louis Bay, Mississippi, population and those found in other coastal areas of the United States and Europe pose many unanswered questions about the physiological tolerances and exact habitat requirements for the North American populations of *M. aestuarina* and emphasize the fact that we know very little of the basic biology of many non-commercial marsh and estuarine invertebrates.

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