Atti Soc. Tosc. Sci. Nat., Mem., Serie B, **97** (1990)
pagg. 295-300, figg. 3, tab. 1

M. ABBIATI (*)

NEW RECORD OF *NEANTHES SUCCINEA* (FREY & LEUCKART, 1847) (POLYCHAETA, NEREIDIDAE) FOR THE NORWEGIAN FAUNA (**)

Abstract — The first record of *Neanthes succinea* in Norwegian waters is reported. Specimens were found in the inner part of the Oslo Fjord, along with two other nereidid species (*Hediste diversicolor* and *Neanthes virens*). Morphological features of the collected specimens correspond to those of specimens from the North and Mediterranean seas. The variability in the distribution of paragnaths on the pharynx in the Oslo Fjord population is analysed. Some ecological aspects concerning the distribution of this species are discussed.

Riassunto — *Prima segnalazione di* Neanthes succinea *(Frey & Leuckart, 1847) (Polychaea, Nereididae) per la fauna norvegese.* Viene riportata la prima segnalazione di *Neanthes succinea* per le acque norvegesi. Tale specie è stata rinvenuta nella parte interna del Fiordo di Oslo, unitamente ad altri nereididi (*Hediste diversicolor, Neanthes virens*). Le caratteristiche morfologiche degli individui campionati corrispondono a quelle delle popolazioni del Mare Mediterraneo e del Mare del Nord. Viene analizzata la variabilità nella distribuzione dei paragnati nella popolazione di *N. succinea* del Fiordo di Oslo. Vengono inoltre discussi alcuni aspetti ecologici concernenti la distribuzione delle specie osservate.

Key words — Polychaeta, Nereididae, New record, Norwegian coast.

INTRODUCTION

The genus *Neanthes* KINBERG, 1866 (Type species *Neanthes vaalii* KINBERG, 1866) belongs to the family Nereididae. The genus includes on the whole 50 species characterised by eversible pharynx with conical paragnaths on both oral and maxillar rings; four pairs of tentacu-

(*) Dipartimento di Scienze dell'Ambiente e del Territorio, via A. Volta 6, I-56126 Pisa, Italy.

(**) This study was supported by a grant from the Norwegian Research Council for Science and the Humanities.

lar cirri; biramous parapodia; homogomph spiniger notosetae; homo- and heterogomph spiniger and heterogomph falciger neurosetae (according to FAUCHALD, 1977). According to the literature, four species of this genus have been recorded from the North Sea until present: *N. succinea* (FREY & LEUCKART, 1847), *N. fucata* (SAVIGNY, 1820), *N. irrorata* (MALMGREN, 1867) and *N. virens* (SARS, 1835) (HARTMANN-SCHRÖDER, 1971). Only *N. virens*, originally described by Sars off the coast near Bergen, has been recorded from Norwegian waters.

Several specimens of *N. succinea* were found in a sample collected on hard bottom at the intertidal leve on the peninsula of Bygdøy (Oslo Fjord). This record of *N. succinea* is the first for the Norwegian fauna.

DESCRIPTION OF THE EXAMINED MATERIAL

Two specimens of *N. succinea* were found in material collected 18 November 1989 on the west coast of the Bygdøy peninsula in the mud between sheets of rock, exposed by a low tide. Another nine specimens were collected 26 November 1989. All worms were 65-70 mm long and approximately 80 setigers. The collected specimens corresponded to the descriptions by FAUVEL (1923) and HARTMANN-SCHRÖDER (1971) for those collected in the Mediterranean and the North Sea, respectively, even though these authors do characterise them differently. Three features are considered distinctive for this species. Firstly, the posterior notopodia beginning with setigers 20-30, have a lamellar and flattened upper lobe with the dorsal cirrus at the extremity (Fig. 1). Secondly, there are paragnaths in each pharyngeal area (Fig. 2), which FAUVEL (1923) considers distinctive for *Neanthes*. The distribution of setae is the subgenus characteristic according to HARTMANN-SCHRÖDER (1971): notosetae are homogomph spinigers, supraacicular neurosetae are homogomph spinigers and heterogomph falcigers, and subacicular ones are heterogomph spinigers and falcigers.

DISCUSSION AND CONCLUSION

Taxonomical notes

The definition of the genera within the Nereididae is still an open question (HARTMAN, 1959). HUTCHINGS & TURVEY (1982) stress: «... the nereid genera require careful re-evaluation...». The distinctive charac-

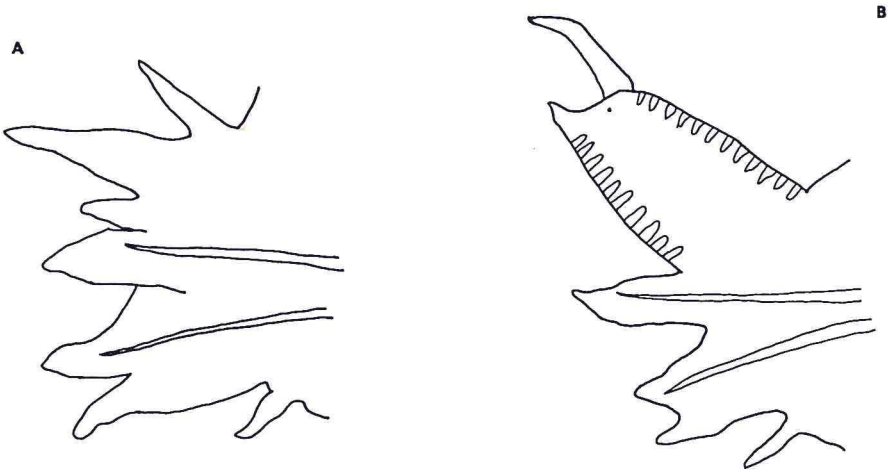

Fig. 1 - Camera-lucida drawing of the anterior (a) and the posterior (b) parapodia of *Neanthes succinea*.

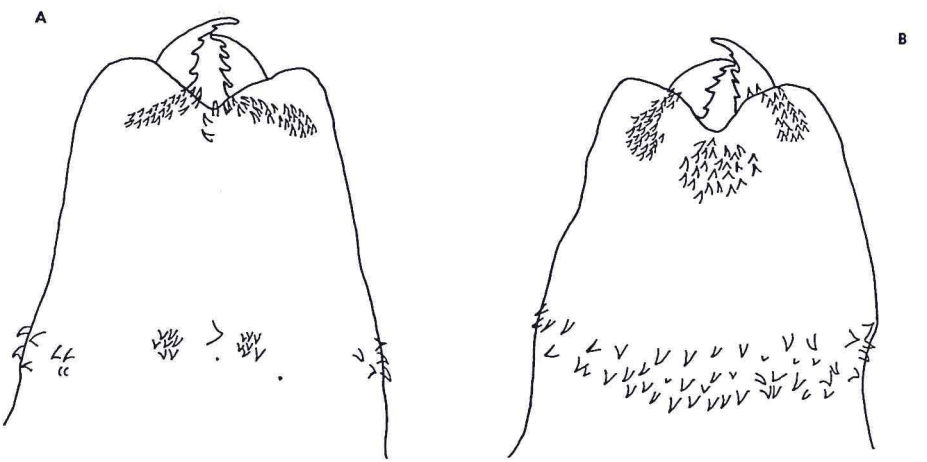

Fig. 2 - Camera-lucida drawing of the dorsal (a) and the ventral (b) surface of the everted pharynx of *Neanthes succinea*.

teristics of *Neanthes* (FAUCHALD, 1977), however, justify giving generic rank to the group. The main character that permits the distinction of *N. succinea* from other nereidids living in similar habitats, is the enlarged dorsal lobe in the posterior parapodia. The distribution of the paragnaths in the pharyngeal areas is also typical, but this character shows variability (Tab. 1) as in other brackish water nereidids (MUUS, 1967a). The variation in the distribution of the paragnaths on the pharynx in nereidids has been analysed in depth, particularly for

TAB. 1 - *The mean, standard deviation (SD) and range of numbers of paragnaths on each area of the pharynx in the population of Neanthes succinea* from Oslo Fjord. (L=left, R=right).

	Pharingeal areas									
	I	IIL	IIR	III	IVL	IVR	V	VIL	VIR	VII-VIII
Mean	3.44	24.56	23.78	35.00	27.44	28.67	1.67	9.11	9.22	50.33
SD	1.33	4.33	4.79	8.83	3.78	4.74	0.50	1.69	1.92	5.61
Range	2-6	17-32	17-32	20-46	21-34	25-40	1-2	7-13	7-13	44-63

Hediste diversicolor (MUUS 1967a; BARNES & HEAD, 1977; KHLEBOVICH *et al.*, 1983; ABBIATI, 1989a, b). MUUS (1967b) stresses that the paragnaths patterns must be taken as proof of the existence of local «races» in this species, confirmed by the electrophoretical studies on the genetic structure of some Mediterranean populations of *H. diversicolor* (ABBIATI & MALTAGLIATI, 1989) which show a clear genetic differentiation between studied populations.

The preliminary results from 9 specimens (Tab. 1) do not permit an in-depth analysis of the variability in paragnath number of *N. succinea* from the Oslo Fjord. The findings indicate, however, that level of intrapopulation variability in this species is low. When the paragnath distribution of Norwegian specimens is compared with that from Mediterranean populations of *N. succinea* (ABBIATI, 1989a), it is evident that both the mean and the range of paragnath numbers in each pharyngeal area are similar for all the populations. Thus, this species shows a relative morphological uniformity even between populations greatly geographically separated.

Ecological notes

Neanthes succinea is a widespread species; it has been found on the North American Atlantic coast and on the Californian coasts, in Europe as far north as the Swedish west coast (SMITH, 1963) and along the Mediterranean coasts (FAUVEL, 1923). This species is typical for brackish habitats were it occurs together with other nereidids like *Hediste diversicolor* and *Neanthes virens* (MUUS, 1967a; RASMUSSEN, 1973). The distribution of this species is determined by its tolerance to environmental variability and by its competitive ability *versus* other nereidids (KRISTENSEN, 1988). In the Bygdøy sample three nereidid were found, but the frequencies of *N. succinea* were lower. This situation is proba-

bly due to the strong competition of *N. virens* seawards, and by the high level of environmental variability in the midlittoral zone, which favours *H. diversicolor*. KRISTENSEN (1988) pointed out that along a gradient of environmental stress a population of *N. virens* may briefly overlap with a population of *H. diversicolor*, and may show greater overlap with *N. succinea*. No overlap is normally observed between the latter two species (SMITH, 1963; KRISTENSEN, 1988) (Fig. 3). Consequently *N. succinea* may occupy a narrow zone between the more ecologically tolerant species *H. diversicolor* and the species more adapted to the sea, *N. virens* (SMITH, 1963; MUUS, 1967a; RASMUSSEN, 1973). *N. succinea* probably survives thanks to its high interspecific aggressiveness (KRISTENSEN, 1988).

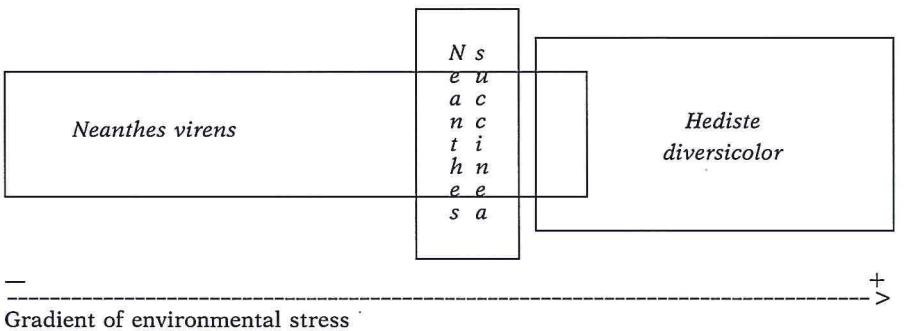

Fig. 3 - The distribution of nereidids species along a gradient of environmental stress from bibliographical data.

The reported occurrence of *N. succinea* along the Norwegian coast is a contribution towards improved knowledge of their distribution. More important, however, is the ecological significance of their presence due to the considerable role that this species play in the dynamics of brackish coastal environments. Moreover, *N. succinea*, in addition to being an ecologically important element and one of the must suitable polychaetes for embryological and physiological studies (SMITH, 1963), offers the opportunity to test FAUCHALD's (1977) assumption that some widespread, brackish water nereidids are species complexes defined on non-morphological features.

ACKNOWLEDGEMENTS

I wish to thank my scientific adviser Professor J.S. Gray (Section of Marine Zoology and Marine Chemistry, Biological Institute, University of Oslo) who offered me the opportunity to work in his laboratory. I would also like to than Doctor K. Eriksen of the same Institution for profitable discussion and critical reading of the manuscript.

REFERENCES

ABBIATI M. (1989a) - *Variabilità morfologica e genetica in nereidi (Annelida, Polychaeta) di habitat salmastri.* Doctoral thesis, University of Pisa, 194 pp.

ABBIATI M. (1989b) - An approach to study a variability in paragnath number in *Neres diversicolor.* P. 20 in (D.J. Reish, ed.): *3rd International Polychaete Conference,* Long Beach 1989. Abstracts.

ABBIATI M., MALTAGLIATI F. (1989) - The relationship between morphological variation and genetic distance in *Nereis diversicolor* and *N. succinea* (Annelida, Polychaeta). P. 1 in: *Abstracts, IInd Congress of the European Society for Evolutionary Biology.* Roma.

BARNES R.S.K., HEAD S.M. (1977) - Variation in paragnath number in some British populations of the estuarine polychaete *Nereis diversicolor. Estuarine and Coastal Marine Science,* **5**, 771-781.

FAUCHALD K. (1977) - The polychaete worms. Definitions and Keys to the Orders, Families and Genera. *Natural History Museum of Los Angeles County, Science Series,* **28**, 1-188.

FAUVEL P. (1923) - Polychètes errantes. *Fauna de France,* **5**, 1-488.

HARTMAN O. (1959) - Catalogue of the polychaetous annelids of the world. Part I. *Allan Hancock Foundation Publications,* Occasional Paper, **23**, 1-353.

HARTMANN-SCHRÖDER G. (1971) - Annelida, Borstenwürmer, Polychaeta. *Die Tierwelt Deutschlands,* **58**, 1-594.

HUTCHINGS P.A., TURVEY S.P. (1982) - The Nereididae of South Australia. *Transactions of the Royal Society of South Australia,* **106** (3), 93-144.

KHLEBOVICH V.V., KOMENDANTOV A. YU, YAKOVISHINA L.A. (1983) - On variation in paragnath number in *Nereis diversicolor, N. japonica* and *N. limnicola* (Polychaeta, Nereidae). *Zoologischeskiy Zhurnal,* **62**, 1110-1113 (In Russian).

KRISTENSEN E. (1988) - Factors influencing the distribution of nereid polychaetes in Danish coastal waters. *Ophelia,* **29**, 127-140.

MUUS B.J. (1967a) - The fauna of Danish estuaries and lagoons. Distribution and ecology of dominating species in the shallow reaches of the mesohaline zone. *Meddelelser Danmarks Fiskeri-og Havundersogelser, 5,* 316 p.

MUUS B.J. (1967b) - Some problems facing the ecologist concerning races and subspecies of brackish-water animals. Pp. 558-563 in: G.H. Luff (ed.): *Estuaries.* American Association for the Advancement of Science, publication *83.* Washington.

RASMUSSEN E. (1973) - Systematics and ecology of the Isefjord marine fauna (Denmark). *Ophelia,* **11**, 1-507.

SMITH R.I. (1963) - On the occurrence of *Nereis (Neanthes) succinea* at the Kristineberg Zoological Station, Sweden, and its recent northward spread. *Arkiv för Zoologi,* **15**, 437-441.

(ms. pres. il 16 dicembre; ult. bozze il 30 aprile 1991)