Capitellidae

Capitella capitata (Fabricius, 1780)

Literature:

Petraitis, P.S. 1988. Occurrence and reproductive success of feminized males in the polychaete, Capitella capitata (species Type I). Marine Biology (97) 403-412.

Grassle, J.P., C.E. Gelfman, S.W. Mills. 1987. Karyotypes of Capitella sibling species, and of several species in the related genera Capitellides and Capitomastus (Polychaeta). Biol Soc. Wash. Bull. (7) 77-88.

Rice, S.A., J.L. Simon. 1980. Intraspecific variation in the pollution indicator polychaete Polydora ligni (Spionidae). Ophelia 19 (1): 79-115.

Swartz, R.C., F.A. Cole, D.W. Schultz, W.A. Deben. 1986. Ecological changes in the Southern California Bight near a large sewage outfall: benthic conditions in 1980 and 1983. Mar. Ecol. Prog. Ser. 31: 1-13.

Tsutsumi, H., T. Kikuchi. 1984. Study of the life history of Capitella capitata (Polychaeta: Capitellidae) in Amakusa, South Japan including a comparison with other geographical regions. Marine Biology 80: 315-321.

Diagnostic Characters:

1. External adult morphology unreliable for discrimination of these species.

2. Diploid chromosome number of 18, 20, and 26 in different species.

3. Karyotype patterns markedly different in each species(see figures).

4. Species with diploid number 2N = 26: one of these species has direct larval development, two of these species with lecithotrophic development, and one of these species with planktotrophic development.

5. Species with diploid number 2N = 20: one of these species with planktotrophic larval development and three species with lecithotrophic development.

6. Species with diploid number 2N = 18: one species with planktotrophic larval development.

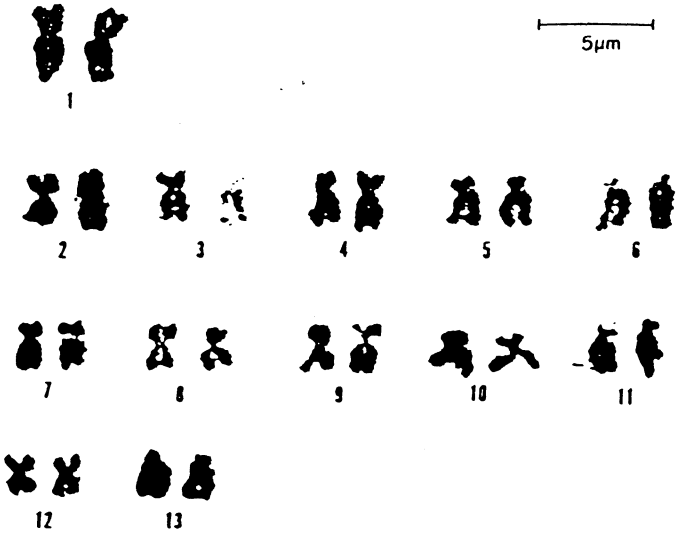
7. All species with nearly complete lack of common allozymes (represents large genetic differences).

8. Egg size differences between species.

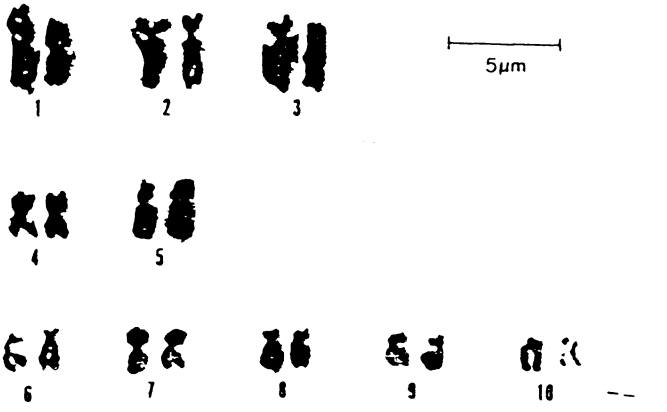
9. Males may transpose to hermaphrodites when females are rare.

Comments:

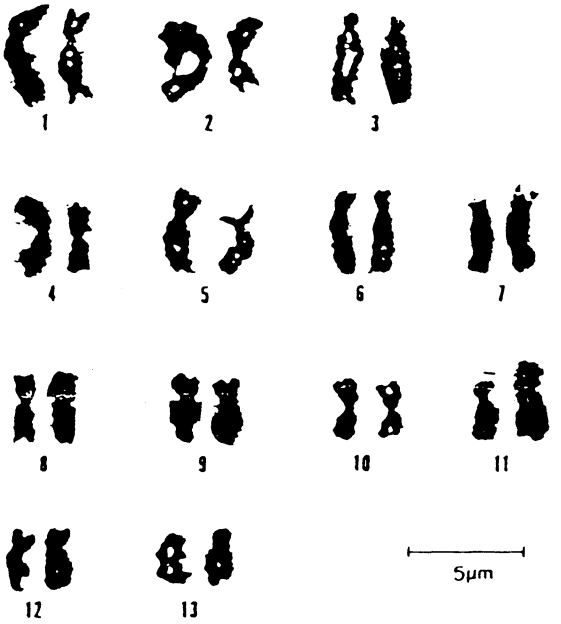
Capitella capitata, as previously known, represents a complex of sibling species that morphological features cannot delineate. The name Capitella capitata should be used with caution and where appropriate accompanied by a note on its taxonomic status.



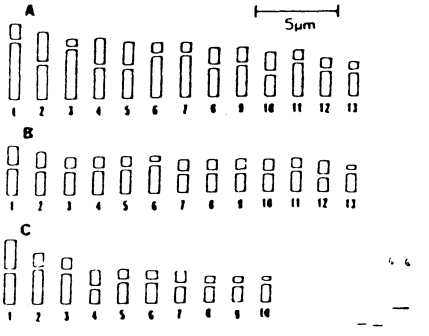
Karyotype for *Capitella* sp. II (Marseille), 2N = 26. The chromosomes of the set are arranged [illegible] in four rows in descending order of length from 1 to 13. Pair 12 is metacentric, pairs 1–5 and 7–11 submetacentric, and pairs 6 and 13 acrocentric.



Karyotype for *Capitella* sp. I (Falmouth), 2N = 20. The chromosomes of the set are arranged in in three rows in descending order of length from 1 to 10. Pairs 1 and 4 are metacentric, pairs 2, 3, and submetacentric, and pair 10 is acrocentric.



Karyotype for *Capitella* sp. II (New Bedford Harbor), 2N = 26. The chromosomes of the set a anged in pairs in four rows in descending order of length from 1 to 13. Pairs 4 and 10 are metacentric, pa 5, 8, 9, 11 and 12 are submetacentric, and pairs 1, 3, 6, 7 and 13 are acrocentric.



Idiograms of the karyotypes in Figs. 2–6. A, *Capitella* sp. II (New Bedford Harbor). B, *Capitella* sp. II (Marseille). C, *Capitella* sp. I (Falmouth).

(from Grassle, et al 1987)

A Precautionary Note on the Taxonomy of *Capitella capitata*

by
Thomas Parker, L.A. County Sanitation Districts

The major thrust of SCAMIT's efforts have been to improve taxonomic standardization of the local marine invertebrate species. Throughout this same period of time (1980-1990) there have been several published examinations of marine invertebrates using techniques of karyotyping and electrophoresis. These have demonstrated that morphological structures do not always differentiate one species from another. The polychaete, *Capitella capitata*, is common in benthic surveys and is considered ecologically important and useful as an indicator of disturbed or polluted conditions. It is also used in toxicity studies. Few, if any, data have been published in the last 10 years which supports the use of *Capitella capitata* as a single species. However, several papers have been published which have demonstrated that *Capitella capitata* is a complex of species differentiated by non-morphological characters.

Tsutsumi and Kikuchi (1984) concluded that morphological features should not be used to define adult worms as the species, *Capitella capitata*. Studies by Grassle, Gelfman, and Mills (1987) have clearly reinforced the separation of *Capitella* species by non-morphological characters. The diploid chromosome numbers of 8 different sibling species, identified morphologically as *Capitella capitata*, were found to be 18, 20, and 26. They also possessed karyotype differences. Among these species is a nearly complete lack of common allozymes, and marked differences in egg size, larval dispersal mode, and reproductive mode. These authors concluded that almost all aspects of these capitellid species examined were "sharply differentiated... except external adult morphology".

Traditionally, taxonomists have relied upon external morphology to define *Capitella capitata* species. The above research indicates that external morphology is inadequate to define *Capitella* species. Continued reports of this species in benthic data may be understood by many working taxonomists to represent a sibling species complex. However, such data may be used in environmental studies and regulatory decisions by non-taxonomists who may not be aware of these relatively recent advances in the knowledge of capitellid speciation. Rice and Simon (1980) provided this opinion: "It is no longer possible to accept a simplistic approach to the identification of species, especially in cases where national policies such as pollution control and abatement may be influenced by experimental results based upon organisms of uncertain identity".

Therefore, *Capitella capitata*, as previously known, represents a complex of sibling species that morphological features can not delineate. The use of the name *Capitella capitata* should be discouraged until further published data resolves the status of this complex.