

Ecological observations on *Tisbe* (Copepoda, Harpacticoïda) species from the Lagoon of Venice

by

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Summary

Distribution and abundance of *Tisbe* species were studied in the Lagoon of Venice and at the Lido station (open sea). The physical data of the stations were similar, but differences were found in algal substratum and faunal benthic community. Differences in species composition were observed between the various parts of the lagoon, and the lagoon and the open sea, indicating that the temperature and salinity are not so important for species diversity as the biotic factors.

Résumé

Les auteurs ont étudié la distribution des espèces de *Tisbe* dans la Lagune de Venise et dans une station marine (Lido). Les caractéristiques chimiques et physiques de l'eau des différentes stations sont semblables, alors que les sédiments, les algues et la communauté benthique diffèrent.

La distribution des espèces entre les stations lagunaires et entre la lagune et la mer est différente, suggérant ainsi que les facteurs biotiques du milieu sont plus importants que les facteurs chimiques dans la détermination de la diversité des espèces. Spécialement, les échantillons pris au fond de la lagune diffèrent considérablement de ceux pris en grattant les poteaux, qui constituent un biotope particulier pour les peuplements benthiques de la lagune. Ces derniers semblent être l'habitat préféré par *T. lagunaris* et *T. cucumariae*.

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Distribution and abundance of *Tisbe* species were studied throughout a period of 3 years at 3 stations in the Lagoon of Venice. At 2 other stations, as also at the Lido station (open sea), samples were taken occasionally.

Twelve species may be considered as common inhabitants of the lagoon as compared to the 9 species found at the Lido. The data suggest that there is a certain interaction between *T. holothuriae* and the other species. Whenever *T. holothuriae* was abundant, the other species were rare; but *T. clodiensis* and *T. dobzhanskii* attained high relative abundance in May and June and *Tisbe* spec. in winter, whenever *T. holothuriae* decreased considerably in number. Interspecific competition studies have shown that under laboratory conditions *T. holothuriae* eliminates all the species tested; the elimination of a competing species might be due to the production of a toxic metabolite. Most likely, this effect is less strong in the natural environment, but the present observations suggest that there is some kind of interaction. Observations in the laboratory revealed that *T. dobzhanskii* eliminates *T. clodiensis* in about two generations. Also, in nature, a slight interaction between the two species seems to exist. While *T. clodiensis* reached its populations peaks in May and June, *T. dobzhanskii* attained maxima in July and August. There seems to be a more or less strong interaction between the different *Tisbe* species, with the presence or absence of other

community members also playing a determinant role. Comparison of the physical data shows that the stations were similar in temperature and salinity, but differed primarily in algal substratum and faunal benthic community. Since remarkable differences in species distribution exist between the various parts of the lagoon temperature and salinity would not, therefore, seem to be as important for species diversity as biotic factors. A fact in favor of this hypothesis is also provided by differences between samples taken at the bottom and on pilings. Since the distance between both habitats is not more than 2 to 5 m., it is unlikely that the varying abundance of individuals and species is due to differences in the physical characteristics of the water. But the pilings constitute a very special biotope and usually harbour a rich sessile fauna. This seems to be the preferred habitat of *T. lagunaris*, the predominant form in all samples from pilings, while at the adjacent bottom stations none to very few individuals were found. *T. cucumariae* seems to be favoured by similar environmental conditions. Recent sampling in Beaufort, N.C. (USA) seemed to confirm these observations. We may conclude that the remarkable fluctuations in physical factors characteristic of this lagoon environment may act as selective agents only under the extreme conditions of the inner lagoon; in the central and northern basin, biotic factors seem to play a more effective role for differentiation of the *Tisbe* populations in space and time.