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**E. SCHWEIZERBARTSCHE VERLAGSBUCHHANDLUNG
(NÄGELE u. OBERMILLER)**

III. Salt and Brackish Inland Waters

Symposium on "Salt and Brackish Inland Waters"

Introductory Comments

I. A. E. BAYLY

To some limnologists, myself included, the second half of the title of this symposium (i. e. "brackish inland waters") is a contradiction in terms. I refer to those who would reserve the term "brackish" for diluted sea water, and would describe non-marine waters with an appreciable salt content as inland or athalassic saline waters. In my opinion the use of "brackish" with reference to non-marine waters should be avoided in scientific literature and parlance, and I made a plea for this in a recent paper of mine (BAYLY 1967). The Venice Symposium on the Classification of Brackish Waters (International Association of Limnology 1959) attempted to overcome the difficulty by proposing the term "misohaline" to replace "brackish" but the former term seems to be rarely used. In case some of you think that this is merely a matter of semantics and of no great importance, I should like to assert, on the contrary, that it is a matter of avoiding confusion and inefficiency.

It is not surprising in the light of the above that this Symposium seems to represent the not entirely happy marriage of two rather distinct topics; Professor BEADLE and Dr. NEEV will be talking about inland saline waters, and Professor SCHACHTER will discuss brackish water. This is not to say that there is no common ground between the two. Professor PORA's contribution is relevant to both brackish and athalassic saline waters.

I should like to explore briefly the common aspects of brackish and athalassic saline waters and then their differences. Both waters are typically poikilosaline or subject to substantial and often rapid changes in salinity. This places a premium on osmo-regulation or the tolerance of large changes by tissues. Sometimes strong regulation of the concentration of body fluids is involved, as seen, for example, in fish belonging to the family Atherinidae (e. g. *Cyprinodon*, *Atherinops*, *Craterocephalus* and *Taeniomembras*). Sometimes, however, there is almost complete conformity between body fluids and external medium over a wide salinity range and we must assume that either cellular osmoregulation or cellular tolerance is well developed. Such appears to be the case with calanoid copepods of the genus *Calamoecia* which occur in Australian salt lakes. In the case of *Mytilus* living in brackish waters, no osmo-regulation seems to occur and its euryhalinity is due entirely to the exceptional tolerance of its tissues. We may take it, therefore, that the ability to osmo-regulate either at the organ or cellular level or the possession of exceptional cellular tolerance is a physiological necessity for success in both brackish and athalassic saline waters.

Now for the differences. Firstly, on the physiological side, brackish waters are very homogeneous from the viewpoint of ionic proportions, but this is not true of athalassic saline waters. The latter are especially heterogeneous with respect to anions; chloride-, (bi-)carbonate- and sulphate-saline waters all occur. It seems reasonable to suppose that this ionic heterogeneity would make ionic regulation in athalassic saline water more difficult; the chances of toxic ionic combinations occurring are greater than in brackish water and ion antagonism is correspondingly more important. Professor PORA will be dealing with this topic. There is, for example, some evidence that freshwater forms will penetrate more easily into carbonate-saline than chloride-saline waters.

A second major difference concerns faunal origin or affinity; that of brackish waters is with marine waters, whilst that of athalassic saline waters somewhat surprisingly is essentially with fresh waters. Professor BEADLE takes up this point in the first paper. Thus in the sense of "ecological phylogeny" fresh water is more closely related to both athalassic saline water and brackish water than these two are to each other. So that in the phylogenetic sense, a symposium on "fresh and athalassic saline waters" or "brackish and fresh waters" would have been more appropriate than our present one. There is a small group of organisms including some harpacticoid copepods and the cyclopoid *Halicyclops* that is common to both habitats, but these are more the exception than the rule. Finally, a very few species occurring in athalassic saline waters seem to have originated on land (e. g. *Haloniscus* in Australia, and *Desertoniscus* in Turkmeniya, southern U. S. S. R.), but these apparently do not occur in brackish water.

References

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