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IN PRAISE OF SODA-WATER

"Let us have wine and women, mirth and laughter
Sermons and soda-water the day after"

Byron 'Don Juan'

Byron had the right idea. Although most museums are conspicuously lacking in the first four items that he mentioned, I would like to suggest that there is good reason for any zoologist working with aquatic invertebrates to keep a soda-siphon within easy reach. The fixation and subsequent preservation of many invertebrates in a near-original shape and condition depends greatly on what you do to the animal before you fix it. The advantages of dealing with animals fixed without distortion or damage are obvious, and the importance of narcotisation prior to fixation should not be underestimated. Many narcotics and methods have been tried for various animals with varying degrees of success. The traditional techniques using menthol and magnesium chloride are still excellent for certain groups, but take quite a long time to become effective and in some situations that time may not be available. Other, more recent narcotics, such as MS 222 have been used with success with fish and small crustacea but their side effects have not yet been fully researched.

In certain field and laboratory situations, a narcotic is often required to be speedy, simple and, if possible, non-toxic to the user. Gannon & Gannon (1975) found that, when working with zooplankton, the addition of a volume of soda-water equal to one-tenth of the sample volume proved a rapid and effective narcotic. Animals could be fixed without distortion, loss of gut contents or dropping of egg-sacs by females. Narcotisation was complete within two minutes.

During a recent visit to the Marine Laboratory at Plymouth, I attempted to narcotise various marine invertebrates by using the soda-water method. The siphon was filled with sea-water and the contents of the CO_2 bulb injected as usual. Various volumes of this carbonated sea-water (CSW) were added to the water containing the animals, and times noted when complete narcotisation occurred. The results are seen in the accompanying table.

Marine invertebrates are relatively unpredictable in their responses to narcotics, but a few general points can be noted from the table of results:

1. Carbonated sea-water is relatively rapid in effect. Only those animals which have some means of shutting themselves off from their environment took an hour or more to become narcotised (e.g. Balanus, Pomatoceros, Cardium). This is only to be expected, since Balanus

close their tergal and scutal plates, Pomatoceros retract into their tubes behind a stout operculum, and Cardium can close the two shell valves.

2. Broadly speaking, a mixture of 50% CSW to 50% sea-water appears optimal for rapid narcotisation without distortion or other side-effects. The pH value at this concentration is 6.5, which should have little side-effect on intertidal animals.

3. Small fish and crustacea seem to respond particularly well to this method.

Here, then, is a simple and effective narcotisation technique which may be applied to fresh water and marine animals, is non-toxic to the user, cheap and portable. Those working on fresh water animals should perhaps carry a small hip-flask to allow for periods of personal narcotisation. The soda-water method is not restricted to invertebrates. This method obviously requires more trials on more animal types, and I would be interested to hear of any results which are obtained. A synopsis of other narcotisation methods (see below: Lee & Smaldon, 1977) is available from me, free of charge.

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REFERENCES

Gannon, J. E., & Gannon, S. A., 1975. Observations on the narcotization of crustacean zooplankton. Crustaceana, 28 (2):220-224

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TABLE

Animal	Optimal % CSW	Time for complete narcotisation
Palaemon longirostris (Prawn)	45	10 min.
Crangon crangon (Shrimp)	45	15 min.
Gobius sp. (Goby)	45	15 min.
Gibbula sp. (Gastropod mullusc)	60	30 min.
Patella vulgata (Limpet)	45	30 min.
Nereis diversicolor (Ragworm)	60	30 min.
Cardium edule (Cockle)	75	1 hour
Pomatoceros triqueter (Tubeworm)	75	1¼ hours
Balanus sp. (Barnacle)	45	2¾ hours