EFFECT OF REDUCED SALINITY ON THE INITIAL MORTALITY OF SPRAT, *SPRATELLOIDES DELICATULUS* (BENNETT), IN CAPTIVITY

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ABSTRACT

The effect of exposure to different concentrations of sea water on the initial mortality of *Spratelloides delicatulus*, the common tuna-live-bait fish of Lakshadweep, was experimented. The shock mortality of the fish due to stress of capture was found to be greatly! reduced by introducing them at once in 50% sea water. However, the aggregate mortality from the time of capture to the end of the second day was least among the fish exposed to 75% sea water, being about three-fourth of the mortality in 100% sea water.

Spratelloides delicatulus is the main live bait in the pole-and-line fishery at Lakshadweep. During 1983-84, 1984-85 and 1985-86 it constituted 32.8%, 36.1% and 22.6%, respectively, of the total live-bait caught at Minicoy Island. In Agatti and nearby islands, the entire live-bait is constituted by this species. *S. delicatulus* is small in size, readily loses seales and is susceptible to shock and osmoregulatory stress. Large-scale mortality occurs in captivity mainly because of the injuries caused during capture and handling. At present, both in the traditional live-bait wells in boats and in the live-bait baskets in lagoons, high rate of mortality of this fish is observed. Average bait-fish mortalities following capture range from 30% to 80%, depending on the mode of capture, size of fish and density of stock in the well. Since the high rate of mortality in bait tanks shortens the duration of fishing an attempt was made at reducing the mortaliy rate of the fish in captivity by transferring them initially to water of reduced salinities.

Specimens of *S. delicatulus*, falling in size range 20-40 mm, were collected during day time (1030 to 1130 hrs.) from the Minicoy lagoon by lift nets made of nylon mosquito-netting. They were trnsferred carefully with minimum handling into 20 litre plastic buckets (blue colour), in approximately equal number (about 100 numbers each), containing 100% (34.6 parts per thousand), 75% (25.3 parts per thousand) and 50% (18.1 parts per thousand) sea water. Subsequently, they were transported to the laboratory, which took about 1 h, and then to aquarium tanks containing sea water of corresponding salinities,

After two hours, the two tanks with reduced saline water were also refilled with 100% sea water. The mortality of the fish from the time of capture up to stocking in the aquarium tanks and during the first and second days of stocking was recorded. The experiment was repeated.

The results are summarised in Table 1. In 100% sea water, the percentage mortality due to shock (shock mortality) was the highest within one hour of capture, which averaged to 70.3%. The mortality in 75% sea water and 50% sea water averaged respectively to 24.7% and 11.0%. During the first day in the laboratory, after changing all the fish to 100% sea water, the percentage of mortality was highest for the fish in 50% sea water, which averaged to 63.1%. The same for the fish in 100% and 75% sea water was 24.6 % and 38.6% respectively. On the second day, the percentage of mortality was highest for the fish exposed to 50% sea water, which averaged to 13.8%. The same for the fish in 100% and 50% sea water were 0.8 % and 10.7%, respectively. It can be seen that the mortality from the time of capture to the end of the second day in captivity was comparatively low for the fish exposed to 75% sea water immediately after capture, which averaged to 74.1%. The percentage of initial mortality for the period for the fish exposed to 50% sea water immediately after capture averaged to 87.8%. The same was very high for the fish without exposure to reduced saline water, which averaged to 96.4%.

Maginnis (1970) showed that the *Stolephorus purpureus* placed in 100% sea water (34.0 to 36.0 parts per thousand) immediately after capture underwent osmoregulatory stress, loss of body water and a simultaneous increase in blood

TABLE 1. *Percentage of initial mortality of* Spratelloides delicatulus *in captivity in different saline concentrations.*

	100% sea water			75% sea water			75% sea water		
	1	2	Average	1	2	Average	1	2	Average
Mortality within 1 h of capture	60.7	80.0	70.3	24.0	25.5	24.7	8.5	13.5	11.0
First Day	30.0	19.2	24.6	37.0	40.3	38.6	61.7	64.4	63.1
Second Day	2.2	0.8	1.5	12.0	9.5	10.7	17.0	10.6	13.8
Total	92.9	100.0	96.4	73.0	15.3	74.1	87.2	88.5	87.8

serum chloride and osmotic pressure. With loss of mucus and scales, fish lost body water by increased exosmosis and also by shock diuresis; most of the body water was lost within one to three hours after capture. Thus, when mucus 'and scales are lost osmoregulatory stress is increased, which results in the high percentage of mortality. Struhsaker et al (1975) have shown in the salinity experiments with *S, purpweus* that there was a significant difference in the percentage of mortality in the experiments with 50% sea water (irrespective of exposure time) compared to the percentage morality in 100% sea water. The mean percentage of initial mortality m 100% sea water (23.4%) was approximately five times that in 50% sea water **(4.7%).** Baldwin et al **(1972)** also recommended the use of a 50-50 mixture of fresh water and salt water for reducing the mortality of *S. purpweus* immediately after capture.

In the case of *S. delicatulus,* a very high rate of mortality due to shock at capture was seen within one hour of capture when they were transferred to 100% sea water. The lowest percentage of this initial mortality was in 50% sea water. However, of all tile fish that were initially exposed to reduced salinities and then changed over to 100% sea water, the fish that had been exposed to 50% sea water have had the highest mortality during the following two days. Hence, when the aggregate mortality is taken, it is seen that the maximum survival can be had when the fish are exposed for two to three hours immediately after capture to about 75% sea water and then transferred to 100% sea water. However, if the live-bait caught are for immediate use, exposure to 50% sea water appears to be more effective.

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