OSMOTIC AND IONIC REGULATION OF THE
HAWAIIAN ANCHOVY, STOLEPHORUS PURPUREUS

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extended time period due to the build-up of toxic metabolites (periods
greater than approximately 8 hr.). The alternative is to reduce bait-
well water concentration to approximately 50% S.W. whenever possible.
At baiting sites, the wells should be filled with diluted sea water.
As previously mentioned, a brackish water system can remain closed for
6 to 8 hr. without reaching dangerous pollution levels. In the evening,
when the tuna vessels return to port, baitwells should again be diluted
to 50% S.W. This would necessitate an adequate water supply to the
docks, but the water pipe installation would prove a profitable invest-
ment for the skipjack tuna industry.

SUMMARY

(1) Some osmoregulatory processes of the Hawaiian anchovy
(Stolephorus purpureus, Fowler) were examined under controlled labora-
tory conditions. Nehu were exposed to five sea water dilutions (0%,
20%, 30%, 40%, and 60% S.W.) and the variables; mortality, body water,
and serum salts were then analyzed to provide indices of tolerance
and regulatory ability.

(2) Nehu suffer a significant loss of body water as a result of in-
jury incurred during capture and transport (Appendix I). Body dehydra-
tion continues for a few hours after introduction to laboratory holding
tanks (100% S.W.), followed by a recovery. Re-establishment of osmotic
balance usually requires six to ten days.

(3) Mortality data indicate that the anchovy is slightly euryhaline.
Although intolerant and slightly tolerant of 0% and 20% S.W. respec-
tively, nehu subjected to 30%, 40% and 60% S.W. exhibited survival
rates equal to or higher than the control fish (100% S.W.).

(4) The body water and serum salt data (chloride and osmotic pressure) revealed a positive correlation between nehu tolerance and osmoregulatory ability in the various sea water dilutions. The anchovy suffered a rapid and non-recovering increase of body water and loss of serum salts in freshwater. 20% and 30% S.W. also induced significant changes in body water and internal fluid concentration, with a partial recovery occurring in 20% S.W. and a nearly complete recovery in 30% S.W.

(5) The processes possibly responsible for the "osmotic imbalance" and "recovery" phases were discussed.

(6) Results from the present investigation indicate that nehu survival aboard tuna vessels could be increased with: (1) the development of bait handling techniques less injurious to the animal, and (2) the use of brackish water (50% S.W.) in the baitwells whenever possible.