

SWIM ANGLES OF *EUPHAUSIA PACIFICA* (ABSTRACT)

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Acoustic methods seem to be effective in estimating the biomass of euphausiids when they are aggregating. It is reported, however, that *Euphausia superba* in the aquarium are not swimming horizontally but obliquely. So the back-scattering strength is expected to be lower than when swimming horizontally. As a basis to develop an accurate acoustic method to estimate standing stock of *E. superba* in the Antarctic Ocean, swim angles of an allied euphausiid, *E. pacifica* were determined in the laboratory aquarium.

Adult *E. pacifica* were collected when swarming in Sendai Bay on March 16, 1987 and transferred to the aquarium of the Onagawa Marine Laboratory of Tohoku University. Forty lively animals were put into the aquarium (60×29×36 cm) filled with ca. 40 l natural sea water collected from the sea near the laboratory. After one-night acclimation their swimming behavior was observed and photographed under the natural light condition. They were then transferred to the GF/C filtered sea water to examine the swim angles when not feeding. Water temperature of the aquarium ranged from 5.0° to 7.2°C, which was close to that of the surface water temperature of the swarming area, 5.6°C. Photographs were taken at each of their swimming mode; hovering, slowly ascending, obliquely ascending and moving forward. And the respective angles were determined. Moreover, with the time-lapse photography technique, their body orientation was recorded every 5 min for ca. 20 h, and by frame-to-frame analyses their swim angles were determined on those individuals both eyes of which were overlapped.

Average swim angles were 40.7° when hovering, 48.3° when slowly ascending, 39.8° when obliquely ascending and 9.4° when moving forward. The mean swim angle obtained with the time-lapse photography technique was 35.3°, which was similar to the angle when hovering, 40.7°. The mean swim angle recorded during daytime (>10 lx), 28.8°, was less than that at nighttime (<0.1 lx), 37.2°, although the difference was not statistically significant. Swim angles, therefore, should be taken into account to estimate the biomass of this species by the acoustic technique. Presence or absence of prey does not seem to affect the swim angle of *E. pacifica*.

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