

Visual physiology of Pacific saury in capture process of light fishing

(集魚灯漁業の漁獲過程におけるサンマの視覚生理)

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[Objective] For the better understanding of the capture process for light fishing, the visual physiology of Pacific saury *Cololabis saira* was investigated both under the fishing at sea, and under the laboratory conditions of different lighting protocol in order to identify the retinomotor response patterns by histological observation of the retina.

[Methods] Three types of lighting condition were compared in the following protocols; 1) Under the fishing condition with incandescent lamp($0.48\mu\text{w}/\text{cm}^2/\text{nm}$ at 1m depth), and under the laboratory condition with 2) Halogen lamp (MEGALight-100) for 6.90, 3.39, and $0.28\mu\text{w}/\text{cm}^2/\text{nm}$, and 3) Monochromatic lighting Device(Model M-4700) for blue-470nm, green-530nm, and red-620nm, with two intensity levels of 1.2 and $0.1\mu\text{w}/\text{cm}^2/\text{nm}$. Sampling interval covered the time elapsed as 5, 15, 30, 45, 60, 75, 90, and 150 minutes.

[Results] The retinomotor response patterns were identified for each lighting protocol, with the time elapsed after turning on the light. The cone movement was observed just in 5 minutes sampling time to show the high photosensitivity of Pacific saury. The higher light intensity resulted in the higher adaptation process, while the single cones were identified more sensitive than the double cones. The unique adaptation patterns were observed both for the single and double cones, to show the different layers distribution according to the lighting protocols, which can be discussed with the results from the monochromatic lighting in relation with the R/G/B sensitivity characteristics of the cones.