

**Swimming performance of the jack mackerel  
(*Trachurus japonicus*) with ECG monitoring  
(心電図測定によるマアジの遊泳能力解析)**

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**[Objective]** The heart beat rate of jack mackerel was examined during the swimming exercise in the flume tank, for understanding the swimming performance during the capture process.

**[Methods]** The forced swimming in the flume tank was monitored for speed level of 1.3 – 6.7 BL/s of jack mackerel (17.5 - 20 cm FL), firstly for the swimming endurance test, and then for the ECG monitoring to analyze the change of heart beat rate according to the swimming speed by step-up protocol.

**[Results]** Jack mackerel sustained the swimming speeds of 1.3–2.9 BL/s for extended period as 89–105 minutes in the flume tank. However, the swimming endurance was limited in less than 40 minutes on average while fish was swimming at 4.4 BL/s or faster. For the speed of 6.0 BL/s, no longer than 7 min. The heart beat rate was not so much increased in the speed range of 1.3 - 2.9 BL/s with the control value of 84Hz in the static water. Higher heart beat rate was monitored for the increased speeds from 2.9 to 4.4 BL/s, and then it was stabilized at 188 Hz on average, at swimming speeds of 4.4 - 6.0 BL/s. The result indicated that the anaerobic threshold in muscle activity for jack mackerel is nearly 4.4 BL/s. Peak heart beat rate was 4.3 times as much as the control. The recovery time from the peak to the control level for the fish experienced forced swimming exercise was 232 minutes on average.