

(学位第3号様式)

学 位 論 文 要 旨	
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題 目	Fundamental study on fluid dynamic characteristics of pots and behavior of <i>Opsariichthys platypus</i> under steady flow (定常流下に置かれたかごの流体力学的特性とオイカワ <i>Opsariichthys platypus</i> のかごに対する行動特性に関する基礎的研究)
<p>Pots are relatively simple fishing gear which have been used traditionally around the world with variations in dimensions, material and mesh sizes. The purpose of this study was to investigate fluid dynamic characteristics of pots and behavior of <i>Opsariichthys platypus</i> toward the pot under steady flow.</p> <p>Box and cylinder pots were used, for which the dimensions were length 0.40 m × width 0.40 m × height 0.22 m and diameter 0.40 m × height 0.22 m. The distance between each rod covering the pot are varied between 4 - 35 mm. The ratio for diameter of twine to leg length of mesh of polyamide net covering the pot ranged from 0.02 to 0.13. Drag and lift force acting on the pots were measured by the flume tank experiments at flow speed of 0.3, 0.4 and 0.5 m/s and attack angles of 0° to 90°. The drag force was decreased when the porosity became larger. The drag force acting on the box pot was larger than that of cylinder pot when the porosity was about the same. Drag coefficient of the box and cylinder pot was the largest at attack angles of 45° and 90° respectively.</p> <p>Box and cylinder pots were set in the flume tank to investigate the flow distribution around pots. Flow speed in the flume tank were set at 0.15 and 0.30 m/s. Flow speed at the rear area of the pot was measured. The flow distributions around the pots were almost symmetrical around the center line. The flow speed was lowest towards the side of the pot, but high in the center. Slowdown area (flow speed ratio of less than 0.6) at the rear of the box pot was larger than that of the cylinder pot. Slowdown area was not formed when the porosity of box and cylinder pot were more than 80% and 70% respectively.</p> <p>The effect of the vision and the lateral line on behavior of <i>Opsariichthys platypus</i> toward the pot was investigated. Fish behaviors were recorded using video camera in following conditions: under bright and dark; with blocked lateral-line or with unblocked. When the porosity of the pots was smaller, more fish stayed at the rear of the pot where flow speed is reduced to less than 4 cm/s. Fish stayed at the area of less than 100 cm from the pot under bright conditions, however, the fish with blocked lateral-line did not stay at the area of less than 100 cm from the pot in either bright or dark conditions.</p> <p>As a result of this study, it is important to aggregate the fish to the pot that the porosity is small to reduce the drag acting on the pot and slowdown area of flow speed is formed for fish to stay at the rear of the pot.</p>	