

**RETINOMOTOR RESPONSE AND VISUAL ACUITY OF PACIFIC SAURY *COLOLABIS SAIRA* IN THE CAPTURE PROCESS OF LIGHT FISHING**

(Respons Retina dan Ketajaman Penglihatan Saury Pasifik Selama Proses Penangkapan Ikan Dengan Cahaya)

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**ABSTRACT**

The visual functions of Pacific saury were examined to understand the capture process of light fishing according to the light adaptation process and visual acuity. A total of 49 individuals (75-335mm in fork length, FL) were collected from the gill net and fine meshed lift-net at the Okhotsk Sea, Hokkaido-Japan. Histological determination of light adaptation process was done based on the retinomotor response according to the position of cone ellipsoids to the different lighting condition. Operation of gill net using incandescent light (18bulbs of 500watt) was applied for the sampling time of 7, 34, and 117minutes after turning on the light in the fishing ground. The retinal adaptation to the light in 7minutes elapsed showed the dark-adapted condition. In 34 minutes elapsed, the transitional stage from the dark to light adaptation. Then in 117minutes, the adaptation of fish to the light was almost light adapted, but not yet completely. For the purpose of detailed observation, Fine meshes lift-net was used to collect the fish and to keep them alive in the tank. In laboratory experiment, the monochromatic light of blue-470nm=0.075 $\mu$ w/cm<sup>2</sup>/nm, green-530nm= 0.095 $\mu$ w/cm<sup>2</sup>/nm, red-620nm=0.099 $\mu$ w/cm<sup>2</sup>/nm and with the lighting time for 5, 10, 20, 30,& 60minutes was applied with the fixed distance to the fish eyeball. The retinomotor response in 5 minutes lighting time showed the different adaptation patterns according to the light colour, while in 60minutes lighting, the cone ellipsoid movement reached the maximum light-adapted for all three colors. Developmental changes of visual acuity were also investigated based on the distribution and density of cone cell. The highest cone density was found in the temporal of the retina. The lens diameters tended to increase (1.40 to 4.71mm) proportionally with the growth, while cone densities tend to decrease (765 to 378cells/0.01mm<sup>2</sup>). As the results, the visual acuity increased as fish grow, as visual acuity of 0.057 for 75mm FL and 0.136 for 335mm.

**Keywords:** Pacific saury *Cololabis saira*, retinomotor response, visual acuity, light adaptation process, cone density, retina.

**ABSTRAK**

Respon retinomotor dan ketajaman penglihatan ikan Saury *Cololabis saira* diteliti untuk memahami proses penangkapan ikan dengan menggunakan cahaya berdasarkan pergerakan ellipsoid cone dan kepadatan cone dalam retina. 49 ekor ikan (75-335mm) dijadikan sampel dari hasil tangkapan gill net dan lift-net di perairan Okhotsk, Hokkaido-Japan. Tingkat adaptasi ikan terhadap cahaya ditentukan melalui proses histologi retina berdasarkan respon retinomotor dari posisi ellipsoid cone pada kondisi pencahayaan berbeda. Pengoperasian gill net menggunakan lampu pijar (18buah@500watt) dengan pencahayaan 7, 34, dan 117menit di area penangkapan.

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