

Record of an anomalous two-tone color pattern in black porgy,  
*Acanthopagrus schlegeli* (Perciformes: Sparidae), observed  
in the Seto Inland Sea, Japan

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Record of an anomalous two-tone color pattern in black porgy,  
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**Abstract :** On May 6, 2004, a black porgy, *Acanthopagrus schlegeli*, 22 cm total length, which has a two-tone bilateral color pattern, was observed in Hiroshima Bay. The anterior half part of the body showed the usual light grayish-silver color, while the posterior half was dark gray. Consequently it lost its protective coloration. The division of two colors on the both sides completely corresponded with each other. This is the first report about the anomalous coloration not only in *A. schlegeli* but in sparid fishes.

**Key words;** anomaly, coloration, black porgy, *Acanthopagrus schlegeli*, Sparidae

**和文要旨 :** 2004年5月6日に瀬戸内海の広島湾で、体側の前後でツートンカラー模様を持つクロダイ *Acanthopagrus schlegeli* 1個体を発見した。本個体の全長は22cmで、体の前半部は通常の明灰銀色だが、後半部は異常な黒灰色を呈し、保護色は失われていた。本体色パターンは左右両側で一致していた。本報は、クロダイのみならずタイ科での本体色異常に関する初めての記録である。

During a visual census of fishes in Hiroshima Bay located in the Seto Inland Sea, western Japan, a unique black porgy, *Acanthopagrus schlegeli* that has a two-tone color pattern on its body, was observed. This is the first report about the anomalous coloration not only in *A. schlegeli* but in sparid fishes.

The black porgy was observed at 12:47 on May 6, 2004, at the Shioya Fishing Port in the northwestern part of the bay. The total length (TL) was estimated visually. The

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estimated TL has about a  $\pm 5\%$  error in the actual TL (Shigeta, unpubl. data). The water temperature and the salinity at the site of the observation were measured by a T-S and DO meter (YSI Model 85, YSI Inc., USA). The degree of illumination and the amount of ultraviolet radiation (UV) ranging from 260 to 400 nm on the water surface were measured by an illuminometer with a UV sensor (TL-20U, Uchida, Japan). A digital video camera was used to record the fish. The water depth was 1.1 m. At the surface and bottom the water temperature was 18.6°C and 18.0°C, and the salinity was 18.0 psu and 31.0 psu, respectively. The degree of illumination and the amount of UV were 83,000 lux and 2.7 mW/cm<sup>2</sup> at 14:00 on May 6, 2004. The population density of all *A. schlegeli*, ranging from 5 to 35 cm TL at the site of the observation, was 64 individuals/311 m<sup>2</sup> on April 22, 2004.

The photograph of the porgy is shown in Fig. 1. Only two species of black porgies, *A. schlegeli* and *A. latus* inhabit Hiroshima Bay. Although the former is abundant, the latter is rare occurring in the northwestern part of the bay. In the figure, its grayish coloration (not yellowish) on the pelvic fin, the anal fin and the lower part of the caudal fin makes it clear that the porgy is identified as *A. schlegeli*. This 22 cm TL individual estimated as two or three years old, has a two-tone color pattern on the body. The anterior part of the body from the edge of the pectoral fin shows the usual light grayish-silver color, which matches its background. On the other hand, the posterior part of the body is dark gray. This part has a high contrast with the background. Its dorsal fin also shows the same pattern as the body side shows. All the area of the anal fin shows melanism, because the fin locates on the posterior part from the division of the pattern. The division of the two colors on the left side of the body completely corresponded with that on the right side. Except for the coloration, no behavioral differences between this two-tone colored porgy and normal colored ones were observed.

Prior to the porgy was found, I performed three quantitative investigations as follows.

1. Monthly catch research of *A. schlegeli* in the bay was carried out from April 2001 to January 2004. I investigated 518 specimens ranging from 4.0 to 48.5 cm TL.
2. The research of the landed fish at the Kuba Fish Market along the bay was carried out from March 2001 to June 2003. I measured 826 fish ranging from 17.9 to 53.5 cm TL.
3. A visual census of *A. schlegeli* at the port was carried out at monthly or more intervals from July 2000 to April 2004. I observed 7,179 individuals (total number) ranging from 5 to 50 cm TL.

In spite of the investigations given above, I was unable to observe such an individual except for the observation in May, 2004. Consequently, the evidence proves that *A.*

*schlegeli* considerably has a rare occurrence of the anomalous coloration. Although the causative factor for this anomaly is not clear, it is known that a distinct two-tone color pattern on the body of fish like this can be produced artificially by an inhibition of the sympathetic nerve system that controls pigmentation. The body color of the part that lost the nerve control changes to a darker one because the chromatosomes disperse in each chromatophore. The phenomenon is called the Parker effect (Fujii, 1998). As for this case, some factor may have caused the porgy to lose its automatic nervous control regarding chromatophore regulation in the anomalous portion.



Fig. 1. The black porgy, *A. schlegeli*, 22 cm TL which has a two-tone bilateral color pattern. The anterior half part of the body remains usual protective coloration. This part matches its background so accurately that it appears to blend in with it. On the other hand, because the posterior half of the body loses its protective coloration, the contrast with the background increases highly. This photograph was registered as KPM-NR 44913 on UODAS.

In general, the deprivation of a function controlling body color would increase the predation risk (Hidaka, 1998). The predation risk of this individual may have been higher than the risk of normal colored individuals because the normal colored pattern of *A. schlegeli* may serve as camouflage from predators. However, it is not known how long this individual has had such a coloration, and as the predation risk of individuals of 5-6 cm or over in body length has been suggested to be reduced in the field (Ochiai and

Tanaka, 1986), the individual may survive in the future.

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