The data presented in this article are related to the research article entitled “Expression of genes for melanotropic peptides and their receptors for morphological color change in goldfish Carassius auratus” (Mizusawa et al., In press) [1]. This article describes data on the density of xanthophores in the scales of goldfish acclimated to white or black background color. To determine the effects of acclimation history during long-term background color adaptation, fish were transferred from a white tank to a white or black tank and vice versa halfway through the acclimation process. To observe xanthophores, the iridophore layer was scraped from the scale and the pteridine/carotenoid pigments were aggregated. The number of xanthophores was calculated after image processing.

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**Specifications Table**

| Subject area | Biology                          |
|--------------|---------------------------------|
| More specific subject area | Fish Physiology                 |
| Type of data | Images, table                   |
| How data was acquired | Micrographs of scales were acquired using a light microscope (H550L, Nikon, Tokyo, Japan) equipped with a digital still camera (DP25, Olympus, Tokyo, Japan); Image processing and xanthophore counting were performed by using Microsoft ICE 1.4.4 (Microsoft, Redmond, WA), ImageJ 1.44p [2], and GIMP 2.6.11 (http://gimp.org) |
| Data format | Raw data statistically analyzed |
| Experimental factors | Scales were obtained from goldfish acclimated to white or black background color |
| Experimental features | The relationship between the density of xanthophores and the acclimation history during long-term background color adaptation was determined. |
| Data source location | Kitasato University, Sagamihara, Kanagawa, Japan, 35.54°N, 139.39°E |
| Data accessibility | The data are available with this article |

**Value of the data**

- These data are valuable for researchers studying the physiology of chromatophores in teleosts.
- The method using sequential replacement of experimental animals between different colored tanks during the acclimation period could be useful to determine the effects of acclimation history during long-term background color adaptation.
- The method of image processing will be useful for measuring the distribution of xanthophores in other vertebrates and invertebrates.

1. **Data**

   Fig. 1 shows typical distributions of xanthophores in the dorsal and ventral scales of goldfish reared under scheduled background conditions (21 days under a white or black background prior to 21 days under the opposite background color. Two groups were also transferred to the same background color as controls, see below). Tables 1 and 2 show the number of xanthophores in a whole scale of the dorsal and ventral body, respectively.

2. **Experimental design, materials and methods**

   2.1. **Acclimation to white or black background color**

   Goldfish were reared initially in one of four tanks—two white and two black ($n = 10$, body weight = 3.4–5.2 g). On day 21, all fish were anesthetized and the dorsal and ventral scales dissected from the specified areas. Subsequently, fish in white tanks were transferred to either the different white (WW fish) or black tank (WB fish). Similarly, fish in black tanks were transferred to either the different black (BB fish) or white tanks (BW fish). Twenty-one days after the transfer, all fish were anesthetized and the dorsal and ventral scales were collected as before.
Fig. 1. Effects of background color change on the distribution of xanthophores in the scale. The images were taken from the dorsal (A–D) and ventral (E–H) scale of WW fish (A and E), WB fish (B and F), BW fish (C and G), and BB fish (D and H). Scale bar = 0.1 mm.
2.2. Calculation of xanthophore number

The scales were observed under a light microscope and the images were processed with multiple software programs to calculate xanthophores in the outer part of the scale [1], as briefly explained below. The iridophore layer on the internal side was scraped with tweezers, and the scales were immersed in 100 mM KCl in Hank’s balanced salt solution (HBSS, Thermo Fisher Scientific, Waltham, MA) at 25 °C for 24 h to aggregate the pigments in the xanthophores. The scales were photographed by a light microscope (H550L, Nikon, Tokyo, Japan) equipped with a digital still camera (DP25, Olympus, Tokyo, Japan). Micrographs of all scale parts were assembled to build an image of whole scales. A square image centered on the midpoint of the long diameter of the outer part of the scale (Fig. 2A–C) was processed, and the number of xanthophores in the square was counted. Then, the number of xanthophores in the whole scale was determined based on the density of xanthophores and the square measure based on the outer part of the scale. Microsoft ICE 1.4.4 (Microsoft, Redmond, WA), ImageJ 1.44p [2], and GIMP 2.6.11 (http://gimp.org) were used for image processing.

2.3. Statistics

Xanthophore number is expressed as the mean ± standard error values. Differences in values among three or more groups were analyzed by one-way analysis of variance (ANOVA) and the Games–Howell test, a post-hoc multiple comparison test, using StatView 5.0 for Windows (SAS Institute, Cary, NC).

Table 1
Number of xanthophores in single dorsal scale of goldfish reared under scheduled conditions of background color (cells/scale).

| Condition | WW  | WB  | BW  | BB  |
|-----------|-----|-----|-----|-----|
|           | 3118| 2268| 8209| 2174|
|           | 2278| 4324| 6113| 3476|
|           | 2975| 4007| 2562| 3694|
|           | 1538| 3636| 6362| 2547|
|           | 5221| 4668| 4301| 3890|
|           | 5277| 2942| 5459| 3574|
|           | 3186| 3840| 2616| 2982|
|           | 382 | 3680| 7564| 1596|
| no data   | 3449| 5989| 2446|     |
| no data   | 5587| 8191| 4780|     |

Average ± S.E. = 2997 ± 634a

3900 ± 315a

5737 ± 315b

3900 ± 315a

Different letters ("a" and "b") indicate statistical difference between conditions of background color (P < 0.05).

Table 2
Number of xanthophores in single ventral scale of goldfish reared under scheduled conditions of background color (cells/scale).

| Condition | WW  | WB  | BW  | BB  |
|-----------|-----|-----|-----|-----|
|           | 1209| 2528| 4163| 3600|
|           | 475 | 2806| 2916| 2505|
|           | 1072| 2303| 1813| 2547|
|           | 722 | 2661| 3195| 2246|
|           | 3145| 2448| 1886| 3271|
|           | 570 | 1744| 3959| 2368|
|           | 714 | 1717| 1789| 2668|
|           | 1536| 2234| 1836| 1768|
| no data   | 1878| 3580| 2673|     |
| no data   | 2946| 1837| 3580|     |

Average ± S.E. = 1180 ± 329a

2327 ± 145b

2697 ± 325b

2627 ± 191b

Different letters ("a" and "b") indicate statistical difference between conditions of background color (P < 0.05).
Normality of all data was confirmed by the Kolmogorov–Smirnov test prior to *t*-test or ANOVA. Significance was determined at the 5% level.

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Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.dib.2017.08.039.

References

[1] K. Mizusawa, Y. Yamamura, S. Kasagi, J.M. Cerdá-Reverter, A. Takahashi. Expression of genes for melanotropic peptides and their receptors for morphological color change in goldfish Carassius auratus, Gen. Comp. Endocrinol. (2017) (In press).
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