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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 18654.4-2026

Replacing GB/T 18654.4-2008

**Inspection of germplasm for fishes - Part 4: Determination of
age and growth**

鱼类种质检验 第4部分：年龄与生长的测定

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. This document is Part 4 of GB/T 18654 "Fish Germplasm Inspection". GB/T 18654 has already published the following parts.

1. Inspection Rules;
2. Sampling Methods;
3. Characteristic Determination;
4. Measurement of Age and Growth;
5. Dietary Analysis;
6. Determination of reproductive performance;
7. Ecological Characteristics Analysis;

8.Determination of Oxygen Consumption Rate and Critical Asphyxia Point;

9.Meat Percentage Determination;

10.Determination of muscle nutrient composition;

12.Karyotype Analysis;

13.Isozyme Electrophoresis Analysis;

1 Scope

GB/T 18654.4-2026 is the Chinese national standard covering reading a fish's age from the rings in its scales, otoliths or fin rays, and fitting the growth curve that describes how fast the population grows. Germplasm inspection is what establishes that a broodstock population really is the species and strain it is sold as, and that it has not degenerated through generations of hatchery breeding. It replaces GB/T 18654.4-2008 and has been in force since 1 September 2026, one of the six parts of the GB/T 18654 series revised together. It was issued on 27 February 2026 and has been in force since 1 September 2026, replacing GB/T 18654.4-2008. The document is under the responsibility of the Ministry of Agriculture and Rural Affairs. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes the reagents and materials, instruments and equipment, samples, experimental procedures and data processing for determining the age and growth of fish. This document applies to the determination of fish age and growth.

4 Measurement of Age and Growth Published on 2026-02-

27 Implemented on 2026-09-

01 State Administration for Market Regulation The State Administration for Standardization issued a statement.

4.1 Reagents

4.1.1 Xylene (C₈H₁₀). Analytical grade.

4.1.2 Glycerol (C₃H₈O₃). analytical grade.

4.1.3 Anhydrous ethanol (C₂H₆O). analytical grade.

4.1.4 Canada balsam.

4.2 Solution Preparation 4.2.1 2% potassium hydroxide (KOH) solution. Weigh 2.0g of potassium hydroxide (KOH) and dilute to 100mL with distilled water.

4.3 Materials

4.3.1 Scale bag.

4.3.2 Petri dish.

4.3.3 Glass slides.

5 Instruments and Equipment

5.1 Dissecting microscope.

5.3 Vernier caliper. accuracy 0.1mm.

5.4 Ruler. accuracy 1.0mm.

5.5 Electronic balance. Sensitivity 0.1g.

5.6 Electronic scale. Sensitivity 1.0g, 10.0g.

5.7 Visual inspection of micrometer scale.

6 Samples

6.1 Scales Take 5-10 intact scales (non-regenerated scales) above the lateral line and below the dorsal fin, and store and number them in a scale bag (4.3.1). Remove... The preserved scales were placed in a petri dish (4.3.2) and rinsed. The scales were then fixed onto a glass slide (4.3.3) and labeled.

6.2 Otoliths Remove the otoliths from the head. For transparent otoliths, place them in xylene (4.1.1); for opaque otoliths, use a file (4.3.4) to cut along the longitudinal or transverse axis of the otolith. The otoliths were filed thin to the center and ground into a thin sheet of about

0.3 mm thickness on an oilstone (4.3.5). This sheet was then mounted on a glass slide (4.3.3) and immersed in glycerol. Oil (4.1.2).

6.3 Vertebrae Take 3-5 thoracic vertebrae with clear concentric rings, soak them in 2% potassium hydroxide (KOH) solution (4.2.1) for 2-3 days, and then place them in anhydrous ethanol. Degreased and dried in alcohol (4.1.3).

6.4 Fins Take a 2mm thin slice from the base of the unbranched fin rays or spines of the dorsal or pectoral fin, and grind it into a transparent sheet of about 0.3mm using a file (4.3.4). The slide was treated with xylene (4.1.1) and then fixed onto a glass slide (4.3.3) with Canada balsam (4.1.4).

7.1.1 Scale method Take the sample prepared in

6.1 and observe the annual rings of the scales using a dissecting microscope (5.1) or a

microscope (5.2). The main characteristics of the annual rings are cut-shaped and sparse-dense. There are two types. Typical annual rings are clear, complete, continuous, and symmetrical on both sides (see Figures 1 and 2). Secondary rings, juvenile rings, and reproductive rings cannot be classified as... Tree rings

7.1.2 Otolithiasis Take the sample prepared in

6.2 and observe the annual rings of the otoliths using a dissecting microscope (5.1) or a microscope (5.2) (see Figure 3).

7.1.3 Spinal Manipulation Take the sample prepared in

6.3 and observe the annual rings of the vertebrae using a dissecting microscope (5.1) or a microscope (5.2) (see Figure 4).

7.1.4 Fin Method Take the sample prepared in

6.4 and observe the annual rings of the fin rays using a dissecting microscope (5.1) or a microscope (5.2) (see Figure 5).

7.2 Growth

7.2.1 Direct Measurement Wipe the surface moisture of the test fish dry, measure the body length with vernier calipers (5.3) or a ruler (5.4), and weigh them with an electronic balance (5.5) or an electronic scale (5.6). Weigh yourself.

7.2.2 Refund Using a dissecting microscope (5.1) or microscope (5.2), and with a visual micrometer (5.7), measure along the growth axis of the scales (otoliths, vertebrae, fin rays) to determine the various... The diameters of the growth rings (r_t , r_{t-1}) and the outer diameter to the edge (R) are shown in Figure 6.

8 Data Processing

8.1 Age Age is determined based on the tree rings and the number of observed tree rings. A tree with only a few initial rings and no tree rings is recorded as 0 (1 year); [the remaining text appears to be incomplete and possibly contains errors. A more accurate translation would require the full context.] One annual ring with surrounding segments is designated as 1 (2 years); two annual rings with surrounding segments are designated as 2 (3 years); and so on, up to 3. (4 years), etc. If the growth ring is exactly on the edge of the scale and there is no ring outside, it is recorded as 1 (1 year); then 2 (2 years), 3 (3 years), etc.

8.2 Growth

8.2.1 Direct Measurement Record the fish's weight and length, calculate the average value, and express the result to two decimal places.