

## Estimation of Broad Sense Heritability

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The high water temperature resistance traits of two clonal lines of silver crucian carp (SCC01-1 and SCC01-2) were investigated. Individual juvenile fish were exposed to high water temperature stress at  $40 \pm 0.5^\circ\text{C}$ , and time points of their deaths were recorded. For both clonal lines, the times of death varied with the growth and rearing water temperature.

The average time until death was used to determine the heritability of high water temperature resistance in four clonal lines of the silver crucian carp: SCC00-4, SCC00-5, SCC00-6, and SCC00-9. The broad sense heritability was calculated as 0.883. This result indicated that the trait of high temperature resistance has high genetic variability in the silver crucian carp.

### 3) ギンブナの低水温耐性形質におけるクローン間差

水産育種; 2003: 33: 49-54.

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## Differences of Low Water Temperature Tolerance Among Clonal Lines in Silver Crucian Carp (*Carassius langsdorfii*)

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The low water temperature tolerance traits of two clonal lines of silver crucian carp (SCC01-1 and SCC01-2) were investigated. Individual juvenile fish were exposed to low water temperature stress at  $4 \pm 1^\circ\text{C}$ , and the time (minutes after start) of death was recorded. For both clonal lines, the times of death varied with the growth and

rearing water temperature.

The time of death was measured, and estimated the environmental and genetic variances of low water temperature tolerance at the second exposure experiment using four clonal lines: SCC00-4, SCC00-6, SCC00-7 and SCC00-9. The genetic and environmental variances of the time were calculated as 65714.16 and 4786.30, respectively. The broad sense heritability of the time was calculated as 0.932. This result indicated that the trait of low water temperature tolerance has high genetic variability in the silver crucian carp.

#### 4) ギンブナの海水耐性形質におけるクローン間差

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Differences of Seawater Tolerance Among Clonal Lines in Silver Crucian Carp  
(*Carassius langsdorfii*)

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The seawater tolerance traits of two clonal lines of silver crucian carp (SCC01-1 and SCC01-2) were investigated. Individual juvenile fish were exposed to seawater stress at 20 ppt, and time (minutes after the start) of death was recorded. For both clonal lines, the times of death varied with the growth and rearing salinity.

The time of death was measured, and estimated the environmental and genetic variances of seawater tolerance at the second exposure experiment using four clonal lines: SCC00-7, SCC00-8, SCC00-10 and SCC00-11. The genetic and environmental variances of the time were calculated as 93531.53 and 6092.60, respectively. The broad sense heritability of the time was calculated as 0.939. This result indicated that the trait of seawater tolerance has high genetic variability in the silver crucian carp.