

A study on the mutant *ne* of the golden venus fish, *Apphyocyris rasborella*

Hideo Tomita

Laboratory of Freshwater Fish Stocks, BioScience Center, Nagoya University, Chikusa-ku, Nagoya 464-01, Japan

Abstract The nacreous-like transparent-scaled mutant (*ne*) of the golden venus fish, *Apphyocyris rasborella* is described. This mutant is characterized by its transparent scales and black eye balls, due to a small amount of guanine in iridocytes. The *ne* mutant is recessive and autosomal.

Introduction

The golden venus fish *Apphyocyris* (*Hemigrammocypris*) *rasborella* is distributed around the western Pacific coast (Nakamura, 1969; Miyadi *et al.*, 1976), and is also widely found in the suburbs of Nagoya. The places where this species inhabits and its population are diminishing due to the degradation of the environment. This fish grows up to 60 mm in body length in one year and then reproduces. The fish are of bright silver in body color and adult males in the breeding season show a bright golden color, a nuptial color. They spawn 100 to 200 eggs once a week from the middle of June to the middle of July in Nagoya.

From 1991 to 1992, five females and one male of this fish, apparently distinguishable from normal fish in having nacreous-like transparent scales due to a diminished content of guanine in their iridocytes, were collected from brooks in Shippo near Nagoya. Besides having transparent scales, this variant has black eye balls owing to an attenuated amount of guanine in iridocytes of the reflect layer, in contrast with bright golden eye balls of normal fish. These characteristics are similar to those of the mutant *ne* of the crucian carp, *Carassius auratus langsdorffii* (Yamamoto, 1977).

The present paper describes the results of genetic analyses of the gene *ne* that produces this variant. This mutant has been briefly described in the list of fishes maintained in Nagoya University (Tomita, 1992).

Results and Discussion

A nacreous-like transparent-scaled female (*ne*) was mated with a nacreous-like transparent-scaled male (*ne*). The progenies (170 fish) were all *ne*.

Another nacreous-like transparent-scaled female (*ne*) was mated with a wild-type male (+). The F₁ progenies (132 fish) were all of the wild type (+). The F₂ progenies were segregated into 107 wild (+) (female 59, male 48) and 28 *ne* (female 11, male 17) in a ratio of 3:1 ($\chi^2=0.52$, $p=0.50-0.30$), with a sex ratio of 1:1 ($\chi^2=3.52$, $p=0.50-0.30$). The χ^2 test showed no significant deviation from the indicated ratios.

An F₁ female of the wild type obtained by the aforementioned cross was mated with a nacreous-like transparent-scaled male (*ne*). The progenies of this backcross were 93 wild (+) and 82 *ne* in a ratio of 1:1 ($\chi^2=0.69$, $p=0.50-0.30$). Another backcross was performed between a nacreous-like transparent-scaled female (*ne*) and an F₁ wild-type male. The progenies were 87 wild (+) and 95 *ne* in a ratio of 1:1 ($\chi^2=0.34$, $p=0.70-0.50$).

These results indicate that the *ne* gene is recessive and autosomal.

References

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