

Xiphophorus maculatus, Nigra



Female



Male

Strain code: Nigra

Phenotypes scored: Pigment pattern: nigra (N), striped side, (Sr); orange caudal peduncle (Cpo), spotted side (Sp); anal fin color: anal red (Ar); shoulder spot (ss); tail spot pattern: dot (D).

Introduction:

Nigra is a strain of *X. maculatus* that carries alleles at two X-linked genes that give rise to the nigra pigment pattern (N = big black spots) and orange caudal peduncle (Cpo). This chromosome is designated X^{NCpo}. The gene encoding the Nigra pattern is linked to a maturation allele, P-5, which results in the “latest” maturation documented in *X. maculatus*. Therefore, this strain has very late maturing, large fish (Kallman and Borkoski, 1978). This X chromosome X^{NCpo} originated from a collection of *X. maculatus* from Belize. The X chromosome was crossed into Jp stock in order to determine maturation rates and inheritance.

Sex determination / sexing:

The chromosomal sex determination mechanism is XX / XY. Although the Nigra fish are late-maturing, they still must be sexed at about 2 months of age. This is due to early maturing segregants that are not required to maintain the stock. Males and females are separated after sexing, and the results are checked after 2 to 4 weeks.

Scoring:

The Cpo pattern can be scored at sexing, at around 2 months of age. This allows for early disposal of the segregants. Nigra spots may easily be visible, and can appear as large, black, randomly arranged spots. However, expression of the nigra pattern does not

exhibit complete penetrance and occasionally a fish carrying the nigra gene may not display any spots. The orange caudal peduncle gives the appearance of an orange wash of color over the caudal peduncle. Fish without the NCpo are discarded.

Maintenance:

The stock is maintained by mating Nigra females to Jp163B males thus producing both male and female Nigra progeny. This is done because Nigra females tend to mature earlier than the males. To ensure a sufficient number of Nigra fish are produced, four matings are set up for each generation. The P1 mating scheme is:

$$\begin{array}{ccc} X^{NCpo}X^{Sp} ss D & \times & X^{Sp}Y^{SrAr} D \\ \text{(Nigra)} & & \text{(Jp163B)} \end{array}$$

Four genotypes are expected in the F1 progeny:

$$\begin{array}{ll} \text{Females:} & X^{NCpo} X^{Sp} ss D, X^{Sp} X^{Sp} ss D, \\ \text{Males:} & X^{NCpo} Y^{SrAr} D, X^{Sp} Y^{SrAr} D. \end{array}$$

Once two of the four original P₁ matings have produced three broods each, the other two P₁ matings are either fixed (if they produced offspring), or discarded (if no offspring were produced).

When the NCpo female offspring reach sexual maturity (about 5 months of age), the next generation of matings is set up. These matings (P₂) are constructed as described above: a female carrying the Nigra allele (X^{NCpo} X^{Sp} ss D, showing nigra spots and orange caudal peduncle) is mated to a Jp163B male. Sufficient back-up fish should be maintained, until the P₂ matings have produced a sufficient number of offspring. Then any original P₁ matings, as well as any back-up fish, can be fixed.

If only male fish carrying the Nigra allele are available, these can be mated to Jp163B females. Only female Nigra progeny will be obtained from this mating, and these are then used to establish the original mating scheme. Male offspring can be discarded.

Stock source:

Prof. Klaus Kallman, the New York Aquarium, 11/20/92, and 5/12/93.