

Xiphophorus hellerii, HX



Female



Male

Strain code: HX

Phenotypes scored: Pigment pattern: dabbed-2 (Db-2) and wild-type (++); sword color: orange(or) and green (gr).

Introduction:

Specimens of the HX strain of *X. hellerii* were collected by Myron Gordon in 1951, from the Rio Lancetilla in Honduras. This stock which was originally bred in the laboratory of Dr. Gordon, exhibited macromelanophore spotting in the flank. This pattern, named dabbed-2 (Db-2), consisted of spots of irregular size and shape that “show a tendency to be arranged in rows”. This arrangement of spots gives the appearance of stripes, and this striping pattern becomes more pronounced with age. Each 'stripe' consists of approximately 8-10 spots (Kallman and Atz, 1966). (Such striping is rare in the BXII strain, where any similar row consists of at most 4 spots.) Results of breeding experiments between HX and BXII strains suggest that these two spotting patterns are controlled by different genes. Further breeding experiments showed that the Db-2 phenotype is controlled by an autosomal dominant gene that shows 100% penetrance.

Another segregating color pattern observed in the HX strain is sword color. According to preliminary Center data this trait appears to be Y linked and sex limited to males. Two alleles are seen at this locus in this population: one expresses an orange color, and the other a green color in the sword. These two alleles are co-dominant. In heterozygotes, orange color appears on the top half of the sword, and green appears on the lower portion of the sword.

Sex determination / sexing:

Chromosomal sex determination is WY / YY, females and males, respectively. HX fish are sexed at 3 to 6 months of age and may take up to a year to reach maturity.

Scoring:

Both male and female fish are scored for the Db-2 and + pigment patterns. A mature male's sword color can be examined with a dissecting microscope against a black background. The coloration should be recorded as green (gr) or orange (or), or a combination of both. Fish should always be scored when being set up in matings and also at a later date such as when the mating is being taken down or fixed.

Maintenance:

Stocks are managed for retention of both the macromelanophore spotting pattern, Db-2 and the wild-type (+) alleles, and both sword colors. Db-2 is maintained through reciprocal matings of Db-2 heterozygotes to wild-type (++) fish, producing a 1:1 ratio of Db-2 to wild-type phenotypes in offspring. Both the orange and green sword color alleles are maintained in two lines: a 'green' line, and an 'orange-green' line. All females used in matings are from the 'green' line, and presumed to carry only the 'green' allele. Both alleles are then maintained by crossing 'green' females to a 'green' male (green-line), and to an 'orange-green' heterozygous male (orange-green line).

An example of crosses that would be set up to manage one generation:

orange/green line:

$WY^{Gr} Db-2$ (x) $Y^{Or}Y^{Gr} ++$,

$WY^{Gr} ++$ (x) $Y^{Or}Y^{Gr} Db-2+$,

green line:

$WY^{Gr} ++$ (x) $Y^{Gr}Y^{Gr} Db-2 +$,

$WY^{Gr} Db-2+$ (x) $Y^{Gr}Y^{Gr} ++$.

Stock source:

Prof. Klaus Kallman, the New York Aquarium, 7/23/93.