

The sex chromosomes evolve faster than we knew

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Abstract. This short note is a news article. Distinct sex-determination systems have evolved independently in many taxa. In the Southern platyfish (*Xiphophorus maculatus*) both XX/XY and ZZ/ZW systems were reported. In several populations of *X. maculatus* even three sex chromosomes, X, Y and W, coexist. A team of researchers has been able to observe in real-time the process of involution and recurrence of sex chromosomes in *Xiphophorus*. It seems that interspecific hybridization plays a particularly important role in speciation.

Key Words: involution, ancestor, hybridization, recombination.

Distinct sex-determination systems have evolved independently in many taxa. For instance, in the Southern platyfish (*Xiphophorus maculatus*) both XX/XY and ZZ/ZW systems were reported (Mag & Petrescu 2006). In several populations of *X. maculatus* even three sex chromosomes, X, Y and W, coexist (Nanda et al 2003).

A team of researchers coordinated by Manfred Schartl has been able to observe in real-time the process of involution and recurrence of sex chromosomes in *Xiphophorus*. They experimentally crossed a *X. maculatus* female with a *X. hellerii* male, and subsequently performed repeated back-crossings of the progeny with males of *X. hellerii*. They found that during the process of continuous introgressive breeding, the sex-determining region of the X chromosome derived from the maternal ancestor was translocated to an autosome of the receiving genome (Franchini et al 2018) (see Figure 1). They also observed that at its new chromosomal position the former X-chromosome-specific region is located in a large region of retained maternal sequences, indicating that the loss of recombination (see also Charlesworth et al 2005) accompanied the establishment of the novel W chromosome (Franchini et al 2018). They could see in this way how a sex-determination system is replaced by another.

As it has been assumed in other papers (Păsărin & Petrescu-Mag 2011; Oroian 2015), interspecific hybridization is likely to play a particularly important role in species evolution.

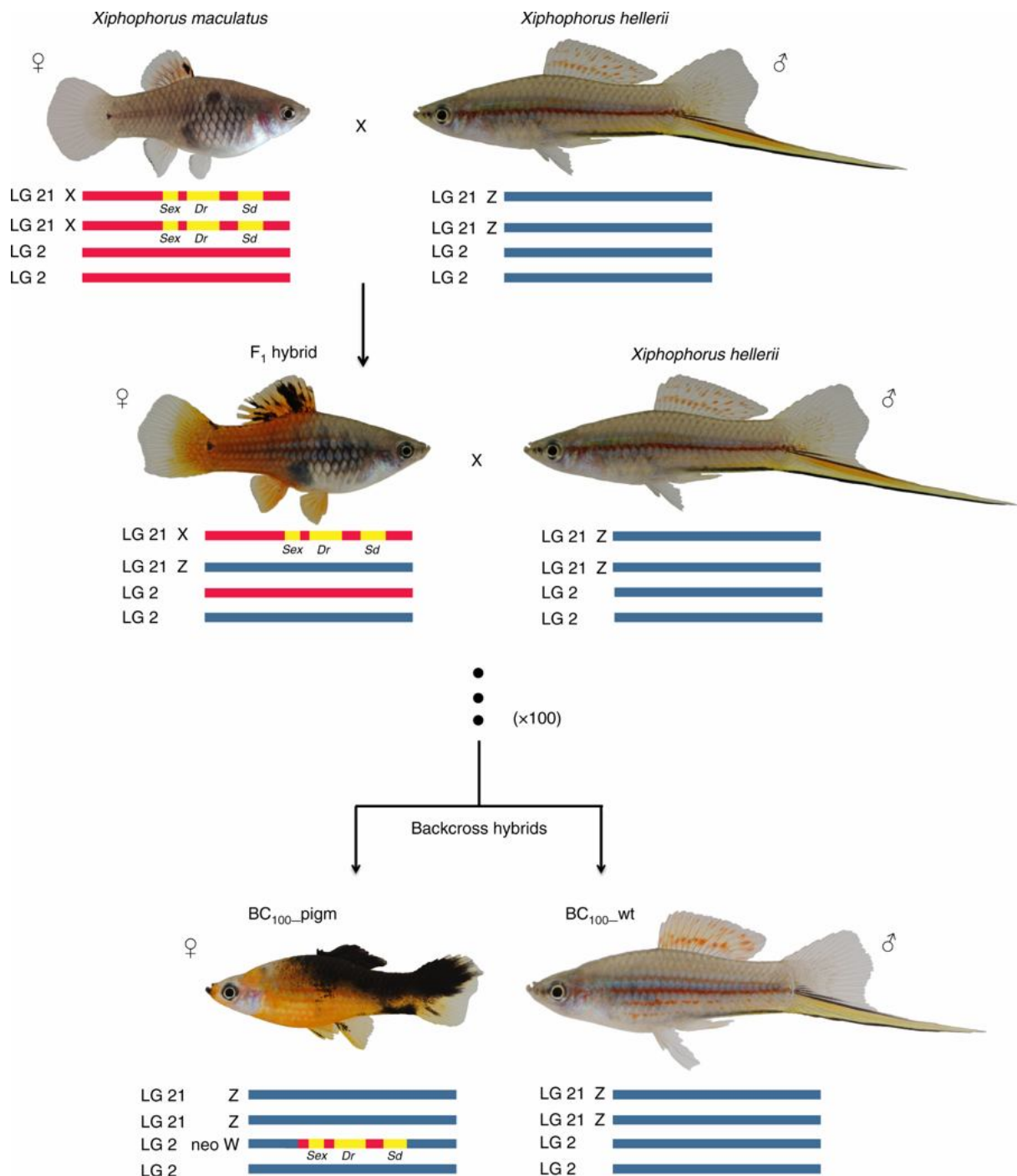


Figure 1. Experimental results presented in Franchini et al (2018).

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