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## **SEX UNCOVERED: THE EVOLUTIONARY BIOLOGY OF REPRODUCTIVE SYSTEMS**

***LA DECOUVERTE DU SEXE :  
BIOLOGIE EVOLUTIVE DES SYSTEMES DE REPRODUCTION***

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**Distinct fate of the asexual genomes in two convergently evolved Pelophylax hybridogenetic systems**

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Hybridogenesis (HG) is a non-orthodox reproduction mode that results from incomplete postzygotic isolation, it is known for several model systems including European water frogs genus *Pelophylax*. Thus, the initial cross between two parental species *P. lessonae* (genotype LL) and *P. ridibundus* (RR) leads to viable and fertile hybrids *P. esculentus* (RL) that can further reproduce hemiclonally via backcrossing to a complementary parental species.

In the vast majority of cases, hybrids reproduce asexually via possessing R-clonal genomes within their germline and thus rely on the *P. lessonae* as a provider of sexual L-genomes. However, there are several independently evolved population systems across Europe, where *P. esculentus* switched its sexual partner species to *P. ridibundus* by giving rise to the L-clonal lineages.

Two such instances are known from the Oder river basin in Czechia and the Siverskyi Donets river in Eastern Ukraine. The principal difference between the two is the absence of RL females in the Czech populations (hence, L-clonal genomes should be exclusively Y-linked) while the hybrids of both sexes are common in Ukraine (hereby, X- and Y-linked L-clonal lineages).

We applied ddRADseq aiming to genotype progeny produced by crossing RL-males with RR-females that originated from these two natural source populations. In both cases, we revealed three types of RL males that are producing i) L-clonal, ii) R-clonal, and iii) mixture of L- and R-clonal sperm.

Bayesian clustering of the phased genomes showed higher levels of variation within L-clonal lineages possessed by the Ukrainian hybrids as well as higher levels of divergence between clonal and sexual R-genomes. In the phased progeny of a single father that produced R and L-gametes simultaneously, we observed several instances where L-clonal genomes had decreased divergence levels to the R-genomes, a sign that we would accurately consider as indicative for a rare recombination event.

On the contrary, the Czech populations show lower levels of divergence between R-clonal and R-sexual genomes and we thus suggest that the R-germ line can frequently change its state and is possessed clonally not longer than a single generation in a row.

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