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# The role of transposable elements in the evolution of reproductive barriers in hybridising birds

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## Abstract

The molecular determinants underlying reproductive barriers between species can be very different from species to species. Recently, structural variants (SVs) are getting more and more attention as facilitators of the evolution of genetic incompatibilities and eventually of reproductive barriers. Inversions are considered particularly important in this context as they can easily link multiple incompatibility loci at once and then reinforce postzygotic barriers. In general, apart from inversions, SVs and notably transposable elements (TEs) are an underestimated source of incompatibilities.

Here, we aim to investigate how hybridisation itself can trigger the generation of new SVs by causing a partially uncontrolled TE activity in hybrids. TEs are known to increase in activity in various hybrid organisms and we hypothesize that the uncoupling of active TEs and their repressors caused by hybridisation and recombination can escalate genetic conflicts in two ways. First, increased TE activity can cause more insertions (SVs per se) and the origin of new incompatibility loci. Second, new homogenous insertions can act as substrate for further SVs through non-allelic homologous recombination between these repeats (e.g., inversions). This hypothesis predicts SVs and TEs to be a preferential source of incompatibilities, then we should be able to see that regions resilient to gene flow between the hybridising species are denser in SVs and that SVs are preferentially induced by TEs.

We test this hypothesis using an extensive phased genomic dataset of 300 wheatears from the *hispanica* species complex that entails hybridization in multiple contact zones between different combinations of species.

**Keywords:** hybridisation, secondary contact, structural variants, genetic conflict, gene flow, birds

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