

## **Reproductive character displacement by inversion of coiling in clausiliid snails (Gastropoda, Pulmonata)**

### **Abstract**

In land snails, a change in the direction of coiling, being associated with a shift in the position of the genital apparatus, may act as a barrier against hybridization between sympatric species. Putative reproductive character displacement by an inversion in chirality has been reported in only a few land snails, based on observations in the field and interbreeding experiments. In this study, we present a new case of possible reproductive character displacement in the direction of coiling, in the clausiliid snail *Isabellaria dextrorsa*. This species is dextral, in contrast with its nearest relatives, including *I. torifera* and *I. lophauchena*, which share plesiomorphic sinistral coiling. Whereas *I. dextrorsa* occurs in sympatry and even syntopically with *I. lophauchena* throughout most of its range, the sinistral species have a mosaic distribution. Phylogenetic analyses of mitochondrial cytochrome c oxidase subunit I (COI) sequences demonstrated that *I. dextrorsa* constitutes a clade with *I. torifera*. In this clade, a shift in coiling direction occurred at least twice, maybe triggered by the presence of a sympatric congeneric sinistral species. The analyses separated the sequences of all *I. dextrorsa* samples from those of sympatric and syntopic *I. lophauchena* samples. The failure to demonstrate gene flow between these species is consistent with the hypothesis of genetic isolation by reproductive character displacement.