Patterns of hybridization and hybrid survival in the invasive alien *Fallopia* (Polygonaceae) complex

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Running Title: Hybridization in invasive *Fallopia*.

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ABSTRACT

Background -- Hybridization and polyploidization are considered important driving forces of invasive processes. In the invasive *Fallopia* spp. complex, hybridization between taxa of various ploidy levels has been experimentally demonstrated. Extensive genetic variation has also been observed among hybrids in the field. However, what makes a certain hybridization event of evolutionary importance is still the subject of speculation considering the invasive potential of hybrid *Fallopia*.

Aims -- The present study examined landscape scale patterns of interspecific hybridization within the alien invasive *Fallopia* complex, and tested whether cold winter might act as selective agent for hybrid survival.

Methods -- Eighty seeds per clone were collected from four taxa (*F. japonica*, *F. sachalinensis*, *F. aubertii*, and *F.* x*bohemica*) and sown in greenhouse and outdoor conditions. Ploidy levels of the resulting seedlings were determined by flow cytometry at early stages of seedling growth and compared to those of mature clones present in the same landscapes.

Key results -- The four studied taxa were involved in interspecific hybridization patterns. Seedlings resulting from hybridization had a large range of ploidy levels, including aneuploid and euploid progeny, and polyploid levels that were not observed in mature clones. Cold winter had a negative effect on germination success. However, a comparison of ploidy levels of seedlings that survived the cold winter with those grown under greenhouse conditions indicated that cold winter was not a significant selection agent for particular ploidy levels.

Conclusions -- Our results stress the importance of interspecific hybridization and polyploidization events in generating invasive hybrids in the alien *Fallopia* spp complex. Cold winter represents a selection agent for the survival of early stages of progeny but does not

explain the discrepancies in ploidy levels between produced seedlings and currently occurring mature clones.

Key words -- *Fallopia*, flow cytometry, hybridization, alien invasive plant, polyploidy