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Origin and Maintenance of *Rhododendron x sochadzeae*, a Fertile F1 Hybrid which Occupies an Ecotone between *R. ponticum* and *R. caucasicum* in Turkey

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**Abstract:** Isolating barriers between sympatric interfertile species are maintained by processes that occur within their hybrid zones. Although the effects of intrinsic selection on hybrid fitness are well known, less is understood about extrinsic fitness variation. At Tiryal Dağı, NE Turkey, *Rhododendron x sochadzeae* Charadze & Davlianidze (*R. ponticum* L. x *caucasicum* Pall.) forms large populations in which neither segregation nor backcrossing occur, in habitats intermediate between those of its parents. Using single-copy species-specific RAPD and ISSR markers, it was determined that all *R. x sochadzeae* plants are F1s, and that there are many separate genets present. Through hand pollination experiments, it was determined that *R. x sochadzeae* plants can produce viable F2 seeds or backcrosses in either direction. Therefore, all non-F1 hybrid derivatives appear to be eliminated at Tiryal Dağı due to post-germination selection. However, adult backcrosses can and do recruit in large numbers in different habitat conditions at another site. From this, the selection that favours F1s over BCs at Tiryal Dağı must be habitat-mediated. We have concluded that strong habitat-mediated selection is most likely maintaining species barriers at Tiryal Dağı by eliminating hybrid generations subsequent to F1. Similar forces might occur in other hybrid zones, but may be countered by additional effects that increase fitness in post-F1s, or restrict the formation and/or fitness of F1s. We suggest that the superior fitness of F1s might be due to gene complexes that confer tolerance to specific habitat conditions in each parent that break up after the F1 generation. A simple mathematical model is provided, that describes how an F1 might thereby outcompete subsequent generations at all points along a habitat gradient.

**Key Words:** Species barriers, reproductive isolation, hybrid zones, extrinsic fitness, F1 advantage, hybrid breakdown, gene complexes, *Rhododendron*

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