

## Post-Introduction Evolution in the Biological Control Agent *Longitarsus jacobaeae*

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### Abstract

Biocontrol introductions provide excellent opportunities to study microevolutionary processes since the time and source of release of an exotic organism to a new environment is usually precisely known. The tansy ragwort flea beetle, *Longitarsus jacobaeae* (Waterhouse), was introduced in 1969 from a Mediterranean climate in Italy to California to control the invasive tansy ragwort, *Jacobaea vulgaris* L. During the past 40 years, these beetles have established in a wide range of environments, from sea level to 1300 m elevations, and from the Pacific coast to eastern Montana. We tested whether rapid evolution has taken place, leading to adaptation of the ragwort flea beetle to a high-elevation environment at Mt. Hood, Oregon. At this site, temperatures are much cooler and the growing season is about six months shorter than in Italy. The life history of Mt. Hood beetles was compared to two low-elevation Italian beetle populations in Oregon, and to a cold-adapted Swiss population, using common garden and reciprocal transplant experiments. The results indicate that the Mt. Hood population of the beetle underwent rapid evolution and adapted to the cooler conditions in less than 30 years with shifts in life history (and morphological) traits that conform to predictions based on models, empirical studies and the phenology of the known cold-adapted Swiss beetles.