

The Advantages and Disadvantages of Being Introduced: European Grasses on Bodega Head

*Peter Alpert, Biology Department, University of Massachusetts, Amherst, MA 01003;
palpert@bio.umass.edu*

Introduced species are those that have been transported into a new region by people. Invasive species are those that enter a habitat and harm species already there. Does being introduced predispose species to be invasive? Advantages of having been introduced include lack of specialized predators and pathogens. Disadvantages include lack of adaptation to local conditions. For example, competition from locally adapted natives may prevent or slow invasion by introduced species, especially in plants. This leads to the ominous prediction that all human-caused alterations to natural habitats will increase invasion, since such changes should decrease the local adaptedness of natives and any competitive advantage over introduced species this may confer. This also leads to the hopeful prediction that reversing past, human-caused alterations will decrease invasion and favor the re-establishment of natives. We tested the first prediction by raising and lowering nutrient availability and disturbance, in the form of grazing by native mammals, in a remnant of native grassland on the coast of northern California. We expected that raising or lowering either factor would promote invasion. To lower nutrient availability, we added sugar to the soil, which increases microbial immobilization of nitrogen. We lowered grazing by fencing out mammals and raised it by clipping plants. After three years, the relative cover and biomass of native plants increased from about 20% to about 60% in plots that were fenced and sugared. This did not fulfill the prediction, and suggested instead simply that lower nutrient availability and lower disturbance favored natives more. We tested the second prediction in highly invaded grassland at the same site, where nitrogen availability was elevated. Here we attempted to restore the lower nutrient availability seen in the native grassland with sugar, and again raised and lowered disturbance by mammals. We also planted young adults of four common native grasses into plots, since there were almost no existing natives. After 18 months, planted natives had attained 15% cover in unmanipulated plots and 25% cover in sugared, fenced plots, again suggesting that lower nutrient availability and disturbance favored natives. We are now setting up larger scale plots on nearby national and state parks lands, and using sawdust as a carbon source in place of sugar, to try to translate these results into prescriptions for the conservation and restoration of native grassland.