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ENDEMIC GALAPAGOS TREE DAISY *SCALESIA PEDUNCULATA* THREATENED BY COMPETITION WITH NONNATIVE BLACKBERRY *RUBUS NIVEUS*

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Study Description

There is a debate whether invasive plants can induce extinction debt in native flora that is not immediately obvious. Competitive effects of invasions and how competition causes native biodiversity loss are complicated to evaluate. Experimental removal or introduction bears the most promise of demonstrating native species displacement mechanics. Over an eight-year period, we followed plots in the only remaining *Scalesia pedunculata* forest on Santa Cruz Island, Galapagos, where invading *Rubus niveus* was either removed or retained. Demographic parameters and total recruitment failure in the presence of *R. niveus* suggest that *S. pedunculata* may face local extinction in two decades without invasion management.

Jäger, H., C. Sevilla, and B. Riegl. 2023. Endemic Galapagos Tree Daisy *Scalesia pedunculata* Threatened by Competition with Nonnative Blackberry *Rubus niveus*. Bull Ecol Soc Am 104(3):e02074. https://doi.org/10.1002/bes2.2074

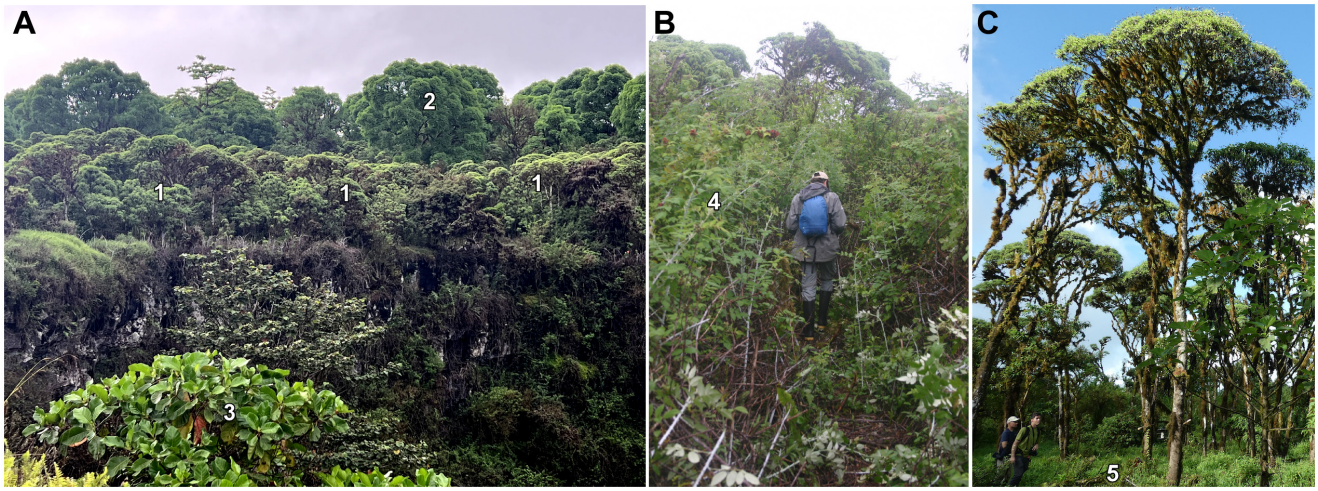

Photo 1. (A) The distribution and population size of the Galapagos Tree Daisy *Scalesia pedunculata* (1) suffers from competition with nonnative trees such as *Cedrela odorata* (2), *Cinchona pubescens* (3) and (B) nonnative undergrowth bushes, most seriously from *Rubus niveus* (4). (C) A removal experiment and subsequent 8 years of monitoring showed that *S. pedunculata* can successfully recruit in areas with low undergrowth such as non-native *Tradescantia fluminensis* (5), but it fails completely to recruit in the presence of *R. niveus*. Photo credit: B. Riegl (A), H. Jäger (B), M. San José (C).

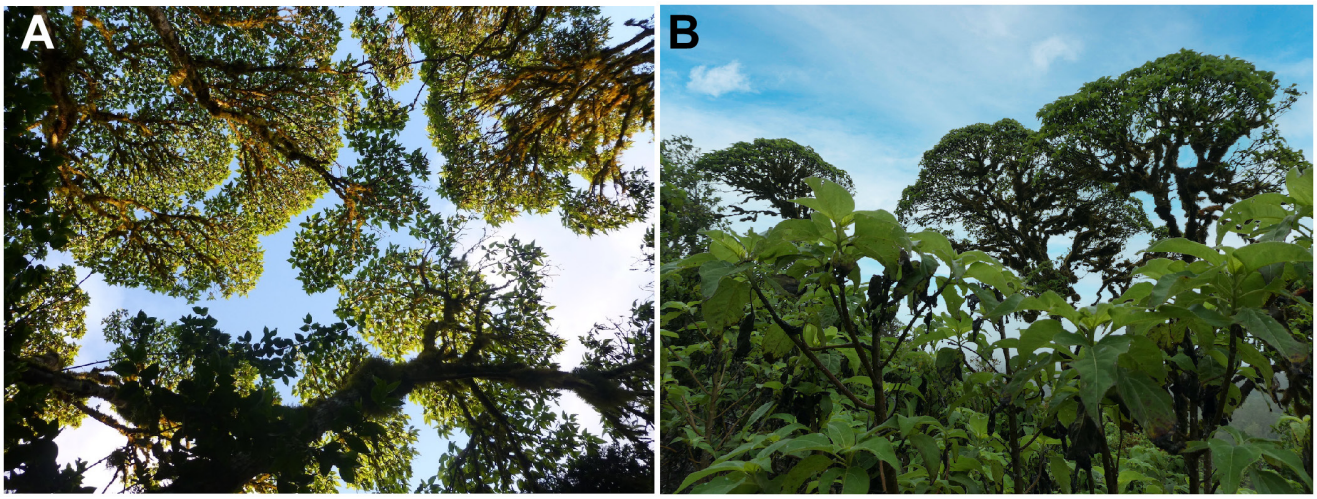

Photo 2. (A) *Scalesia pedunculata* trees are true trees and follow an asymptotic growth function. Under competition with *Rubus niveus*, *S. pedunculata* produces thinner, shorter trees with a reduced life-span. (B) *Scalesia pedunculata* is a relatively short-lived species and shows strong, pulsed, recruitment dynamics in undisturbed habitat. The shown high density of recruits was only observed in the immediate aftermath of *R. niveus* removal, but later decreased. However, in the continued presence of *R. niv*eus, no recruitment at all was observed over the 8-year study period. Photo credit: H. Jäger.

Photo 3. The endemic *Scalesia pedunculata* forest is a unique ecosystem that provides an important habitat for many invertebrates and vertebrates, such as this (A) Monarch Butterfly *Danaus plexippus megalippe* and the (B) endangered Little Vermillion Flycatcher *Pyrocephalus nanus*. Past control of invasive *Rubus niveus* has had temporary negative effects on arthropod biomass and bird breeding success of Darwin's finches, but is outweighted by long-term habitat restoration benefits. Photo credit: M. San José.

These photographs illustrate the article "Invasive blackberry outcompetes the endemic Galapagos tree daisy *Scalesia pedunculata*" by Bernhard Riegl, Anna Walentowitz, Christian Sevilla, Rafael Chango, and Heinke Jäger, published in *Ecological Applications*. https://doi.org/10.1002/eap.2846