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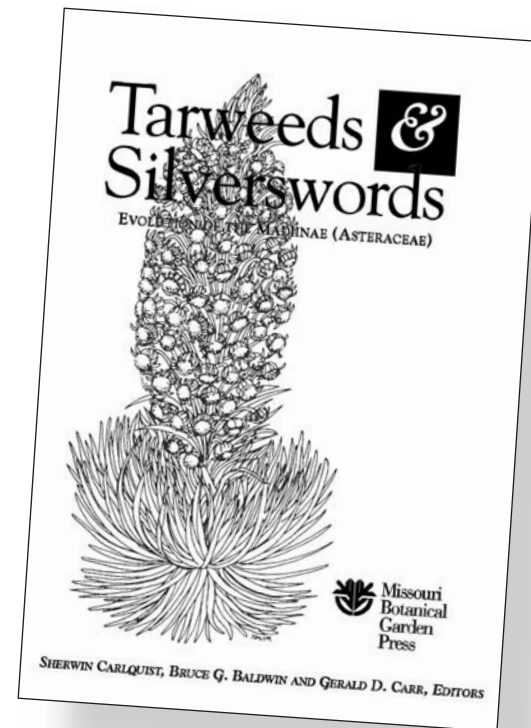
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Evolution of the Madiinae (Asteraceae)

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he most dramatic example of evolution in recent time began about 5 million years ago in the mountains of western North America. The group we now know as tarweeds spread downward into the hills and

valleys of California and nearby regions, forming species on harsh, bare habitats other plants had not conquered. Some of the tarweeds flower in the inhospitable hot months of late summer, some decorate fields of spring wildflowers, some have reached offshore islands of California and Mexico, some have stayed in rocky mountain refuges, and all occupy distinctive

beyond any doubt by DNA evidence. These lucky Hawaiian arrivals probably reached Hawaiian mountains and opportunistically formed a bizarre series of species in Hawaii's habitats: trees in rain forest, shrubs in moist scrub, mats on dry lava, woody vines in shady woodland, tufted plants in bogs, and, most dramatically, the alpine silversword. The silversword alone shows the nature of evolutionary depth and accomplishment in the group: giant rosettes of shimmering felted leaves that reflect ultraviolet light and store water in unusual gels, the silverswords in midsummer erupt into huge masses of flower heads the scent of which tells of their improbable ancestry in mountains of western North America.

This book, for the first time, draws together the intricate details of this multidimensional story, as dramatic a story of plant evolution as can be found, inviting readers to read as they might read a mystery story, but also inviting them to do research on details that still remain undiscovered.



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Tarweeds & Silverswords: Evolution of the Madiinae (Asteraceae)

Sherwin Carlquist, Bruce G. Baldwin, and Gerald D. Carr, editors

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habitats. Their evolution has been achieved by lavish reworking of their chromosome structure, by unlikely changes in structure and function.

Simultaneously with the spread of tarweeds into the Californian area, a few lucky tarweed seeds reached Hawaii on bird feather, across perhaps 3,000 miles of ocean, a seemingly preposterously unlikely event proved

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1. Natural History of the Continental Tarweeds and the Hawaiian Silversword Alliance (Madiinae). *Bruce G. Baldwin*
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 4. Hybridization in Madiinae. *Gerald D. Carr*
 5. Diversity of Trichomes and Glandular Structures of Madiinae. *Sherwin Carlquist*
 6. Leaf Anatomy of Madiinae and Adaptive Radiation. *Sherwin Carlquist*
 7. Wood Anatomy of Madiinae in Relation to Ecological Diversification. *Sherwin Carlquist*
 8. Secondary Metabolites of Madiinae. *Bruce A. Bohm and Ji Yong Yang*
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 11. A Phylogenetic Perspective on the Origin and Evolution of Madiinae. *Bruce G. Baldwin*
- Appendix 1:** List of accepted taxa of Madiinae and synonyms. *Bruce G. Baldwin, Gerald D. Carr, and John L. Strother*
- Appendix 2:** Nomenclator: alphabetical list of all names, accepted and not accepted, published in Madiinae. *Bruce G. Baldwin, Gerald D. Carr, and John L. Strother*