Domatia in New Mexico

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The processes of evolution have given plants a seemingly infinite number of ways of adjusting to their environments so as to benefit their survival. Many adaptations are obvious and well-known. Others are quite subtle and infrequently observed. One such unusual adaptation is the formation of domatia. These structures are not uncommon in the tropics, being reported in 277 plant families and more than 2000 species, but are little known and quite uncommon in the United States.

Domatia (singular domatium) are plant structures evolutionarily modified into cavities serving as homes for insects, mites, thrips, even bacteria. There are two types, primary and secondary. Primary domatia derive from normal plant parts. Some plants develop swollen stems, internodes, or petioles which become hollow through tissue decay or are excavated by potential inhabitants. Some plants develop hollow stipular spines or tubers with empty chambers. Ants, wasps, or small bees residing in these sheltered domains fiercely defend the host plants. Plants with primary domatia are mainly tropical. Secondary domatia are atypical structures developed on abaxial leaf surfaces by plants to provide environments for animal symbionts. Most commonly these are tufts of hairs or marsupial-like pouches or a combination of both produced in the axils of vein branches at the bases of leaves or occasionally at other major vein branches farther from the leaf base. In contrast to the obviously intimidating creatures associated with primary domatia, small mites are the predominant occupants of secondary domatia.

The advantages of being defended by ants, wasps, or bees are not difficult to imagine. Mites, on the other hand, would not appear to be the most swashbuckling of defenders. In actual fact, mites living in secondary domatia are carnivorous, fungivorous, or microbivorous. Herbivorous arthropods like aphids, white flies, spider mites, minute pirate bugs, and big-eyed bugs suffer significant predation from carnivorous or parasitic mites living in domatia on leaves. Riverbank grape (Vitis riparia) can suffer heavily from grape powdery mildew. Fungivorous mites in leaf domatia have been shown to provide significant biological control of this mildew. Small but mighty. As eloquently stated by David Evans Walter from the University of Queensland in Australia: “Very small or obscure animals fall out of biodiversity inventories, fail to be represented in food web analyses or community studies, and generally escape notice unless they have an effect on their environment disproportionate to their size.”

Plants have evolved the ability to produce domatia and pay a price in resources in the process. The presence of mites must provide sufficient benefit to the plants to justify the formation of domatia. Other housing structures like galls differ notably from domatia in

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Domatia are known to occur on some species of Quercus and Acer, and likely appear in other genera. I shall always look on leaves a bit differently.
Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+). Comments [in brackets] are the editor’s.

— Russ Kleinman [25 Oxbow Drive, Silver City, NM 88061]

Medicago minima (Linnaeus) Linnaeus ex Bartalini (Fabaceae, little burclover): Grant County: Silver City, campus of Western New Mexico University, Harlan Hall rear parking lot, in gravel along curb, in full sun, 23 Mar 2012, Russ Kleinman 2012-3-23-1 (SNM). [first report for NM] See photos following.

— Karen Blisard and Russ Kleinman [25 Oxbow Drive, Silver City, NM 88061]

Entodon seductrix (Hedwig) Muller Hal. (Bryophyta, Entodontaceae): Grant County: Black Range, Railroad Canyon about 100 meters upstream from the parking area at the first stream crossing, mixed conifer forest, growing on rock at bottom of north-facing rocky cliff, 7000 ft, 19 Jan 2012, Karen Blisard & Russ Kleinman 2012-1-19-3 (NMCR, SNM). [first report for NM]

Fossombronia sp. (Marchantiophyta, Fossombroniaceae): Grant County: Gila National Forest, approximately 100m south of Hwy 152 on Trail 78, Emory Pass, on the Grant County / Sierra County line, mixed conifer forest, growing on soil, growing with moss on west-facing slope, with Pinus scopulorum, Abies concolor, Pinus strobiformis, & Pseudotsuga menziesii, 13 Oct 2011, Karen Blisard and Russ Kleinman 2011-10-13-6 (SNM). Det by Paul Davison, Univ. North Alabama. Photo illustration at http://www.wnmu.edu/academic/nspages/ gilaflora/fossombronia_sp.html. [Identification of species requires spores, which were absent, but this is the first known report of this liverwort family and genus for NM]

— William R. Norris [Dept. Natural Sciences, Western New Mexico University, Silver City, NM 88061]

Carex scopulorum Holm var. scopulorum (Cyperaceae, Rocky Mountain sedge): Taos County: Sangre de Cristo Mts, Long Canyon Trail about 0.1 mile above Taos Ski Resort parking, N36° 35.79' W105° 26.99', canyon bottom near stream, open seep at trail; spreading rhizomes, within spruce-fir forest, 9700 ft, 20 July 2004, R.D. Worthington 32660 (UNM, UTEP), det by Stanley Jones; Latir Mesa, Latir Lakes, about 30 meters below and east of shore of uppermost lake in seep adjacent to outflow stream, site is at timberline (Krummholz), sedge seep adjacent to stream, standing water sometimes present, densely rhizomatous, 3625 m, 13 Aug 2001, J. McGrath 341, 342, 353, 355 (UNM), det by A. Reznicek. [Also known from the Costilla Massif (Peterson, R. Vegetation of the Costilla Massif, Taos County: http://aces.nmsu.edu/academics/rangescienceherbarium/documents/peterson---costilla-massif.pdf); first reports for NM]

Carex senta Boott (Cyperaceae, swamp carex): Grant County: sandy alluvium at Little Creek Spring, 16 May 1993, Paul Boucher 1164 (SNM), det by A. Reznicek. [validates an earlier but questionable report by M&H]

Carex tenera Dewey (Cyperaceae, quill sedge): Rio Arriba County: 250 meters east-south-east of the Corkin Lodge within 20 meters of the road to Brazos Box, semi-open edge of seepy wetland, soil dark and loamy, with Carex lanuginosa, Eleocharis sp., Thermopsis pinetorum, Veratrum californicum, Populus tremuloides, Juncus

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Botany is the natural science that transmits the knowledge of plants.

— Linnaeus
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