MOSSES OF CHIRICAHUA NATIONAL MONUMENT, AZ
FINAL REPORT

CHIRICAHUA NATIONAL MONUMENT
NATIONAL PARK SERVICE

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Species Abundance

A total of fifty species of mosses and liverworts are reported for Chiricahua National Monument, AZ.

The most common moss in Chiricahua National Monument is a weedy cosmopolitan species, Ceratodon purpureus. This species was collected on soil at almost every site, especially in (though not restricted to) sunny, exposed situations. Where it was not collected, its presence was at least noted. I feel confident in expecting that Ceratodon purpureus occurs ubiquitously in Chiricahua National Monument. It may be recognized as a green mossy crust on (usually) sunny soil.

The next most common moss species at Chiricahua National Monument are Haplocladium microphyllum and Homomallium mexicanum. Both occur commonly on the bark at the base of conifers, cypresses, oaks and other trees; they may also occur on rock faces and fallen decomposing logs. Healthy populations of both species may be seen on the bark at the base of the oaks right on the nature trail beside the visitors center. Haplocladium microphyllum is darker, richer green, with tiny stems and tiny leaves; it looks more like a deep green fuzz that a moss. Homomallium mexicanum is brighter, yellow-green, more robust, and in overall appearance more scraggly than fuzzy. The two may grow separately in a single mat or together in mixed mats.

Seven other moss species also occur regularly, but less commonly than the three species cited in the paragraphs above: Braunia secunda, Grimmia arizonae, Hedwigia nivalis, Hypnum revolutum, Schistidium apocarpum, Tortula bartramii and Tortula ruralis.

These ten moss species referenced above (Braunia secunda, Ceratodon purpureus, Grimmia arizonae, Haplocladium microphyllum, Hedwigia nivalis, Homomallium mexicanum, Hypnum revolutum, Schistidium apocarpum, Tortula bartramii, and Tortula ruralis) occur at almost every site in Chiricahua National Monument.

The other forty moss species occur with less frequency than these ten species. Of these forty, none are particularly rare species, and none represent noteworthy range extensions.

Like all species lists, this list of fifty species is preliminary. Additional collecting at still more sites will probably reveal species hitherto unreported-- but new species reports will accrue with diminished frequency. This list of fifty species therefore probably represents a fair, though highly preliminary, approximation of the total moss flora of Chiricahua National Monument.

Floristic Interpretation

Fifty species seems a low count for an area as large as Chiricahua National Monument. Mosses, however, favor cool and perennially wet or moist habitats. The general aridity of the monument, its mostly west-facing aspect, its geologic and altitudinal homogeneity, and, with the exception of some small springs, its lack of perennial running water, probably account for its low total diversity in moss species.

In the past, periodic wildfires may also have acted to suppress moss diversity by minimizing successful immigration/establishment of new species.

The area of richest diversity surveyed was Sarah Deming Canyon. Small, east-facing side canyons or chasms off Sarah Deming Canyon Trail were especially high in species richness. Probably the narrowness of the Sarah Deming Canyon and its more northerly aspect create cooler conditions more favorable to moss growth. More than higher plants, mosses are sensitive to subtle microhabitat differences. Highly dissected terrains and/or narrow canyons could reproduce the microconditions for moss species richness in other areas of the monument-- notably Totem Canyon.

A much richer moss flora is found in cooler, wetter and sometimes higher areas of the Chiricahua Range outside the monument boundaries-- e.g., Rustlers Park and the Cave Creek/Trogon Management Area in adjacent Coronado National Forest.

Floristic Affinities

Continent-wide bryological investigations have revealed several general geographic patterns of moss distribution in North America. The so-called Appalachian-Mexican moss arc is the most widespread of these distributional patterns. Its area of greatest species richness centers in the southern Appalachians. Although diminishing in species diversity with increasing aridity, this generalized flora nevertheless extends westward as far as the Sierra Nevada and southwestward into Veracruz and Jalapa states, Mexico. As the suite of species included in the Appalachian-Mexican moss flora requires summer maximum rainfall, elements of this moss flora predominate also in wetter areas of southern Arizona, including Chiricahua National Monument.

Moss species endemic to mountain ranges of the border region of the United States and Mexico, may also be found in Chiricahua National Monument: e.g., Grimmia arizonae and Tortula bartramii.

Some species whose affinities are more tropical American than Appalachian-Mexican are present in Chiricahua National Monument, as northern extensions of mosses more generally distributed in Central and South America. Notable species in this category are Anacolia laevisphaera, Braunia secunda and Hedwigia nivalis.

Additionally some widespread Rocky Mountain elements occur in Chiricahua National Monument as southern extensions of species more widespread farther north: e.g., Dicranum rhabdocarpum and Hypnum revolutum. Generally these species occur rarely in the lower and/or western areas of the Chiricahua Mountains, such as the monument itself, but more commonly in the eastern and/or higher areas, such as Cave Creek Canyon and Rustlers Park. This pattern holds for a number of both Rocky Mountain and Appalachian-Mexican mosses in the Chiricahua Mountains generally.

Altogether, therefore, the moss flora of Chiricahua National Monument may be considered a western attenuation of the Appalachian-Mexican flora, augmented by some invasions from north and south, and by some elements broadly endemic to the U.S.-Mexican border region.

CHECKLIST OF MOSSES AND LIVERWORTS
CHIRICAHUA NATIONAL MONUMENT, AZ
1 MARCH 1996

Amblystegium serpens
Anacolia laevisphaera
Barbilophozia barbata
Braunia secunda
Bryum argenteum
Bryum pseudotriquetrum
Callicladium haldanianum
Campylium chrysophyllum
Cephaloziella rubella
Ceratodon purpureus
Coscinodon cribrosus
Desmatodon guepinii
Dicranoweisia cirrata
Dicranum rhabdocarpum
Didymodon luridus
Didymodon rigidulus
Didymodon tophaceus
Didymodon vinealis
Eurhynchium pulchellum
Fabronia ciliaris
Fabronia wrightii
Fissidens bryoides
Frullania eboracensis
Grimmia arizonae
Grimmia pulvinata
Grimmia tenerrima
Haplocladium microphyllum
Hedwigia nivalis
Homomallium mexicanum
Hypnum revolutum
Lindbergia brachyptera
Orthotrichum anomalum
Orthotrichum diaphanum
Platydictya jungermannioides
Platygyrium fuscoluteum
Pohlia nutans
Pseudoleskeella tectorum
Ptychomitrium leibergii
Schistidium agassizii
Schistidium apocarpum
Schistidium rivulare
Timmiella anomala
Tortella humilis
Tortella tortuosa
Tortula bartramii
Tortula fragilis
Tortula inermis
Tortula pagorum
Tortula ruralis
Weissia controversa

MOSS AND LIVERWORT SPECIES
CHIRICAHUA NATIONAL MONUMENT, AZ
SITE BY SITE CHECKLIST
a = abundant; c = common; u = uncommon

Bonita Creek Picnic Area

Homomallium mexicanum	c
Orthotrichum diaphanum	c
Tortula pagorum	u

Slope north of Bonita Creek Picnic Area

Bryum argenteum	c
Desmatodon guepinii	u
Tortula fragilis	c
Weissia controversa	c

Ridge north of Bonita Creek Picnic Area

Bryum pseudotriquetrum	c
Ceratodon purpureus	c
Grimmia arizonae	c
Grimmia pulvinata	u
Grimmia tenerrima	c
Homomallium mexicanum	a
Schistidium apocarpum	c
Tortula bartramii	c
Tortula pagorum	u

Natural Bridge Trail Head

Campylium chrysophyllum	u
Ceratodon purpureus	c
Didymodon luridus	c
Didymodon vinealis	c
Frullania eboracensis	c
Grimmia arizonae	c
Grimmia tenerrima	c
Haplocladium microphyllum	a
Homomallium mexicanum	a
Lindbergia brachyptera	u
Pseudoleskeella tectorum	u
Schistidium apocarpum	c
Tortula bartramii	c
Tortula inermis	c
Tortula ruralis	c

Natural Bridge

Braunia secunda	c
Bryum pseudotriquetrum	c
Cephaloziella rubella	c
Ceratodon purpureus	c
Coscinodon cribrosus	u

Fabronia ciliaris	c
Frullania eboracensis	c
Grimmia arizonae	c
Grimmia tenerrima	c
Haplocladium microphyllum	a
Hedwigia nivalis	c
Homomallium mexicanum	a
Platydictya jungermannioides	u
Ptychomitrium leibergii	u
Schistidium apocarpum	c
Tortula fragilis	c
Tortula inermis	c

Picket Park & nearby ridge top

Bryum pseudotriquetrum	c
Homomallium mexicanum	a
Weissia controversa	c

Massai Point Trail

Braunia secunda	c
Campylium chrysophyllum	c
Frullania eboracensis	c
Grimmia arizonae	c
Grimmia tenerrima	c
Haplocladium microphyllum	a
Hedwigia nivalis	a
Homomallium mexicanum	a
Hypnum revolutum	c
Orthotrichum anomalum	c
Pseudoleskeella tectorum	c
Schistidium apocarpum	c
Schistidium rivulare	c
Tortella humilis	u
Tortella tortuosa	u
Tortula ruralis	c
Weissia controversa	c

Madrone Canyon Spring

Ceratodon purpureus	a
Didymodon luridus	c
Didymodon tophaceus	c
Haplocladium microphyllum	a
Homomallium mexicanum	c

Rhyolite Canyon Trail

Amblystegium serpens	u
Bryum pseudotriquetrum	c
Campylium chrysophyllum	u
Ceratodon purpureus	a
Didymodon rigidulus	c

Eurhynchium pulchellum	u
Grimmia pulvinata	u
Haplocladium microphyllum	a

Sarah Deming Canyon Trail

Anacolia laevisphaera	u
Barbilophozia barbata	c
Braunia secunda	c
Bryum pseudotriquetrum	c
Callicladium haldanianum	u
Campylium chrysophyllum	u
Ceratodon purpureus	a
Fabronia wrightii	c
Fissidens bryoides	u
Grimmia arizonae	a
Haplocladium microphyllum	a
Hedwigia nivalis	a
Homomallium mexicanum	a
Orthotrichum anomalum	c
Pohlia nutans	c
Ptychomitrium leibergii	u
Schistidium agassizii	u
Timmiella anomala	u
Tortella tortuosa	u
Tortula bartramii	c
Tortula ruralis	c

Heart of Rocks Trail

Braunia secunda	c
Dicranum rhabdocarpum	u

Sea Captain

Didymodon vinealis	c
Dicranoweisia cirrata	u
Fabronia ciliaris	c
Homomallium mexicanum	a
Platygyrium fuscoluteum	u
Ptychomitrium leibergii	u
Schistidium rivulare	c
Tortella tortuosa	u
Tortula inermis	c
Tortula ruralis	c