# ARIZONA GAME AND FISH DEPARTMENT
# HERITAGE DATA MANAGEMENT SYSTEM

**Plant Abstract** **Element Code:** PPADI0H0B0

## CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

**NAME:** *Pellaea ternifolia*
**COMMON NAME:** Ternate Cliffbrake, Trans-Pecos Cliffbrake
**SYNONYMS:** *Allosorus ternifolius, Cheilanthes ternifolia, Notholaena ternifolia, Pellaea brandegeei, Pellaea weddelliana, Platyloma ternifolia, Pteris peruviana, Pteris subverticillata, Pteris ternifolia*
**FAMILY:** Pteridaceae

**AUTHOR, PLACE OF PUBLICATION:** Link, Johann Heinrich Friedrich. Filicum Species 59. 1841.

**TYPE LOCALITY:** Columbia

**TYPE SPECIMEN:** Real Jardin Botanico, MA 659939 (original material of *Pellaea ternifolia*). Mutis (#MA-MUT 3103, 3132). No date.

**TAXONOMIC UNIQUENESS:** There are about 40 species of Pellaea worldwide (15 in the Flora of North America 2015). The majority are found in the western hemisphere, with a smaller number occurring in Asia, Africa, the Pacific Islands and Australia. In a broad sense, the genus is a diverse, poorly defined assemblage of xeric-adapted ferns.

NatureServe (2015) recognizes 16 species, nine subspecies, and one hybrid. Seven of these species, and two subspecies, are found in Arizona. *P. ternifolia* occurs in Texas, Arizona and Hawaii, and its subspecies *arizonica*, is found in Texas and Arizona. See Aids to Identification for characteristics used to distinguish both the species and subspecies.

**DESCRIPTION:** Stems compact, ascending, stout, 5--10 mm diam.; scales bicolored, linear-subulate, 0.1--0.3 mm wide, centers black, thick, margins brown, thin, erose-dentate. Leaves monomorphic, clustered on stem, 10--50 cm; croziers sparsely to densely villous. Petiole black or dark purple, lustrous, rounded or slightly flattened adaxially, without prominent articulation lines. Blade linear to ovate, deeply pinnate-pinnatifid proximally, 2.5--8 cm wide; rachis black or purple throughout, straight, often flattened adaxially, glabrous or villous. Pinnae perpendicular to rachis or slightly ascending, not decurrent on rachis, ternate at base of leaf; costae absent. Ultimate segments linear-oblong, 10--40 mm, leathery, glabrous to sparsely villous abaxially on midrib; margins recurved on fertile segments, rarely covering more than 1/2 abaxial surface, borders whitish, entire; apex mucronate. Veins of ultimate segments obscure. Sporangia long-stalked, containing 64 spores, not intermixed with farina-

producing glands) Flora of North America 2015).

**AIDS TO IDENTIFICATION:** The following summary was taken from the Flora of North America (2015):

- Petioles and rachises dark brown to black, usually lustrous; stem scales linear-subulate, less than 0.3 mm wide.
- Some stem scales bicolored, with dark central region and lighter, brown margin.
- Leaf blades linear-oblong to deltate, pinnate-pinnatifid to 3-pinnate, at least some pinnae lobed or divided; fertile ultimate segments with mucronate apices; segment margins recurved, usually concealing sporangia.
- Leaf blades deeply pinnate-pinnatifid at base, basal pinnae ternately lobed; petioles dark purple or black; sporangia not intermixed with farina-producing glands……*P. ternifolia*

*Pellaea ternifolia* is represented in the flora by three morphologically and chromosomally distinct taxa. These discrete genetic entities also show a tendency toward geographic isolation and are treated here as subspecies. Diploid populations referred to *P. ternifolia* subsp. *ternifolia* are scattered from Texas through Mexico to South America. The pubescent tetraploid (*P. ternifolia* subsp. *villosa*) follows the Sierra Madre Oriental from Puebla, Mexico, north to Texas; the glabrous tetraploid ( *P . ternifolia* subsp. *arizonica* ) occurs in Arizona, Texas, and northern Mexico. Isozyme and chromosome studies suggest that both tetraploids are segmental allopolyploids produced by hybridization between subsp. *ternifolia* and other (as yet unidentified) diploid elements within *P. ternifolia*.

- Rachises villous, especially in axils of pinnae; pinnae with hairs scattered along main veins abaxially……subsp *villosa*
  Rachises glabrous or with a few widely scattered hairs; pinnae completely glabrous:
- Largest ultimate segments (excluding terminal pinnae) usually less than 18 mm; distal portion of petioles grooved or flattened adaxially; spores usually 39–45 µm diam……..… subsp *ternifolia*
  Largest ultimate segments (excluding terminal pinnae) usually more than 18 mm; distal portion of petioles rounded or slightly flattened adaxially; spores usually 46–53 µm diam……subsp *arizonica*

**ILLUSTRATIONS:**
Photos: http://swbiodiversity.org/seinet/taxa/index.php?taxon=Pellaea%20ternifolia.
Photos and Herbarium Mounts: http://eol.org/pages/597269/media.

**TOTAL RANGE:** Arizona, Texas, northern Mexico.

**RANGE WITHIN ARIZONA:** SE Arizona. From Globe south to Tucson and Nogales, and eastward to the Chiricahua Mountains. Pinal, Pima, Santa Cruz, Graham and Cochise

Counties. Tends to be associated with the Sky Island mountain ranges, including the Pinalenos, Santa Ritas, Patagonias, Whetstones, Dragoon, Huachucas, Mule and Chiricahua.

## SPECIES BIOLOGY AND POPULATION TRENDS

**GROWTH FORM:** Perennial herb, fern-like.

**PHENOLOGY:** Sporulating: summer to fall. Sterile plants have been noted in Arizona during April, June, August and September.

**BIOLOGY:**

**HABITAT:** Cliffs and rocky slopes, in cracks and crevices; terrestrial in dry open areas, but also occurring in shaded gullies, rock ledges on stream banks and wet riparian zones. Oak-pine woodlands.

**ELEVATION:** Flora of North America 2015: 5575 – 7870 feet (1700-2400m). Based on Arizona collections: 4840 – 7100 feet (1475-2165m).

**EXPOSURE:** Variable. Reported from shady north facing canyon sides and riparian zones, to open canyons and cliff tops.

**SUBSTRATE:** Found on a variety of acidic substrates including quartzite, granite and rhyolite. One collection noted a "humusy" soil.

**PLANT COMMUNITY:** Oak-pine woodlands. Associated species include: *Pinus cembroides, Quercus emoryi, Juniperus deppeana, Opuntia, Dasylirion, Cercocarpus, Heuchera, Cheilanthes lindheimeri, Selaginella, Rubus, Draba, Quercus arizonica, Dyschoriste procumbens, Pleopeltis riograndensis, Pellaea intermedia, Cheilanthes fendleri, C, tomentosa, Pellaea wrightiana, P. truncata, Quercus hypoleucoides, Corydalis, Nolina, Solidago, Salix, Juglans, Agave parryi, Eragrostis, Andropogon, Muhlenbergia emersleyi, Cyperus, Bouteloua, Tradescantia, Ranuculous arizonicus, Ipomoea, Callinadra, Bommeria.*

**POPULATION HISTORY AND TRENDS:** *Pellaea ternifolia* is well distributed throughout SE Arizona in the Sky Island mountain ranges at elevations between 4800 -7100 feet. There are 20 known collection sites from nine mountain ranges. Of the five sites that have been collected over multiple years, two of these field collections span more than 25 years, demonstrating the persistence of the species. However, for those relatively few collections that actually commented on abundance, the majority noted the species as uncommon. Overall, it may be construed that *P. ternifolia* is a well established and relatively widely distributed species in SE Arizona, but that populations may not be especially large.

## SPECIES PROTECTION AND CONSERVATION

**ENDANGERED SPECIES ACT STATUS:** None.
**STATE STATUS:** None.
**OTHER STATUS:** None.

**MANAGEMENT FACTORS:** None specified.

**PROTECTIVE MEASURES TAKEN:** None specified.

**SUGGESTED PROJECTS:** Collect additional information to better evaluate actual populations at some of the known sites.

**LAND MANAGEMENT/OWNERSHIP:** The majority of collections are from USDA Forest Service lands (mostly Coronado National Forest, two from Tonto NF). Other lands include USDI Bureau of Land Management (2), Arizona State lands (1), U.S. Department of Defense, U.S. Army (2), and private land holdings (1).

## SOURCES OF FURTHER INFORMATION

**REFERENCES:**

Flora of North America (eFloras), accessed 05/14/2015, http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200003508.

JStor| Global Plants, accessed 05/14/2015, http://plants.jstor.org/stable/10.5555/al.ap.specimen.ma659939.

NatureServe Explorer, and Online Encyclopedia of Life, accessed 05/06/2015, http://explorer.natureserve.org/index.htm.

Tropicos, accessed 05/14/2015, http://www.tropicos.org/Name/26602375.

Windham, Michael D. 1993. Contributions from University of Michigan Herbarium 19: 40 f. 3.

**MAJOR KNOWLEDGEABLE INDIVIDUALS:**

Michael D. Windham, Curator of Vascular Plants Collection, Duke University, Durham, NC.

**ADDITIONAL INFORMATION:** *Pellaea ternifolia* subsp. *arizonica* and *P . wrightiana* hybridize; the hybrids are morphologically intermediate tetraploids and have malformed spores (Flora of North America 2015).

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