ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PMORC1C040
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Hexalectris arizonica* (S. Watson) A.H. Kenn. & L.E. Watson
COMMON NAME: Crested Coral Root, Crested Coralroot, Spiked Crested Coralroot, Cock'scomb, Dragon's Claw, Raíz-de-coral crestada [Spanish]
SYNONYMS: *Arethusa spicata* Walter, *Corallorhiza arizonica* (Walter) Tidestrom, *Hexalectris spicata* var. *arizonica* (S. Watson), *Bletia arizonica* (Watson) Sosa & M.W. Chase
FAMILY: Orchidaceae

AUTHOR, PLACE OF PUBLICATION: Aaron H. Kennedy and Linda E. Watson. 2010. *Systematic Botany 35(1):64-76.*

TYPE LOCALITY: Arizona: in rocky places in the Santa Rita Mountains

TYPE SPECIMEN: *C. G. Pringle s.n.,* 6 July 1881 (HT:NY!).

TAXONOMIC UNIQUENESS: In North America, *H. arizonica* is 1 of 9 in the genus *Hexalectris*, and 1 of 4 in Arizona (the others being *H. parviflora*, *H. warnockii*, and *H. colemanii*). In some publications, *H. arizonica* is referred to as a variety of *H. spicata* (Catling and Engel 1993, Catling 2004, FNA 2002); in this sense, var. *arizonica* is the only variety of *H. spicata* that occurs in Arizona.

After phylogenetic work by Kennedy and Watson (2010), *H. arizonica* was elevated to specific rank. Sosa and Chase (2020) proposed the new name combination of *Bletia arizonica* (Watson) Sosa & M.W. Chase for this species but this proposed change has not been widely adopted.

DESCRIPTION: Mycotrophic plant, with a leafless, spicate inflorescence, 27-65 cm (11-26 in) tall, nearly 1 cm thick at base. Roots consist of branched, circumferentially ridged rhizomes with few if any fibrous roots. This leafless plant has 3-5 bracts sheathing the stem (leaves reduced to stiff, purplish, sheathing scales). Floral bracts are lanceolate to oblanceolate, 5-10 x 2-6 mm. Flowers 9-20(5-25), 1.5-2.5 x 2-2.5 cm; pedicals 8-20 mm; lateral sepals oblong-ovate to oblong-lanceolate, falcate, apex acute; petals weakly to strongly recurved, elliptic, oblong-obovate, oblanceolate, or obovate, falcate. Sepals and petals are dark pink to tan to brown with faint veining. The lip is white with purple dots, stripes, and ridges, ovate to obovate, clawed, shallowly 3-lobed, fissure between lobes less than 2 mm deep, 1.4 cm wide x 1.6 cm long, with five to seven raised purple ridges down the central lobe with purple lines in lateral lobes. The middle lobe ovate to suborbiculate, margins undulate, lateral lobes incurved, broadly rounded

to obtuse, margins entire, apically triangular to rounded. The lamellae 5(-7), central, purple to white; the column is white to yellowish white, apically winged, 11-18 mm, with a slight hour-glass shape and curved when viewed from the side; anthers whitish to yellow; pollinia are yellow. The capsule is ellipsoidal, 1.2 cm long and 0.6 cm in diameter. (Coleman 2002, FNA 2002).

AIDS TO IDENTIFICATION: *Hexalectris arizonica* is sometimes confused with *Corallorhiza striata*, but can be distinguished by the three-lobed shape of the lip and the raised ridges down the central lobe. The lip of *C. striata* is entire, with fused lamellae on only about the basal third. *Hexalectris arizonica* is closely related to *H. colemanii*, which shares the same habitat. Flowers of *H. arizonica* are cleistogamous or nearly so, occasionally chasmogamous. The sepals are recurved on *H. arizonica*, but less than 90 degrees. The petals lean forward over the column and are only slightly, if at all, recurved. The sepals and petals of *H. colemanii* recurve more than 360 degrees, forming tight circles at the apex (Coleman, 2002).

Hexalectris arizonica grows in Arizona and New Mexico, and is described as self-pollinating, due to the fact that it lacks a rostellum. *H. spicata* (of which *H. arizonica* was formerly considered a variety of) is not found in Arizona. Since the function of the rostellum is to separate the pollen in the stigma, the lack of one enables autogamy. *Hexalectris arizonica* can be identified fairly accurately while still in early spike. The spikes have a pinkish brown cast, while *H. spicata* is much more tan to brownish (Coleman, 2002). Flowers of var. *arizonica* are cleistogamous or nearly so, occasionally chasmogamous; rostellum as indicated are absent or nearly so; lamellae 0.2-0.7 mm; petals less than 16 x 5 mm. Flowers of var. *spicata* are chasmogamous; rostellum present; lamellae 0.7-1 mm; petals greater than 14 x 5 mm (FNA 2002).

ILLUSTRATIONS: Color photos of both varieties (Coleman, 2002: plates 13 and 14)
Color photo of flower (V.S. Engel *in* Catling and Engel, http://the-light.com/orchids/ldl1.html, accessed 2002)
Color photos (Leur, 1975: plate 74)
Line drawing (*in* Todsen and Spellenberg, 1999 at
Color photos (Victor Engel, *in* Todsen and Spellenberg, 1999 https://nmrareplants.unm.edu/node/100)
Holotype here: http://www.uvm.edu/~pringle/mauz/arizona/images/Orchidaceae/VT-i0856.jpg
Color photos: https://swbiodiversity.org/seinet/taxa/index.php?taxon=13176

TOTAL RANGE: Arizona, New Mexico, Texas, and down into Sonora, Mexico (SEINet 2022).

RANGE WITHIN ARIZONA: Cochise, Santa Cruz, Pima and Yavapai counties.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial forb/herb.

PHENOLOGY: *H. arizonica* flowers from late July to late August (May to July in New Mexico, Todsen and Spellenberg, 1999). Plants seldom flower 2 years in a row and often skip several years before reappearing. Plants that emerge with spikes and buds may not proceed to flowering. In both *H. arizonica* and *H. spicata* a significant percentage (10-80%, depending on the year) of spikes and buds abort without fully developing, and others are browsed upon (Coleman 2002).

BIOLOGY: According to Coleman (2002), this plant "appears above ground only to flower as a stout, leafless, spicate inflorescence. Since these mycotrophic plants lack significant amounts of chlorophyll, the flower stalks are shades of brown, ranging from a yellowish tan to rich, almost reddish dark brown." This orchid has an obscure symbiotic relationship with mycorrhizal fungi, which is wrapped around the branching rhizomes (Kennedy et al. 2011). They are thought to live in this symbiosis until sufficiently mature for flowering.

Recent molecular work has demonstrated that within the *Hexalectris* genus, the loss of photosynthetic capabilities has occurred independently among members of the genus as many as five times (Barrett et al. 2019); specifically for *H. arizonica,* photosynthetic losses has occurred within the past 10 million years.

Other recent phylogenetic analyses (Sosa et al. 2016) suggest that Mexico and Central America are the ancestral areas for *Hexalectris*; their recent expansion into the arid west most likely occurred as a result of (and was enabled by) their shift from epiphytism to a terrestrial life form.

HABITAT: In the southwest at the lower end of their elevation range, they grow in oak woodlands, on the wooded sides of canyons, and on canyon bottoms. At the upper end of their elevation range, they grow in mixed oak and conifers. Rarely are the plants out in the open. Typically they are in heavy leaf litter under the drip line of the oaks, pines, and companion shrubs. They are adaptable to a wide range of lighting conditions; from direct sun much of the day to deep shade (Coleman 2002).

ELEVATION: 3,480 – 6,950 ft (1,061 – 2,118 m) in Arizona and New Mexico. Up to 7,500 ft (2,288 m) for their whole range.

EXPOSURE: Shaded.

SUBSTRATE: Limestone, to calcareous sandy or organic soils.

PLANT COMMUNITY: Associated orchids that bloom in the same habitat as *H. arizonica* include *Corallorhiza wisteriana* (spiny coralroot), *H. colemanii* (Coleman's coral-root), *H. warnockii* (purple-spike coralroot), *H. parviflora*, *Malaxis corymbosa* (Huachuca Mountain Adder's-mouth), and *M. soulei* (=*M. macrostachya*, Mountain Adder's-mouth) (Coleman, 2002). In Cochise County, Arizona, known to grow under *Pinus leiophylla* (Chihuahuan pine), and *Quercus arizonica* (Arizona oak) with associated plants including: *Arctostaphylos pungens* (Mexican manzanita), *Brickellia betonicifolia* (Betony-leaf Brickell-bush), *Garrya wrightii* (Wright's silktassel), *Nolina* (bear-grass), and *Rhus trilobata* (sumac). In Yavapai County, associated species include: *Abutilon parvulum* (dwarf abutilon), *Agave parryi* (Parry's agave), *Berberis* (=*Mahonia*) *fremontii* (Fremont Mahonia), *Cercocarpus montanus* (Colorado birch-leaved mountain-mahogany), *Cheilanthes* (lipfern), *Coryphantha* (=*Escobaria*) *vivipara* (Foxtail pincushion cactus), *Juniperus osteosperma* (Utah juniper), *Nolina microcarpa* (Sacahuista bear-grass), *Opuntia engelmannii* (New Mexican prickly pear), *Pinus edulis* (Two-needle pinyon pine), and *Yucca baccata* (fleshy-fruit Yucca) (SEINet, accessed 2005).

POPULATION HISTORY AND TRENDS: In Arizona, *Hexalectris arizonica* is relatively rare, and in New Mexico, it is considered rare and endangered. When looking at the trend for both states, *H. spicata* is less common than *H. arizonica*. It grows in small colonies, and only a few plants bloom each year. Although still rare, *H. arizonica* is slightly more common, where it is found as widely scattered individuals, though some small colonies develop up to a half-dozen plants (Coleman 2002).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None

STATE STATUS: Forest Service Sensitive (USDA FS Region 3 2013, 2007), as *H. spicata var. arizonica*
Salvage Restricted (ARS, ANPL 2016, 1999), as *H. spicata*

OTHER STATUS: None

MANAGEMENT FACTORS: *H. arizonica* is sensitive to soil disturbance and compaction. In the southwest, the habitat of this species is at risk to mining activities.

PROTECTIVE MEASURES TAKEN: Some plants grow within Saguaro National Park, where they are presumably safe from development (SEINet 2022).

SUGGESTED PROJECTS:

LAND MANAGEMENT/OWNERSHIP: NPS – Saguaro National Park (Rincon Mountains); USFS – Coronado and Prescott National Forests; State Land Department; Private.

SOURCES OF FURTHER INFORMATION

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

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ADDITIONAL INFORMATION:

The species name *spicata*, is from the Latin *spicatus*, "spiked", referring to the spicate inflorescence.

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