ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDRAN05070
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Aquilegia desertorum*
COMMON NAME: Mogollon Columbine, Desert Columbine
SYNONYMS: *Aquilegia formosa* var. *desertorum* Jones, *Aquilegia triternata* Payson
FAMILY: Ranunculaceae

AUTHOR, PLACE OF PUBLICATION: *Aquilegia desertorum* (M.E. Jones) Cockerell ex A. Heller, Muhlenbergia; a journal of botany 1: 27. 1901. *Aquilegia formosa* var. *desertorum* M.E. Jones, Contributions to Western Botany 8: 2. 1898.

TYPE LOCALITY: Rock crevices near springs, Flagstaff, Arizona. August 29, 1884, by M.E. Jones.

TYPE SPECIMEN: None designated

TAXONOMIC UNIQUENESS: The species *desertorum* id 1 of 20 in the genus *Aquilegia*, which in turn is 1 of 25 genera in the family Ranunculaceae. "The species of *Aquilegia* group themselves into three quite distinct sections ... Cyrtoplectrae, Rhodanthae and Macroplectrae" (Payson 1918). There are 7 species of *Aquilegia* in Arizona (Kearney et al. 1960). *Aquilegia desertorum* is in the section Rhodanthae and is closely related to *A. elegantula*.

DESCRIPTION: Stems slender, glandular-hairy above, about 30.0 cm (12.0 in.) high. Bright green basal leaves biternate (twice divided into three), rarely over one-third as long as the stems; leaflets small, rather thick, pubescent, glaucous on both surfaces; cauline leaves several. Bracts once or twice ternate; **flowers nodding**, 3.5 - 4.0 cm (1.4 - 1.6 in.) long, 1.5 - 2.0 cm (0.6 - 0.8 in.) across. **Sepals dark red**, elliptic-lanceolate, 7 – 20 mm long, spreading, extending past the blade of petals about 3.0 mm (0.12 in.). **Laminae yellow**, rounded, about 5 mm (0.2 in.) long; spurs light red, straight, slender, 22.0 - 25.0 mm (0.88 - 1.0 in.) long; ovaries pubescent; styles about 10 mm (0.4 in.) long; follicles 1.5 - 2.0 cm (0.6 - 0.8 in.) long, the tips widely spreading.

AIDS TO IDENTIFICATION: *Aquilegia desertorum* is vegetatively similar to *Thalictrum fendleri* (meadowrue), another member of Ranunculaceae. When flowers or follicles not present, care should be taken in identification. **Basal leaves biternate and leaflet margins deeply lobed.** Stems pubescent, often viscid and the leaflets glabrous or sparsely pubescent below. Flowers are nodding and sepals and spurs are dark red while petal tips are yellow **and exerted, numerous stamens.** Widely spaced sepals shorter than spurs but longer than petals.

Aquilegia desertorum resembles its close relative *A. elegantula*. However, *A. desertorum* has smaller leaflets which are glaucous on both surfaces; also true cauline leaves (borne on stem) present in addition to bract and dark red spreading sepals.

ILLUSTRATIONS: Line drawings (Payson 1918:136)
Line drawing (USDI, FWS)
Color photo of flower (W.L. Wagner, *in* USDA, NRCS PLANTS database, http://plants.usda.gov.
Color photos of plant and flowers (Larson Stavast, *in* http://www.cahe.nmsu.edu/riparian/AQDE.htm).

TOTAL RANGE: Known from Coconino County, Arizona. Has also been reported from Utah and New Mexico, but confirmed.

RANGE WITHIN ARIZONA: Kaibab Plateau at Jumpup Springs and Big Sowats Canyon; Ribbon Falls, Grand Canyon; canyons and plateaus southwest, south and southeast of Flagstaff toward the Mogollon Rim. Herbarium records from the University of Arizona and Northern Arizona University show single collections in Navajo and Yavapai counties respectively, but no specific localities were reported and the plants have yet to be recollected from those counties.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Herbaceous perennial.

PHENOLOGY: Flowers and sets fruit from June to September.

BIOLOGY: "*Aquilegia desertorum* is xerophytic, living on rocky slopes in the transition zone and is remarkable for its enormous root and long life... the plant comes into flower long before the other Rocky Mountain species..." (Payson 1918). Plants retain dead stems from previous years. Blooms were found on 30%-55% of the population, the total average equaling 45% (Brian et al. 1982). The number of blooms on reproductive individuals range from one to six. The species is reproductive over a period of four months.

HABITAT: Grows on ledges and bluffs, in potholes and clefts of Kaibab limestone outcrops in ponderosa pine (*Pinus ponderosa*) community in north-central Arizona. Sites may be moist or xeric. Usually some shade is provided by pine overstory.

ELEVATION: 5,000 - 7,500 feet (1,524 - 2,288 m), possibly as low as 3,500 feet (1,067 m) and high as 8,197 feet (2500 m).

EXPOSURE: Grows on all exposures; often shaded by forest overstory.

SUBSTRATE: Rocky slopes of Kaibab limestone.

PLANT COMMUNITY: Rocky Mountain Montane Conifer Forest. In the area of Flagstaff, Arizona, this species has been found in association with *Pinus ponderosa* (ponderosa pine), *Quercus gambelii* (gambel oak), *Abies concolor* (white fir), *Pseudotsuga menziesii* (Douglas fir), *Bromus frondosus* (weeping brome), *Andropogon scoparius* (little bluestem), *Sisymbrium linearifolium*, *Monarda menthaefolia* (mintleaf beebalm), *Geranium caespitosum* (purple geranium), *Cirsium arizonicum* (Arizona thistle), *Artemisia carruthii* (flat sagebrush), *Blepharoneuron tricholepis* (pine dropseed), and *Sitanion hystrix* (bottlebrush squirreltail).

POPULATION TRENDS: As no seedling plants were observed at the three study sites, reproductive success is difficult to ascertain. It is possible that conditions for seed germination are stringent, but the abundance of plants within each small sub-population ensures sufficient seed source. *Aquilegia desertorum* becomes a successful plant once established and is long lived. Plants take advantage of all cracks, ledges and soil-filled potholes of the limestone bedrock. Locally abundant where Kaibab limestone bluffs, outcrops or ledges are exposed (Brian et al. 1982).

In the three areas studied for the status report, the plants ranged from 0.7 plants/m^2 to 2.2 plants /m^2 with a combined average of 1.5 plants/m^2. Each sub-population of *A. desertorum* is very small with its area dependent on each specific outcrop of Kaibab limestone. Known localities for the species south of Flagstaff are scattered over an estimated area of 210 km^2 (Volunteer Canyon to Lake Mary) and 220 km^2 (Clint's Well to Blue Ridge Reservoir).

Numerous observational records were obtained from Greg Goodwin (from Brian et al. 1982) from within the Coconino National Forest boundaries. These are significant additions to the knowledge of the species since the Fletcher (1978) report was prepared. Goodwin stated that the species is very widespread and common wherever the limestone outcrops are exposed.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None (USDI, FWS 1996)
[3C USDI, FWS 1985]
[3C USDI, FWS 1983]
[C1 USDI, FWS 1980]
[PTN-T USDI, FWS 1975]

STATE STATUS: Salvage Restricted (ARS, ANPL 1999)
[Salvage Restricted (ARS, ANPL 1993)]

OTHER STATUS: Not Forest Service Sensitive (USDA, FS Region 3 1999)
[Forest Service Sensitive (USDA, FS Region 3 1990)]
Not listed on NESL (NNDFW, NESL 2000)
[Group 4, NNDFW, NESL 1994]

MANAGEMENT FACTORS: Water development, housing development and growth in and around Flagstaff may limit this species' existence. Timber cutting of adjacent forest lands may destroy populations if slash is piled over the limestone outcrops. None of the plants appeared grazed. Fletcher (1978) attributed overgrazing within the habitat of *A. desertorum* on the Kaibab Plateau for the columbine's restriction to inaccessible areas.

CONSERVATION MEASURES TAKEN:

SUGGESTED PROJECTS: Forest Service personnel should take this species into consideration as part of their monitoring practices, particularly regarding water developments. Additional surveys needed on the North Kaibab National Forest.

LAND MANAGEMENT/OWNERSHIP: The majority of sites are located on the Coconino National Forest. Also on the Kaibab National Forest (two populations known on the North Kaibab Ranger District--1992); Ribbon Falls, Grand Canyon National Park; Northern Arizona University campus; and private property.

SOURCES OF FURTHER INFORMATION

REFERENCES:

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

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Greg Goodwin - Coconino National Forest, Flagstaff, Arizona.
Dr. James Rominger - Department of Biology, Northern Arizona University, Flagstaff, Retired

ADDITIONAL INFORMATION:

Daniela Roth (1998) reports that "Although Kearney and Peebles give its distribution as AZ, UT, and NM, I could not locate any vouchered specimens from New Mexico, or Utah. It appears to be endemic to Coconino Co., AZ. Unspecific collections from Apache, Yavapai, and Navajo counties, AZ, have yet to be relocated."

"The Navajo-Kayenta use *Aquilegia desertorum* in ceremonies" (D.E. Moerman 1986).

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