

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Gonocalyx concolor*

COMMON NAME: no common name

LEAD REGION: 4

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION:

Species assessment- determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: May 11, 2004

90-day positive - FR date:

12-month warranted but precluded - FR date:

Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

Listing priority change

Former LP:

New LP:

Date when the species first became a Candidate (as currently defined): October 25, 1999

Candidate removal: Former LPN:

A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act’s definition of “species.”

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY:

Flowering plant - Ericaceae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Puerto Rico

CURRENT STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Puerto Rico

LAND OWNERSHIP:

The known population of *Gonocalyx concolor* occurs on land managed by the Puerto Rico Department of Natural and Environmental Resources (DNER).

LEAD REGION CONTACT: Rob Tawes, 404/679-7142, robert_tawes@fws.gov

LEAD FIELD OFFICE CONTACT: Marelisa Rivera, Caribbean Field Office, 787/851-7297

BIOLOGICAL INFORMATION:

Description

Gonocalyx concolor is a small evergreen epiphytic or terrestrial shrub, usually clambering, attaining 5 meters (m) (15 feet (ft)) in length (Acevedo 2005, p.227). The leaves are simple, alternate, coriaceous (leathery), ovate, and 1.5 to 3 centimeters (cm) (0.5 to 1.2 inches (in)) long, and 1.5 to 2.25 cm (0.5 to 0.9 in) broad. Venation is 5-plex from the base with the mid-vein immersed above and emersed beneath. Young leaves and branches are brilliantly rose colored, but become green with age. Flowers are bisexual, 5-merous, regular, and uniformly vivid red. They are borne singly on axillary brachyblasts and are semipendent. The corolla tube is carnose, campanulate, and about 13 to 15 millimeters (mm) (0.5 to 0.6 in) in length and 6 to 7 mm (0.2 to 0.3 in) in diameter. The flowers may be hummingbird pollinated (Proctor 1992, p.3).

Taxonomy

The genus *Gonocalyx* is endemic to Puerto Rico with two species: *Gonocalyx portoricensis* and *Gonocalyx concolor* (Liogier and Martorell 1982, p.132). *Gonocalyx portoricensis* is found in the El Yunque National Forest in the Luquillo Mountains and in the Toro Negro Commonwealth Forest in Jayuya. *G. concolor* was discovered in 1968, by Richard A. Howard of the Arnold Arboretum, Harvard University, and Lorin I. Nevling of the Field Museum of Natural History, Chicago on Cerro La Santa in the Carite Commonwealth Forest (Nevling 1970, p.221-227)). *G. concolor* differs from *G. portoricensis* in its vivid red, semipendent flowers which apparently are hummingbird pollinated. *Gonocalyx portoricensis* has whitish to pinkish insect-pollinated flowers (Proctor 1992, p.3). *G. concolor* is currently recognized as a valid taxon (Liogier and Martorell 1982, p.132).

Habitat/Life History

The Carite Commonwealth Forest, where *G. concolor* is found, is steep with slopes ranging from 20 to 60 percent. Underlain by volcanic rock, andesitic in composition, the forest's soils are primarily of clay texture with moderate or slow permeability. Mean annual rainfall is 215 cm (86 in), with February through April being the drier months. Mean temperature is 22.7 ° Celsius (C) and varies from 20°C (68° Fahrenheit (F)) in January to 24° C (73.4° F) in July (Silander et al. 1986, p.183). The forest lies within the subtropical wet forest and subtropical lower montane forest life zones (Ewel and Whitmore 1973). Five vegetation types were described from the Carite Forest: upper montane and palm, lower montane, dwarf or elfin, early successional, and plantations. *Gonocalyx concolor* occurs in the dwarf or elfin forest type. Over 159 species of plants are described from Carite Forest; 35 are endemic to Puerto Rico and 15 are considered endangered or rare (Silander et al. 1986, p. 187).

Preliminary studies of the species' reproductive biology indicate that the plant is predominantly out crossed, and that out crossed flowers produce twice the number of seeds than self-pollinated flowers (S. Flores, pers. comm. 1996).

Historical Range/Distribution

Gonocalyx concolor was discovered in 1968 on Cerro La Santa in the Carite Commonwealth Forest, at an elevation of approximately 903 m (2,962 ft) by Nevling (1970, p.222). The Carite Commonwealth Forest is located in the Sierra de Cayey in the municipalities of Guayama, Cayey, Caguas, San Lorenzo, and Patillas in southeastern Puerto Rico. A second population was found and collected at Charco Azul by Dr. Frank Axelrod in 1993 (Axelrod 6643 (1993)) at an elevation of approximately 630 m (2,067 ft). This second population was found around 2.0 miles southeast of Cerro La Santa. The plant was also reported in 1996 from the El Yunque National Forest in the Luquillo Mountains of northeastern Puerto Rico (S. Flores, pers. comm. 1996); although, this last record has not been confirmed.

Current Range/Distribution

Currently, *G. concolor* is known from two populations: one at Cerro La Santa and the other at Charco Azul, both in the Carite Commonwealth Forest. The population previously reported by

Dr. Samuel Flores in the El Yunque National Forest is apparently no longer extant. Forest Service Tropical Vegetation Specialist, Mr. Luis Rivera, was contacted on February 22, 2007. He reported that the U.S. Forest Service does not have records of the *G. concolor* in the El Yunque National Forest.

Population Estimates/Status

Proctor (1992, p.4) reported approximately 35 individuals in Cerro La Santa at 903 m (2,962 ft). In 1996, Dr. Flores (pers. comm.) located approximately 172 plants at the site. In December 2006, Omar Monsegur (2009, pers. comm.) visited the two known populations of *G. concolor* estimating its abundance at around 25 individuals at Cerro La Santa and 4 individuals at Charco Azul. Information regarding the cause of this change in population numbers is not available to the Service. The number of individuals previously reported from the Luquillo Mountains (El Yunque National Forest) is unknown and apparently it is no longer extant there. Dr. Flores conducted propagation experiments of *Gonocalyx concolor* (1996, pers. comm.). At this time, updated information on population estimates and results from propagation efforts, are not available to the Service.

THREATS:

- A. The present or threatened destruction, modification, or curtailment of its habitat or range. At present time, one of the known populations in Cerro La Santa is found growing on trees located close to communication towers, roads, plantations, and trails. Although the species is currently located within a public forest, and several laws and regulations protect the species within the forest, maintenance of existing communication facilities continue resulting in loss of individuals. During a 2006 site visit, Omar Monsegur (2009, pers. comm.) observed damage to the existing population caused by vegetation removal activities outside of the fence for the maintenance of tower facilities. Therefore, we find that habitat destruction and modification is a current threat to the species at the Cerro La Santa site.

The Charco Azul site may be affected by landslides along the steep hills of the headwaters of the river. Additional visits to this site to evaluate the status of individuals there are warranted.

- B. Overutilization for commercial, recreational, scientific, or educational purposes. *Gonocalyx concolor* is an attractive plant but it is not known to be utilized for commercial, recreational, scientific, or educational purposes.
- C. Disease or predation. Neither disease or predation are known to be factors affecting this species.
- D. The inadequacy of existing regulatory mechanisms. In 1999, the Commonwealth of Puerto Rico approved the Law # 241 known as the “Nueva Ley de Vida Silvestre de Puerto Rico”(New Wildlife Law of Puerto Rico). The purpose of this law is to protect,

conserve and enhance both native and migratory wildlife species; declare all wildlife species within its jurisdiction property of Puerto Rico, regulate permits, regulate hunting activities, and regulate exotic species among others. This law also protects plants. The Carite Commonwealth Forest is designated as a Critical Wildlife Area (CWA) by the Commonwealth of Puerto Rico. The CWA designation constitutes a special recognition by the Commonwealth with the purpose of providing information to Commonwealth and federal agencies about the conservation needs of these areas and assisting permitting agencies in precluding negative impacts as a result of permit approvals or endorsements (DNER 2005, p.vii). The Carite Commonwealth forest is also protected by Law #133 (“Ley de Bosques de Puerto Rico” or The Puerto Rico Forest Law), as amended in 2000.

In 2004, the Commonwealth of Puerto Rico adopted Regulation #6766 (“Reglamento para Regir las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico”) that recognizes and provides protection for certain Commonwealth listed species; *G. concolor* is not on this list of protected species. However, DNER Natural Heritage Program considers this species a critical element and although this designation does not provide regulatory protection, actions that may affect such species are generally scrutinized and measures to minimize or avoid impacts to these species are recommended and implemented. Management plans for Commonwealth forests include the protection and conservation of species classified under DNER regulations as critical, threatened, or endangered; however, the location of the individuals at the Carite Forest makes the enforcement of these regulations difficult.

The species is located adjacent to existing boundaries of the telecommunication facilities. Since damages to the population have been observed, existing laws and regulations have not been effectively enforced. Thus, we believe that this factor is a current threat to the species.

- E. Other natural or manmade factors affecting its continued existence. One of the most important factors affecting the continued survival of *G. concolor* is its limited distribution. The species is epiphytic, growing on the trunks of trees. Damage caused by hurricanes, including tree falling, defoliation, and landslides, could result in the loss of individual plants. Hurricane Georges in 1998 caused severe damages to the Carite Commonwealth Forest. The species is possibly pollinated by hummingbirds, and any modification in habitat that results in shifts in faunal composition or hummingbird mortality may result in the reduction of pollinators. Based on the above, we consider this factor as a current threat to the species

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

Scientists at the University of Puerto Rico, Mayaguez Campus, through a Grant Agreement with the Service, are conducting studies on the species. At this time, the final report has not been submitted to the Service.

The Service plans to notify personnel of DNER of the findings of this review and coordinate a meeting to discuss threats identified within the forest and possible measures to avoid or minimize these threats.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate):

The species is currently threatened by habitat disturbance related to the maintenance of existing telecommunication facilities at Cerro La Santa, limited distribution (two sites) and low population numbers (less than 30 individuals total), and hurricanes. Although the species is located in the Carite Commonwealth Forest, a public forest managed by DNER, applicable laws and regulations are not effectively enforced and Service personnel have documented damages to the population located adjacent to existing communication towers at the forest. We find that this species is warranted for listing throughout all of its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

1. Species should be included on the list of threatened and endangered species under DNER regulation #6766. The Service will request DNER to add this species under consideration for the inclusion on their list of protected species.
2. The Service and the DNER should establish a Memorandum of Understanding or a Candidate Conservation Agreement (CCA) to protect the existing populations in the Carite Forest from harmful forest management practices.
3. The Service should identify partners and cooperators to start propagation efforts. The studies should continue for both augmenting existing populations and establishing additional self-sustainable populations in protected areas.
4. Efforts should start to identify restoration protocol of habitat previously disturbed to reverse the trend of elfin forest loss within the Carite Forest and the rest of the island.

5. Continue the search for this species in other elfin forest, including El Yunque National Forest.

LISTING PRIORITY

THREAT				
Magnitude	Immediacy	Taxonomy	Priority	
High	Imminent	Monotypic genus	1	
		Species	2	
		Subspecies/population	3	
	Non-imminent	Non-imminent	Monotypic genus	4
			Species	5*
			Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7	
		Species	8	
		Subspecies/population	9	
	Non-imminent	Non-imminent	Monotypic genus	10
			Species	11
			Subspecies/population	12

Rationale for listing priority number

Magnitude:

The largest known population (approximately 25 individuals) within the Carite Commonwealth Forest is threatened by maintenance of existing communication facilities. Service personnel have observed damage to the existing population from vegetation removal activities for the maintenance of tower facilities. It is believed that maintenance of existing communication facilities will continue resulting in loss of individuals. Furthermore, this species is epiphytic making it more vulnerable to natural events, such as hurricanes, which may damage the trees on which they grow. Because of extremely low population numbers and the vulnerability to current threats (maintenance activities and hurricanes), the magnitude of current threats on the species is considered high.

Imminence:

Since *G. concolor* is only known from the elfin forest type in the Carite Commonwealth Forest, administered and managed by the DNER for conservation and recreation, the manmade threats to the species are considered non-imminent. The DNER developed a management plan for the Carite Commonwealth Forest in 1976. The species is considered as a critical element under the DNER Natural Heritage Program. Although this designation does not provide regulatory

protection, actions that may impact such species are generally scrutinized and measures to minimize or avoid impacts to these species are recommended and implemented.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing warranted?

No. At the time of this review, there was no indication that threats to *Gonocalyx concolor* have increased, or that the population numbers have been reduced from previous numbers.

DESCRIPTION OF MONITORING:

In December 2006, Omar Monsegur (2009, pers. comm.) visited the two known populations of *G. concolor* estimating its abundance at around 25 individuals at Cerro La Santa and 4 individuals at Charco Azul. The Service provided funding during FY 2006 to Dr. Duane Kolterman and Dr. Gary Breckon, from the University of Puerto Rico at Mayagüez, to update the status of this species. The project is in progress and a report has not been submitted. Once the report is submitted, the information will be incorporated in future reviews.

COORDINATION WITH STATES (indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment):

The Department of Natural and Environmental Resources, which administers and manages the Carite Commonwealth Forest where *G. concolor* is found, regularly requests from the Service comments on activities that may affect candidate, threatened, or endangered species within the Carite Commonwealth Forest, to determine their potential impact on such species and ensure compliance with the Endangered Species Act. The species is considered a critical species under the Natural Heritage Program. It is not included in the 2006 State Wildlife Action Plan for the Commonwealth of Puerto Rico.

Indicate which State(s) did not provide any information or comments: N/A

LITERATURE CITED

Acevedo-Rodriguez, P. 2005. Vines and climbing plants of Puerto Rico and Virgin Island. Smithsonian Institution, Contribution from the United States National Herbarium. Vol. 51. 227-229 pp.

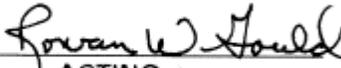
Department of Natural Resources. 1976. The Master Plan for the Commonwealth Forests of Puerto Rico. Puerto Rico Department of Natural Resources, San Juan, Puerto Rico. 259 pp.

Department of Natural and Environmental Resources. 2006. State Wildlife Action Plan.

- Ewel, J.S. and J.L. Whitmore. 1973. Ecological life zones of Puerto Rico and the U.S. Virgin Islands. USDA Forest Serv. Res. Paper ITF-18. 72 pp.
- Flores, S. 1996. Telephone interview with Susan Silander, USFWS. University of Puerto Rico, Humacao, Puerto Rico.
- Liogier, H. A. and L. F. Martorell. 1982. Flora of Puerto Rico and adjacent islands: a systematic synopsis. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico. 342 pp.
- Nevling, L. I. Jr. 1970. The ecology of an elfin forest in Puerto Rico: A new species of *Gonocalyx* (Ericaceae) . J. Arn. Arb. 51 (2): 221-227.
- Monsegur, O. 2009. Personal interview with Marelisa Rivera, USFWS. USFWS, Puerto Rico.
- Proctor, G. 1992. Status report on *Gonocalyx concolor* Nevling. Puerto Rico Department of Natural Resources. 6 pp.
- Rivera, L. February 22, 2007. Telephone interview with Marelisa Rivera, USFWS. U.S. Forest Service, El Yunque National Forest, Puerto Rico
- Silander, S., H. Gil de Rubio, M. Miranda, and M. Vázquez. 1986. Los Bosques de Puerto Rico, In. J. Vivaldi (ed). Compendio Enciclopédico de Los Recursos Naturales de Puerto Rico. DRNA. Vol. II. 178-205

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: 
_____ June 14, 2010
for Regional Director, Fish and Wildlife Service Date

Concur: 
_____ October 22, 2010
ACTING :
Director, Fish and Wildlife Service Date

Do Not Concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: March 2010

Conducted by: Boquerón, Puerto Rico Field Office