Title – Native Broomrape (*Aphyllon*) Herbarium Specimen Collection. 11 December 2023

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Introduction – This project is an effort to determine how many species in the clustered broomrape (*Aphyllon*, aka. *Orobanche*; Orobanchaceae) group exist in the Austin area. Two species (*A. cooperi* and *A. ludoviciana*) have been reported on iNaturalist, but the images are insufficient to verify the identifications conclusively. Purpose of the field study is to collect new herbarium material for identifications (this includes at least one *Aphyllon* plant from each population plus a portion of the host plant to which it is attached), prepare additional digital images of critical structures, inventory for variation within populations, and confirm the host(s) whose roots these parasitic plants attach to for nutrition.

Materials and Methods – Efforts centered on relocating records reported in iNaturalist and any new records reported by Parks staff during other field work. Previous reports indicated flowering mainly in April, but with secondary periods some years in August and December. The areas from which plants were reported previously on the iNaturalist web site included: Mt. Bonnell, Barton Creek Greenbelt, Bull Creek Greenbelt, and Emma Long Metro Park. Field work was accomplished by foot, both on-trail and off-trail. Collection of herbarium specimens followed standard protocols of harvest, documentation, pressing, and drying. Specimens were made of the parasite, its host, and selected species in the immediate vicinity that were unfamiliar to the collector. Voucher specimens were deposited in the University of Texas Herbarium (TEX). Photographs were made in the field using a digital SLR camera.

Results – Field trips were made to sites on 27 April and 2 May 2023. Plants were collected only at Emma Long and Barton Creek Greenbelt. No plants were located at other sites included in the permit. Because of the extreme summer drought, no field work was conducted during August 2023. A final field trip was completed on 8 December 2023, but no plants were found at any site during that time. The following specimens were collected during the two spring trips:

27 April 2023, George Yatskievych collections (accompanied by Liming Cai)
Emma Long Metropolitan Park, W side of City Park Rd ca. 0.1 mile W of Turkey Creek Trail parking area, near trail; 30.33596° N Lat., 097.84237°W Long; elev. 641 feet.
23-002 *Aphyllon cooperi*
23-003 *Viguiera dentata* (the host species).

2 May 2023, George Yatskievych collections
Barton Creek Greenbelt, along trail 0.3–0.5 mile below Hill of Life Dam; 30.27021° N Lat., 097.82764° W Long; elev. 592 feet.
23-004 *Aristida purpurea* var. *longiseta*
23-005 *Valerianella radiata*
23-006 *Giliastrum incisum*
23-007 *Warnockia scutellarioides*
23-008 *Colubrina texensis*
23-009 *Aphyllon cooperi* (with piece of *Viguiera dentata* unnumbered to confirm the host)

Discussion – The ability to observe and collect fresh material has helped to confirm that the plants growing in the Austin area are all one species, *Aphyllon cooperi*. The species is mainly distributed in the Sonoran and Chihuahuan deserts and the Austin area populations are relatively disjunct to the Northeast of the main species distribution. The sole host species for these relatively benign annual parasites in the Austin area appears to be *Viguiera dentata* (golden eye, Asteraceae); elsewhere in its range, the species parasitizes mainly *Ambrosia* (ragweed, Asteraceae).

The Austin area plants are relatively small with fewer flowers per spike; the flowers have smaller corollas as well. Morphological variation within *A. cooperi* is complex. Three subspecies have generally been recognized (Collins et al. 2019). Subspecies *cooperi* and subsp. *latiloba* occur mainly in the Sonoran Desert in the southwestern states and adjacent Mexico. Plants mainly from the Chihuahuan Desert region in New Mexico, Texas, and northeastern Mexico have been referred to as subsp. *palmeri*, which has the smallest corollas of the group (to 22 mm with the lip 3–5 mm vs. to 32 mm with the lip 5–10 mm). Plants of the Austin region have still smaller corollas (to 12 mm with the lip 2–4 mm).

Conclusions – Clustered broomrape plants growing in the Austin area represent a single species and are referable to *Aphyllon cooperi*. However, they grow in a unique habitat for the species, have a different host preference, and a morphology that does not allow them to be readily assignable to any of the three named subspecies within *A. cooperi*. Further study is required, but the Austin area plants may turn out to represent a novel fourth subspecies that is endemic to a small area at the eastern edge of the Edwards Plateau.

Literature Cited –

Collins, L. T., A. E. L. Colwell, and G. Yatskievych. 2019. *Orobanche*. Pp. 467–488 *in* Flora of North America Editorial Committee, ed., Flora of North America, North of Mexico. Volume 17. Magnoliophyta: Tetrachondraceae to Orobanchaceae. Oxford Univ. Press, New York.









