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Additional notes on *Cistanthe philhershkovitziana* Hershk. (Montiaceae)

Mark A. Hershkovitz
Santiago, Chile, cistanthe@gmail.com

ABSTRACT

Scrutiny of online herbarium and social network images revealed at least three historical collections and one recent photograph of the recently described *Cistanthe philhershkovitziana* Hershk. (*C.* sect. *Cistanthe*). The herbarium specimens, dating to 1829, 1882, and 1905, corroborate, and extend slightly the species range estimated on the basis of unvouchered collections and observations *C. grandiflora* (Lindl.) Schlect.
Key words: *Cistanthe,* Chile.

Background

Cistanthe philhershkovitziana Hershk. (*C.* sect. *Cistanthe*) was described based on a single vouchered type locality collection and reference to additional unvouchered collections/observations at other localities in Chile's Regions IV-V (Hershkovitz, 2018a, cf. Hershkovitz 2018b). After Hershkovitz (2018a) was finalized for publication, further ongoing research on Montiaceae uncovered previously unidentified historical collections of *C. philhershkovitziana* among digital images available from various herbaria. These specimens and their URLs are cited here. In addition, a URL is provided for an archived internet social network image of *C. philhershkovitziana* growing at the type locality under more humid conditions. The gross vegetative morphology appears different than that observed during a drought year.

Results

Specimens of *C. philhershkovitziana* were found in digital collections of three herbaria: E (Royal Botanic Gardens, Edinburgh 2018), K (Royal Botanic Gardens, Kew 2018), and NY (New York Botanical Garden 2018). These include at least three and up to five different collections mounted on four sheets. All are identifiable easily as *C. philhershkovitziana*, based on the fusiform caudex/root, basal leaf rosette, and leafless (though bracteate) culm (cf. Hershkovitz 2018a: 219. Fig. 3B). In contrast, specimens of all other Chilean species of *C.* sect. *Cistanthe* generally include only inflorescence branches cut from much larger plants and no caudices. The collections are as follows:

1. **CHILE**: Region IV, Elqui Province, Coquimbo, 23-30 August 1879 ["Feb 1882"], *R. W. Coppinger s. n.* (K: 001057601, http://specimens.kew.org/herbarium/K001057601), Fig. 1.

The two individuals of *C. philhershkovitziana* are mounted on the right side of a sheet shared with *Cuming 408* (K: 001057600), annotated as a holo-epitype of *Calandrinia glauca*

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Schrad. [= *Cistanthe grandiflora* (Lindl.) Schlect.; Veldkamp 2015, cf. Hershkovitz 2018a, b]. The 1882 date on the label is inaccurate and probably is generic. An 1879 collection locality and date can be deduced from Coppinger (1899: 93).

Coppinger's (1899) account suggests that the plant was collected in what is now Coquimbo city proper or very close by. This is about 10 km north of my northernmost observation at Las Tacas (Hershkovitz 2018a) and corroborates the northern limit of the species. Whether or not the species occurs today in this heavily transformed urbanized area remains to be determined.

2. Locality, collector, date uncertain (K: 001057598, http://specimens.kew.org/herbarium/K001057598; 001057599, http://specimens.kew.org/herbarium/K001057599), Fig. 2.

The individual in the center of this sheet is *C. philhershkovitziana*. The rosettiform fragment to the immediate right of this individual also may pertain to this collection. As with the preceding collection, an individual of *C. philhershkovitziana* is mounted on the same sheet as an epitype of *Cuming 408*.

The specimen associated with K: 001057599 is the inflorescence fragment on the far right side of the sheet. At this writing, the Kew database indicates that the collector script is illegible and collection number unknown. The collector is Andrew Mathews, as clear from comparison with the label of *Mathews 314* (E: E00514023, http://data.rbge.org.uk/herb/E00514023), and the collection number is likely 315, given Veldkamp's (2015) description of the label of a duplicate at CGE, also mounted on a sheet with *Cuming 408*. The collection label of *Mathew 314* places the collection number in the margin above the locality data. Possibly the number was scissored from the label in this Mathew sheet.

The individual of *C. philhershkovitziana* on this sheet may well be the Coppinger collection cited above. Evidently, at that time, different collections were mounted together rather promiscuously, and composite sheets were duplicated, albeit haphazardly. Forensic examination may be necessary to clarify the source of this specimen.

3. **CHILE**: Region V, Quillota Province, Quillota, "in silvaticis petrosis calidis collium" [forested hills on hot, rocky substrate], "Sptbr.-Nvbr, 1829, 1830, *Bertero 685 & 1349*" [!August-October, 1829, *Bertero 1349*] (NY: 02065851, http://sweetgum.nybg.org/science/vh/specimen_details.php?irn=2247886), Fig. 3.

This collection corroborates my reported observation of the species in the sclerophyllous forest of the Region V coast ranges (Hershkovitz 2018a). My locality was ca. 25 km to the E/SE, but the ecology is similar.

However, the collection numbers and dates present inaccuracies. This is not surprising, given the persistent difficulties with parsing of Bertero's collections. Delprete et al. (2002) summarized evidence for Bertero's itinerary in Chile, although their tabulation seems to have transposed the dates of visits to Quillota and the Juan Fernandez Islands. Correcting for this

indeed places Bertero in Quillota, September-November, 1829. However, Bertero departed Chile on 28 September, 1830 (Delprete et al. 2002), and there is no indication that he ever returned to Quillota.

Comparison with contemporaneous Bertero collections of other taxa reveal the error. *Bertero* 683 (G: 00440471, http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=303319&lang=en) indicates Rancagua, October, 1828. This corresponds with Bertero's itinerary (Delprete et al. 2002), rendering unlikely the collection of *Bertero 684* in Quillota a year later.

Other key collections are *Bertero 1348* (G: 00440494, http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=303415&lang=en, P: 01903300, http://coldb.mnhn.fr/catalognumber/mnhn/p/p01903300) and *Bertero 1350* (E: 00282302, http://data.rbge.org.uk/herb/E00282302. Both collections indicate Quillota, the former dated August-October, and the latter September-October, 1829. The collection numbers, locality, and dates correspond perfectly with *Bertero 1349*.

The evidence thus indicates that Bertero made only one collection of this taxon in Quillota, and that the correct number/date are *Bertero 1349* and August-October. 1829. The *Bertero 684* number and 1830 and November dates are erroneous. This also may help explain why there is only one caudex on the sheet: the two fragments might be from the same individual. An underway search for duplicates of this collection will help clarify this.

4. **CHILE**: Region V, Valparaiso Province, Quintero, ca. 10 m altitude, Sept. 1923, *Werdermann 39* (E: 00033182, http://data.rbge.org.uk/herb/E00033182), Fig. 4.

Given the altitude, this individual likely originated from a beach backdune habitat similar to those of Zapallar and Pichicuy (Hershkovitz 2018a). Quintero is ca. 45 km S of the previously reported southernmost observation of the taxon in Zapallar. The specimen was annotated by I. E. Peralta (MERL) as "*Cistanthe* aff. *crassifolia*." This is somewhat surprising, since *C. philhershkovitziana*, is a relatively diminutive annual, and the collection is from the Valparaiso vicinity, whereas *C. crassifolia* is a pachycaul shrub occurring nearly 700 km to the north (Hershkovitz 2018b). Still, the annotation manifests Peralta's recognition that this plant did not pertain to one of the better-known species of *C.* sect. *Cistanthe*. In fact, I have made more and worse misidentifications in *Cistanthe* (Hershkovitz 2018a, b).

5. **CHILE**: Region V, Petorca Province, La Ligua Municipality, Humedal de Pichicuy, 11 August 2016, *Francisco J. Ovalle s. n.* (photo, https://www.instagram.com/p/BI-VgNDAT7v), Fig. 5.

This photo shows an individual of *C. philhershkovitziana* growing in more irrigated conditions. The plant is "young:" only one culm is in flower, but six immature culms can be detected among the leaves. The leaves are larger and deeper green than those found in 2018 (Hershkovitz 2018a). Also, the leaves and stems are decidedly more prostrate, as I also have observed at this site during wetter seasons.

Although annual precipitation in central Chile was well below "normal" in 2016, records from near Pichicuy (Longotoma station, ca. 20 km) indicate above-normal May-July rainfall (> 200 mm, > 100 mm in July; Government of Chile 2018). This explains the early and lush appearance of the photographed individual. Normally, the plants flower in late September to October at this locality. However, Hershkovitz (2018a) noted that phenology of this annual taxon is climate responsive.

Discussion

The finding of historical unidentified collections of *Cistanthe philhershkovitziana*, along with its extensive distribution in populated areas, indicate that this conspicuous species simply fell through the cracks of botanical surveys. This is especially so considering that both Bertero and Werdermann collected the species. Their collecting of this species is not surprising, since both were exceptional collectors of Chilean plants. But precisely for this reason, their collections generally have been sought out and well-studied. However, studies of their collections have been facilitated by broad distribution of their duplicates. As yet, I have not located duplicates of *Bertereo 1349* or *Werdermann 39*. Lack of duplicates might have obscured visibility of these odd collections. Bertero's untimely demise (Delprete et al. 2002) did not help matters, because he was sufficiently astute to have recognized eventually that his collection was a new species. But as I have noted (Hershkovitz 2018a, b), the historical oversight of this species was exacerbated by the historical taxonomic ambiguity in *Cistanthe*, intermittency of precipitation, and poor specimen preservation.

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Figures

Fig. 1. *Cistanthe philhershkovitziana*. *R. W. Coppinger s. n.* (K: 001057601). The two specimens on the right are this collection. The specimen on the left is *Cuming 408* (K: 001057600), an epitype of *Calandrinia glauca* Schrad. [= *Cistanthe grandiflora* (Lindl.) Schlect.]. Image from Royal Botanic Gardens, Kew (2018).

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Fig. 2. *Cistanthe philhershkovitziana*. Without collection data. (K: 001057598). The specimen in the center and possibly the small fragment to its right are this species. Possibly the collection is the same as the Coppinger collection is Fig. 1. The specimen on the left is *Cuming 408*, (K: 001057598) an epitype of *Calandrinia glauca* Schrad. [= *Cistanthe grandiflora* (Lindl.) Schlect.]. The inflorescence stem on the far right (K: 001057599) is an Andrew

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Mathews collection, probably *Mathews 315* (see text). Image from Royal Botanic Gardens, Kew (2018).

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Fig. 3. *Cistanthe philhershkovitziana*. *Bertero 1349.* (NY: 02065851). The collection number *Bertero 684* does not pertain to this specimen, and the correct date is August-October, 1829 (see text). Image from New York Botanical Garden (2018).

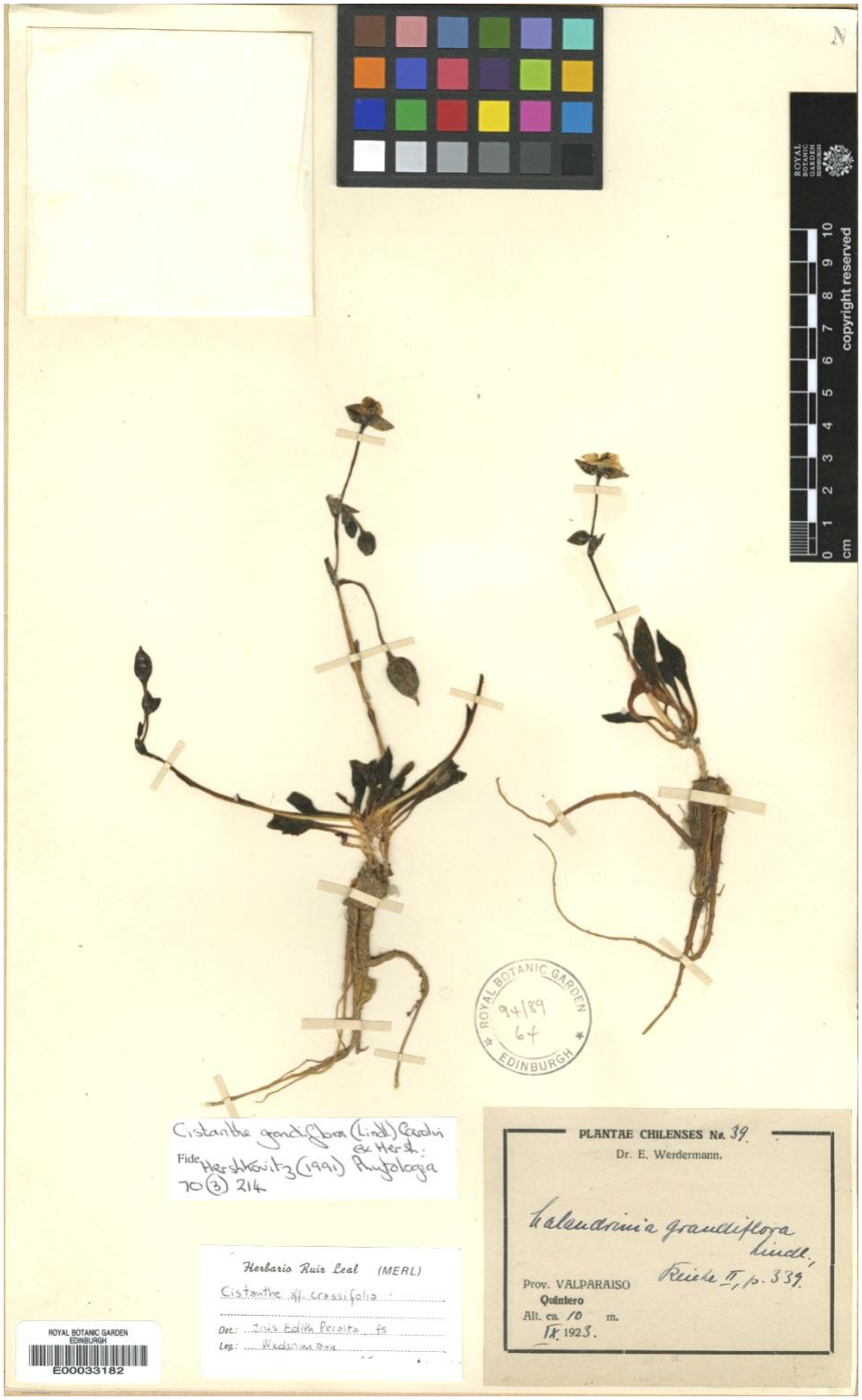

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Fig. 4. *Cistanthe philhershkovitziana*. *Werdermann 39.* (E: 00033182). Image from Royal Botanic Gardens, Edinburgh (2018).

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Fig. 5. *Cistanthe philhershkovitziana*. Individual at type locality at Humedal de Pichicuy, 11 August, 2016. Note the prostrate habit, deep green leaves, and, besides the flowering inflorescence, six inflorescence branches in early stages of development distributed radially, emerging from leaf axils. Photo by Francisco J. Ovalle, posted on Instagram, @francisco.j.ovalle.3, https://www.instagram.com/p/BI-VgNDAT7v).