Notes on the taxonomy of the *Cistanthe philhershkovitziana* Hershk. species complex (*C.* sect. *Cistanthe*; Montiaceae)

Mark A. Hershkovitz
El Quisco, Chile
cistanthe@gmail.com

ABSTRACT

The *Cistanthe philhershkovitziana* Hershk. species complex (*C.* sect. *Cistanthe*; Montiaceae) here is informally circumscribed to include four named species, its namesake plus *C. behacheliana* Hershk., *C. gbifiana* Hershk., and *C. reshetiana* Hershk. The species occur in coastal Chile in the littoral and adjacent riparian zones, coastal plains, and coastal range matorral, extending some 600 km in between Cardenal Caro Province (Libertador O'Higgins Region) and Huasco Province (Atacama Region). These species share a geophytic (to scarcely hemicryptophytic) rather than the chamaephytic to phanerophytic life form of other *C.* sect. *Cistanthe* species, and also are much smaller in maximum height. The present work provides a consolidated review of the characteristics of the species, as well as complete revised descriptions of each. The significance of the relatively recent discovery of not merely a new species, but a new and widespread species complex, is discussed in the context of botanical research in Chile. Evidence for phylogenetic relations of the species also is evaluated.

Key words: *Cistanthe*, Montiaceae, Chile, taxonomy

[CITATION: Hershkovitz, M.A. 2026. Notes on the taxonomy of the *Cistanthe philhershkovitziana* complex (*C.* sect. *Cistanthe*; Montiaceae)]

Introduction

As designated here, the *Cistanthe philhershkovitziana* Hershk. species complex ["*C. philhershkovitziana* s. l.," *C.* sect. *Cistanthe* sensu Hershkovitz (2019a) non Hershkovitz (1991a, b, 1993); Montiaceae], as designated here, comprises four successively named species: *C. philhershkovitziana* s. str. (Fig. 1), *C. reshetiana* Hershk. (Fig. 2), *C. behacheliana* Hershk. (Fig. 3), and *C. gbifiana* Hershk. (Fig. 4). These distribute collectively in coastal vegetation in Chile between ca. -28.5° (Huasco Province, Atacama Region) and -34° (Cardenal Caro Province, Libertador O'Higgins [LOH] Region). The species differ from other *C.* sect. *Cistanthe* species principally in their life form and smaller size. The species are unique among *C.* sect. *Cistanthe* species in qualifying as geophytes, viz. plants whose perennating organs are (in nature) completely subterranean. Only one species, C. reshetiana, may scarcely become a subrosettiform hemicryptophyte, similar to small plants of subrosettiform chamaephytic *C.* sect. *Cistanthe* species. Species of the latter otherwise are subrosettiform chamaephytes to phanerophytes (Hershkovitz, 2024). Stem lengths of *C. philhershkovitziana* complex species usually are on the order of 20–30(–40) cm long, whereas stem lengths of other species commonly are 40–60(–100+) cm long. Leaf number and size are correspondingly less. However, the difference in floral organ and fruit size is negligible.

The first described species (Hershkovitz, 2018a), *C. philhershkovitziana* s. str., had been collected as early as 1829 by Carlo Bertero (Hershkovitz, 2018b, 2019b, 2020a). Hershkovitz (2022a) later documented a distribution spanning (at that time) -28.5–33.8°. Hershkovitz (2024) studied in detail the developmental and ecological behavior of *C. philhershkovitziana* plants in Chile's southern Central

Littoral Zone (CLZ). This scrutiny led Hershkovitz (2025a) to appreciate that Coquimbo Region plants growing in more arid coastal matorral vegetation away from the littoral zone were a distinct species, *C. reshetiana*. These plants differed, albeit subtly, in several root, leaf, stem, and floral traits, as well as in their overall size. Moreover, *C. reshetiana* appeared to be self-incompatible, whereas *C. philhershkovitziana* s. str. self-pollinates mechanically, which produces ~100% seed set.

The segregation of *C. reshetiana* muddied considerably the earlier distributional map (Hershkovitz (2022a), which presumed that all small rosettiform coastal region *Cistanthe* plants from the Valparaiso to Atacama Regions pertained to *C. philhershkovitziana*. Hershkovitz (2025a) suggested that only the littoral (including near-coastal estuary/riparian) zone plants are *C. philhershkovitziana*, while Coquimbo Region coastal matorral plants must be *C. reshetiana*. Numerous images of *C. philhershkovitziana* complex plants from the Coquimbo Region are available via iNaturalist.org, but, unfortunately, few show clearly the diagnostic characteristics. Thus, the plant identities must be confirmed in the field on a locality-by-locality basis. But more problematic were the small and subtly different plants from Huasco Province (Atacama Region). Field studies of these in 2025 led to segregation of two additional forms, *C. behacheliana* and *C. gbifiana* (Hershkovitz, 2025b), but there are forms besides these.

As pointed out in Hershkovitz (2025c), the genus *Cistanthe* attracted little scientific interest in the nearly two centuries following description of the first species, viz. *C. grandiflora* (Lindl.) Schltdl. (≡ *Calandrinia grandiflora* Lindl., *nom. cons.*; Lindley, 1828). But within the past decade or so, interest in *Cistanthe* has emerged in the areas of evolutionary ecology and ecophysiology, with emphases on pollination ecology, life history evolution, microbial associations, photosynthesis, and phylogenetic and functional genomics (Stoll et al., 2017; Astorga-Elo et al., 2020; Holtum et al., 2021; Martinez et al., 2022; Chomentowska et al., 2025a, b, c; Ossa et al., 2025). Advances in these areas are constrained by a taxonomic scaffold that remains inadequate and, in the case of the *C. philhershkovitziana* complex, rudimentary.

In the interest of clarifying further the taxonomy of this complex, the present work reports additional information on its variability based on observations of plants both in the field and following collection and cultivation ex situ. The taxonomy presented here is heuristic rather than definitive. Some observed forms do not fit neatly into the scheme, demonstrating the need for additional research.

Materials and methods

Additional observations of *C. philhershkovitziana* complex species from fieldwork in October, 2025, from behavior of collected plants in cultivation, and from internet sites, especially iNaturalist.org, were synthesized with evidence presented previously in Hershkovitz (2018a, b, 2022a, 2024, 2025a, b). The classical typological approach (Hershkovitz, 2022b) is applied to circumscribe taxa corresponding to the four named Types. This provides the taxonomic scaffold for purposes of analysis and orientation of future research. Observations of plants not easily inserted into this taxonomic scheme are discussed.

Results

A principle distinction emphasized between *C. philhershkovitziana* (s. l.) and other *C.* sect. *Cistanthe* species was the absence of above-ground mass during the Mediterranean climate summer drought period and year-round during extended droughts, especially towards the Atacama Desert (Hershkovitz, 2018a). This led to its erroneous initial characterization as an annual, its thick fusiform taproot notwithstanding. Subsequent empirical analysis and historical literature review (Hershkovitz,

2024) demonstrated not only that *C. philhershkovitziana* was a facultative annual, but that this condition characterizes most, if not all, perennial species not only of *C.* sect. *Cistanthe*, but of most perennial Montiaceae. Still, at least in nature, *C. philhershkovitziana* s. l. plants appear to have a shorter lifespan and higher first-year mortality than other species of the section.

Below I describe the taxonomic history of *C. philhershkovitziana* complex species. Appendix 1 elaborates a detailed taxonomy as conceived here and provides revised and expanded diagnoses and descriptions of the species, as well as a corrections of a few earlier editorial errors.

a. *C. philhershkovitziana*. Following a publishing hiatus of 12 years, one of the main motivations of Hershkovitz (2018a) was to correct an error in Hershkovitz (2006), in which *C.* sect. *Cistanthe* plants were badly misidentified. Plants corresponding to *C. philhershkovitziana* plants from the Type locality in Pichicuy (ca. -32.35°) were identified in Hershkovitz (2006) as "*Cistanthe* sp. 03-06." Meanwhile, all specimens corresponding to *C. grandiflora* sensu Hershkovitz (2025d) were misidentified as *C. discolor* (Schrad.) Spach. Even before Hershkovitz (2006) was published, I re-misidentified the Pichicuy plants as *C. grandiflora*, and the plants identified as *C. discolor* in Hershkovitz (2006) were re-identified as *Cistanthe glauca* (Schrad.) Lilja (now *nom. rej.*). On my advice, this erroneous taxonomy was applied by Villagrán et al. (2007) for the flora of the coastal locality of Zapallar (ca. -33.3°).

However, while Candolle (1828) listed *C. glauca* as a species distinct from *C. grandiflora*, Veldkamp (2015) documented how the former later came to be considered nearly universally to be a taxonomic synonym of the latter. He also argued successfully that the younger basionym *Calandrinia grandiflora* Lindl. should be conserved over the older *Calandrinia glauca* Schrad. (now *nom. rej.*). For purposes of Villagrán et al. (2007), I unwittingly provided the name *at that time* both taxonomically and nomenclaturally correct for the *C. grandiflora* plants. In particular, I diagnosed the plants I called *C. glauca* especially by their distinctly angled flowering stems, which actually is the diagnostic trait of *C. grandiflora* (Hershkovitz, 2025d). But then I erred in applying the latter name to eventual *C. philhershkovitziana*.

It is important to clarify that my misidentifications above were not derived analytically, but more or less by process of elimination. In particular, following the most recent revision of *C.* sect. *Cistanthe* species by Reiche (1898a, b), *C. grandiflora* had become a catchall for most if not all Types pertinent to this section (e.g., Hershkovitz, 1991a). The taxonomy of this section had bewildered Reiche (1897), as well as Philippi (1893) before him. Later, Johnston (1929, 1932), Hershkovitz (1991a), and Ford & Peralta (2002) manifested difficulties in species identification. Especially consequent to my fieldwork, 2000–2004, it had become abundantly clear to me that my erstwhile lumping of *C.* sect. *Cistanthe* into *C. grandiflora* was untenable.

The task then became to associate the observed forms with their correct names. A principal theoretical dilemma was that recognition of species as being *distinct* from *C. grandiflora* still required precise identification and circumscription of *C. grandiflora* itself. This was difficult because of my scant accessibility at that time in Chile to literature and Type specimens, combined with the inadequate preservation of taxonomically diagnostic traits in available *Cistanthe* herbarium specimens (Hershkovitz, 2019a). In retrospect, my notion of the identity of *C. grandiflora* up until 2007 was simply an educated guess. Given that the *C. philhershkovitziana* complex morph was conspicuous, conspicuously located, and conspicuously distinct, I could not imagine that it was an undescribed species, and that led me to denominate it as *C. grandiflora*. But I hardly was alone in misjudging the identity of *C. grandiflora*. Notably, as recent as late 2025, other Montiaceae specialists identified plants of *C. lindleyana* (Walp.) Hershk. and probably *C. reshetiana* as *C. grandiflora* and, concomitantly, plants of *C. grandiflora* as *C. cachinalensis* (Phil.) Peralta & D.I.Ford (Hershkovitz, 2025e).

By ca. 2010, during my publishing hiatus, I had resolved the correct identity of *C. grandiflora* and, to my surprise, that eventual *C. philhershkovitziana* was undescribed. But I did not publish this knowledge until late 2018. Still, that work was not free of naivety. In the section of Hershkovitz (2018a) entitled "other observations [of *C. philhershkovitziana*]," I cited several plants besides the Type. Of these, I can verify as *C. philhershkovitziana* only the Zapallar plant illustrated as *C. grandiflora* by Villagrán et al. (2007). The plants cited as observed along the Panamerican Highway in the central Coquimbo Region are probably *C. reshetiana*. I now consider highly unlikely the identification of the cited destroyed collection *Hershkovitz 99-977* from the eastern portion of the coastal ranges (see below). The cited destroyed collection *Hershkovitz 99-945* from along the Panamerican Highway in Los Vilos must be ignored, because its anthropogenic habitat no longer exists. But *C. philhershkovitziana* does, in any case, occur in the littoral zone of Los Vilos. The population of the cited (destroyed) collection *Hershkovitz 00-144* from along the Panamerican Highway just south of Coquimbo city at the Las Tacas exit (ca. -30.06), misidentified as *C. grandiflora* in Hershkovitz (2006), must be reexamined. This population occurs on a sandy coastal alluvial plain ca 1 km inland at ca. 30 m elev. This habitat is somewhat intermediate between that of the littoral zone and coastal hill matorral.

Subsequently, Hershkovitz (2018b, 2022a) provided additional occurrence data for *C. philhershkovitziana* that consequently expanded its apparent range. Of the occurrences reported in the Valparaiso and Coquimbo Regions, I consider only those below 30 m in elevation and within perhaps 500 m of the waterfront to be most likely *C. philhershkovitziana*. In these regions, those further from the coast and/or at higher elevation and/or in arid matorral probably are *C. reshetiana*. However, plants at each locality must be reexamined to verify their identities. Also, some plants identified as *C. philhershkovitziana* from the Atacama Region require reexamination (see below).

An especially problematic collection reported in Hershkovitz (2018b, 2022a) is that referred to as "*Bertero 1349*," supposedly collected in Quillota (Valparaiso Region) in 1829 (Hershkovitz, 2019b, 2020a). This is not only the oldest known collection of *C. philhershkovitziana*, it demonstrates that the species already had been collected during the first major "wave" of botanical exploration of central Chile during the 1820–1830s (see Lasègue, 1845). One problem with this material was described by Hershkovitz (2020a), who demonstrated that Bertero's Chilean specimens in various herbaria commonly are mixed collections of multiple species and/or from multiple localities, and that the "collection numbers" refer to taxa, not actual collections. After Bertero's death, collections bundled taxonomically by Bertero (like-numbered and otherwise) were lumped and split arbitrarily and distributed throughout Europe, so that the collection dates and locality data became meaningless. In this case, "*Bertero 1349*" is part of a mixed collection sometimes combined with "*Bertero 684*" that includes at least three *C.* sect. *Cistanthe* species nominally from both Quillota and the Andean precordillera near Rancagua (LOH Region). The other problem is that Quillota is in a coastal range valley some 25 km inland from the littoral zone. But since Bertero specimen label data evidently is unreliable, it seems possible that the *C. philhershkovitziana* individuals in these specimens may have originated elsewhere and later were combined with plants from Quillota. Bertero also visited Concón, where *C. philhershkovitziana* is present.

b. *C. reshetiana*. This species was illustrated as *C. philhershkovitziana* (s. l.) in Hershkovitz (2021a). Several morphological traits support the segregation of *C. reshetiana* from *C. philhershkovitziana* (Hershkovitz, 2025a), and these traits in turn correlate with an ecological separation. In particular, although these two species are distributed within ca. 20 km of the coast along the latitudinal length of the Coquimbo Region, *C. reshetiana* occurs in semiarid coastal matorral above 50 m in altitude, whereas *C. philhershkovitziana* is restricted to the littoral and near-coastal estuary/riparian zone below 30 m in elevation. But the distributional details remain to be resolved by reexamination of populations throughout the Coquimbo Region coastal zone, especially given the presence of as yet not re-identified plants in intermediate habitats in broad coastal plains at latitudes in between ca. Ovalle and Coquimbo.

Among the traits reportedly separating *C. reshetiana* from *C. philhershkovitziana* are taproot morphology and growth form. Taproots of the former, while thickened, do not appear as markedly fusiform as those of *C. philhershkovitziana*. There is not a sharp constriction at the caudex apex. *Cistanthe philhershkovitziana* has fleshy subterranean stem portions (caudical rhizome of Hershkovitz, 2018a) that separate the subterranean caudex apex from the emergent leafy rosettes. This morphology is what imparts a clearly geophytic character to its life form. I consider *C. reshetiana* also to be geophytic, but of the caudex apex is near the surface, it appears ± as a subrosettiform hemicryptophyte. However, the caudex and taproot morphology of other *C. reshetiana* populations need to be examined. It is possible that their form is influences by substrate and local conditions.

Other traits supporting the segregation of *C. reshetiana* include: **(i)** a larger maximum (flowering) stem length, and, accordingly, more fertile nodes and flowers; **(ii)** stems subangular at the base and at nodes rather than terete; **(iii)** leaves somewhat longer, narrower, and stiffer that lack differentiation into blade and petiolar portions and that have more sharply acute apices; **(iv)** leaf texture more rigid and less succulent with a smoother (less rugose) surface versus a commonly coarsely rugose surface; **(v)** the almost invariable presence of a single small foliage leaf (viz. notably larger than more apical bracts and otherwise lacking bract characteristics) at the basalmost flowering stem node (versus its absence in *C. philhershkovitziana* s. str.); **(vi)** larger flowers; **(vii)** deeper rose to nearly magenta rather than paler rose petals; and **(viii)** reported self-incompatibility (Hershkovitz, 2025a).

The last distinction, however, appears to be somewhat inaccurate. As described in Hershkovitz (2025a), numerous manually self-pollinated flowers of numerous field-collected individuals failed to produce seed. However, a few of these individuals were cultivated, and during eventual subsequent flowering, the flowers were substantially self-compatible (> 50 % seed set), although seed viability is not yet tested. Developmental loss and/or plasticity of self-incompatibility are not unprecedented (Suijkerbuijk et al., 2025). But the species remain distinct in their reproductive behavior, because, unlike *C. philhershkovitziana*, *C. behacheliana*, and *C. gbifiana*, the self-compatible flowers of *C. reshetiana* do not self-pollinate spontaneously. In the other species, the stamens initially spread after anthesis but later recurve inwards and make contact with the stigma. This does not occur in *C. reshetiana*, which requires a pollinating agent.

Some but not all plants identified as *C. philhershkovitziana* from a peculiar anthropogenically-disturbed near-coastal estuary/riparian zone population in Cartagena (-33.5°, San Antonio Province, Valparaiso Region) have some characteristics of *C. reshetiana*.[1] In particular, the plants are much larger than plants from other nearby southern CLZ populations of *C. philhershkovitziana*, the leaf surface is less rugose, and the flowering stems bear at their basal nodes small appendages that are patently leaf-like rather than bract-like. Other plants from this locality appear as larger but otherwise typical *C. philhershkovitziana*, e.g., a plant that I have maintained in cultivation since December, 2023. Hershkovitz (2024) attributed the larger size of plants at this locality to high substrate fertility afforded by the dominance of the exotic invasive leguminous shrub *Lupinus arboreus* Sims. But since *C. reshetiana* was not yet described, no significance was afforded to the other peculiar traits.

The occurrence of some plants similar to *C. reshetiana* plants within a population of *C. philhershkovitziana* in the perennially humid near-coastal estuary/riparian zone some 150 km S of “bona fide” populations of the former in semiarid coastal matorral may challenge the taxonomic distinction

---

[1] E.g., https://www.inaturalist.org/observations/136217959, https://www.inaturalist.org/observations/185353241.

between these species. It might suggest that the morphological differences represent habitat-specific developmental differences associated with one or another *particular* distinctive habitat (i.e., *either* high fertility perennially humid near-littoral *or* semiarid coastal matorral). However, the morphological distinctions between the species remain clearly evident in plants cultivated side-by-side in my inland residence in the littoral zone city of El Quisco (ca. -33.24°, ca. 60 m elev. at my residence 1 km inland). Hence, for the moment, I attribute the *C. reshetiana*-like traits of some Cartagena plants to some explanation other than plasticity owing to lack of lineage separation.

A more sublime distinction between *C. reshetiana* and *C. philhershkovitziana* is that the collected individuals of the former proved to be very difficult to establish in cultivation both in and out of doors in El Quisco. Taproots of only five of ten collected individuals developed lateral roots when cultivated in water, and root development was extensive in only one. Only four individuals survived transplantation to solid substrate, and even these required multiple interventions owing to root rot. One individual finally established an extensive root system after ca. nine months, then rapidly initiated inflorescence development and flowering during the 10th month. The other three individuals did not establish until ca. the 14–15th month and first flowered during the 15–16th month. In contrast, *C. philhershkovitziana* caudices from multiple southern CLZ localities and collected in various developmental stages rapidly produced abundant new roots, even without substrate in plastic Ziplock bags. New rosettes and inflorescences follow shortly thereafter. The differential behavior in cultivation suggests underlying physiological differences, although these may be conditional rather than genetic.[2]

c. *C. behacheliana*. Hershkovitz (2022a) reported that *C. philhershkovitziana* (s. l.) extended northward to Huasco Province (Atacama Region). The segregation of *C. reshetiana* in the Coquimbo Region thus necessitated a reevaluation of the Huasco plants. Hershkovitz (2025b) segregated two additional species, *C. behacheliana* and *C. gbifiana*, although this does not rule out the presence of *C. philhershkovitziana* also. *Cistanthe behacheliana* was illustrated in its emergent rosette stage as *C. philhershkovitziana* in Hershkovitz (2022a). Like *C. philhershkovitziana*, it possesses a distinct caudical rhizome, and clearly it is geophytic.

Its primary distinction is that the plants are “albino” in the sense of apparently lacking betacyanin/betaxanthin pigmentation. This distinction is somewhat weak, since plants lacking any gene product in the pigment production pathway will be albino. In fact, albino forms of other *C.* sect. *Cistanthe* (and other *Cistanthe*) species are known. Notably, *C. crassifolia* (Phil.) Carolin ex Hershk. plants in the northern half of its continuous distribution in Huasco Province commonly are albino. Furthermore, also collected at the *C. behacheliana* Type locality was a red-pigmented individual that also appears to be geophytic, and other red-pigmented geophytic forms evidently occur in southeastern Huasco Province. Based on images only, I might even classify one or two of the pigmented forms as *C. philhershkovitziana*. These require additional field study.

---

[2] Notably, of the four *C. philhershkovitziana* complex species, only *C. philhershkovitziana* s. str. rapidly initiated new roots and above-ground growth following transplantation. The other three species were recalcitrant, the caudices remaining dormant or rotting. I considered the possibility that this may be an ecological effect, since the *C. philhershkovitziana* plants were collected in a rainier but largely fog-free environment near El Quisco at -33.24°, whereas *C. reshetiana* was collected in a slightly cooler semi-arid and diurnally foggy zone at ca. -31.24°, while the other two species were collected in Huasco Province in a very low rainfall but much cooler and foggier zone at ca. -28.6°. Caudices of larger *C.* sect. *Cistanthe* species from Huasco Province easily rerooted and grew/reproduced in cultivation in El Quisco, but these species are not vernal geophytes. They seem to grow/reproduce as long as conditions permit.

My recognition of *C. behacheliana* thus bases on subtle characteristics. The only apparent clear distinction besides its albinism is its leaf surface. In particular, the leaf primary vein and secondary vein loop outlines, when visible externally, are slightly elevated above the leaf surface ("embossed"), whereas in the other species, again when visible, they are recessed below the leaf surface, deeply so in *C. gbifiana* (see below).[3] The flowering stems of *C. behacheliana* also appear to be more slender and less rigid than in the other species. Besides these, the more inland and higher elevation habitat separates it from *C. philhershkovitziana* and is more similar to the morphologically less similar *C. reshetiana*. The Type locality is ca. 36 km inland and ca. 500 m elevation. Since its publication, images have been posted on iNaturalist.org from second locality ca. 35 km due south, ca. 1.5 km W of the Panamerican Highway, ca. 30 km inland, and ca. 800 m elevation.[4] Presence at two separated inland localities more arid and much higher in elevation than the littoral zone bolsters support for recognition as a species rather than relegation to color polymorphism status, especially since *C. behacheliana* morphologically otherwise bears no special resemblance to the inland and higher elevation *C. reshetiana* in the Coquimbo Region.

Perhaps not unexpectedly given aridity and higher daytime temperatures at its inland locality, *C. behacheliana* appears to complete its above-ground phase relatively rapidly. Numerous healthy rosettes were observed on 19 September 2025. Most had developing inflorescences but no flowers. A large collected individual first flowered in my residence on 25 September. On 13 October, I found perhaps only five individuals at the locality, and only one still bore flowers. I do not know whether most individuals in the original population had reproduced and senesced naturally or whether they had been grazed.

It seems peculiar that this evidently most fragile of *C.* sect. *Cistanthe* species, lacking even the "sunscreen" offered by pigmentation, is restricted to more exposed, elevated, arid sites. It is not known, however, if the plant would behave more rigorously in a cooler, moisture situation. It should be kept in mind, however, that its current localities are much more arid now than they were as recently as 100-200 years ago, when yearly rainfall and runoff in SW Huasco Province and NW Elqui Province were much greater and more perennial (Peralta, et al., 1971; Squeo et al., 1999; Ocampo Painepán, 2015). Climate regimes fluctuated also at the millennial scale: 4000 years ago, the climate in this region was characterized as "wet." (Orellana et al., 2023).

Although a pigmented plant otherwise pertinent to the *C. philhershkovitziana* complex was collected at the *C. behacheliana* Type locality (Hershkovitz, 2025b), it was notably more robust than the albino, especially in its stiffer and more resistant leaf texture. This robustness is still apparent now in cultivation some 4–5 months after collection. All of the leaves of the albino plant deteriorated rapidly following collection, yet one of the original leaves of the pigmented plant is still healthy. Of course, this difference might be associated with the albinism itself. Neither form has formed new rosettes thus far.

Recognition of *C. behacheliana* embodies a taxonomic strategy that takes advantage of the inherently orthogonal dimensionality of the typological approach, viz. an individual is or is not the same species as the Type. Thus, I typified a form that is at an extremity of what might appear as a morphological and geographical gradient linking this interior Huasco Province albino form with *C. philhershkovitziana* Type from the littoral zone in Petorca Province (Valparaiso Region) via pigmented Huasco Province plants. Focusing on the last might yield a different taxonomic interpretation, in which all of the Huasco Province plants might be classified as *C. philhershkovitziana*, and *C. behacheliana* might be marginalized as a mere color polymorphism. Recognition of *C. behacheliana* defines two separate taxonomic questions. One is the relation between the albino plants and Huasco Province pigmented

---

[3] Except for *C. gbifiana*, the 2° leaf vein outlines in the other species are not always visible externally.
[4] https://www.inaturalist.org/observations/337665274

plants, and the other is the relation between the pigmented plants from Huasco Province and Petorca Province. Are there one, two, or three species?

Also unlike *C. philhershkovitziana* but more like *C. reshetiana*, thus far, in cultivation, five months after collection, caudices of *C. behacheliana* have failed to produce anything more than a few short-lived hair-like roots, and they have developed only small and short-lived new leaves (< 5 x 10 mm) and a few underdeveloped inflorescences. This new shoot growth seems to have developed using caudex reserves from prior growth rather than new caudex growth. It is not unlike "last gasp" late season growth observed in both annual and perennial species.

d. *C. gbifiana*. I initially considered *C. gbifiana* to be a form of *C. philhershkovitziana* with especially rugose leaves (Hershkovitz, 2025b), a trait that I had believed to be induced environmentally, in particular, chemically. This form is restricted to the littoral zone and river valleys of southern Huasco Province (Atacama Region) and the adjacent La Higuera comuna of northern Elqui Province (Coquimbo Region). There, the substrate is higher in heavy metal concentrations than in littoral zones further south (Duran et al., 2022). The coastal hills of Huasco Province and northern Elqui Province of the Coquimbo Region support a metal mining industry. Adding to this is heavy metals and salts in runoff from the mines in the Andes of eastern Huasco Province. Because rainfall is extremely low, this runoff contributes considerably to the coastal area water economy. And adding to this is the natural high salinity of the littoral zone substrate. I supposed that this chemical mixture could influence leaf development to exaggerate the degree of leaf rugosity otherwise evident in *C. philhershkovitziana* and many *Cistanthe* species. This interpretation was supported circumstantially by the presence of superficially similar plants with smoother leaf surfaces in Huasco Province, but I now refer the latter plants to other species.

Leaf rugosity of *C. gbifiana* owes to more than just water potential dynamics during early leaf development, which is how I have explained leaf rugosity in other *Cistanthe* species.[5] Examination of the leaf surface with a cheap plastic 10X lens shows that the striking rugosity of *C. gbifiana* has two components: "macrorugosity" formed by curvature (bulging) of the intercostal regions, and "microrugosity" at the epidermal level. In particular, the adaxial leaf cuticle appears to be very thin and is itself rugose at the microscopic level. The epidermal cells individually appear to bulge above the leaf surface and sometimes are distinctly papillate. The more papillate cells appear whitish and presumably concentrate a mineral substance. I have supposed that this is calcium oxalate, but it could be some other salt. Regardless, the characteristics of the *C. gbifiana* epidermis render its texture somewhat velvety to touch rather than smooth and/or waxy as in other *Cistanthe* species. The epidermal characteristics also affect leaf behavior ex situ. Although the leaves are turgid and appear resistant in situ, they wilt rapidly following collection and transplantation. With any degree of manipulation, the surface ruptures and the leaves deliquesce.

---

[5] Leaf rugosity often varies within *Cistanthe* species, populations, and even within individuals. Hershkovitz (2022b) explained this in terms of protracted rather than simultaneous vascular tissue development, in turn evident from the "ribbon-like" leaf veins described in this genus (Hershkovitz, 1991c). The leaf finer vein xylem is flat, one cell layer thick, with inherently length- and shape-flexible protoxylem elements with annular 2° wall thickenings at the abaxial vascular bundle pole transitioning to inflexible metaxylem elements with sclariform pitting at the adaxial pole. During early leaf development, the protoxylem elements permit leaf expansion/contraction according to water content. With the transition to inflexible metaxylem, leaf size becomes successively fixed by the vasculature (and cuticle), but additional growth is possible in the intercostal regions. This growth causes the veins to buckle, creating a rugose surface, but this rugosity itself becomes fixed as the leaf matures. Like any plastic trait, the developmental pathways leading to leaf rugosity can themselves become fixed in a lineage.

Closer inspection reveals distinctions of *C. gbifiana* besides leaf texture. The leaves attain a maximum size much larger than that observed in the most other *C. philhershkovitziana* complex species,[6] and this owes especially to maximum width. The largest leaves are broadly obovate with rounded apices. While only basal leaves were observed in nearly all individuals, at least two individuals also bore large, sessile to nearly amplexicaul leaves on the inflorescence, similar to that observed in *C. paniculata* (Ruiz & Pavon) Carolin ex Hershk. The taproot tends to branch near the apex, and the branches grow horizontally just below the substrate surface. Possibly this reflects growing in flat and possibly hardpan terrain that tends to flood following rains. Also, the caudical rhizomes are much thinner and shorter than in the other species, breaking off easily during transplantation. Similar to *C. reshetiana*, the corolla is broader than in *C. philhershkovitziana* s. stricto. Finally, the fruit is about twice the size of those in the other species, and probably the largest in the genus. Correspondingly, ovule/seed numbers are much higher. In one fruit, I counted ca. 665 ovules/seeds, of which ca. 500 developed into mature seeds that were nonetheless only slightly smaller than those of the other species. Hershkovitz (2018a) reported that the seed number in *C. philhershkovitziana* was ca. 100/fruit, later reporting smaller numbers in plants from Chile's southern CLZ (Hershkovitz, 2024). My recollection is that ca. 100 seeds/fruit seems to be otherwise the upper limit for *Cistanthe* species generally. Even if the actual number is twice that, it is still less than half of that in *C. gbifiana*.

As a final note about *C. gbifiana*, after a larger taproot had apparently died but not yet desiccated or rotted, I preserved transverse slices in alcohol. The anatomy of the thickest portion (as best as I can make it out) seemed to include besides a stellate 1° xylem (stele), one complete 2° xylem growth ring and an additional ring of current year 2° xylem, these surrounded by a cortex and periderm. Accordingly, the root must be in its third growth season, but it could be older if it remained dormant during a previous drought year. I have not examined the root anatomy of any other perennial *Cistanthe* species, so their life spans remain unknown. Naturally, I would love to study the comparative anatomy of the genus, but I will not have the opportunity.[7]

e. Summary. The Types and plants from the Type localities of the four species of the *C. philhershkovitziana* complex can be distinguished easily based on morphology, geography, and ecology. Based on this information, the distributions and ranges can be approximated. *Cistanthe philhershkovitziana* s. str. has the most extensive range, occurring in the littoral zone in between Cardenal Caro Province (LOH Region) and at least Elqui Province (Coquimbo Region), ca. 500 latitudinal km, and possibly extending to Huasco Province (Atacama Region), 600–650 latitudinal km.

Following this, *C. reshetiana* occurs near the coast but in matorral above ca. 50 m elevation, at least between Choapa and Elqui Provinces (Coquimbo Region), at least 150 latitudinal km. Because of

---

[6] An exception is plants from the recurring population at the locality of the destroyed collection *Hershkovitz 00-144* (see above). My recollection is that the leaves were perhaps 6 cm long, obovate, and also especially "floppy" and somewhat wilted in the late afternoon.

[7] Unfortunately, I do not have access to a laboratory. In 1998-1999, I was recruited by Mary Kalin Arroyo to move to Chile at my expense to take a very low paying position in the University of Chile and to finance and build a molecular (etc.) laboratory, with no start-up funds and from bare cement. I even had to pay out of my pocket for the electrical installation. Yadda-yadda-yadda, by a mere five years later, I had suffered a complete cognitive and emotional collapse, was heavily medicated, and I became one of a small handful of academics *ever* fired from this 150 year-old university. The molecular lab, in which I dedicated *primarily* to collaborations solicited by Kalin Arroyo…went to Kalin Arroyo…who became the de facto most accomplished, best financed, best paid, and best equipped molecular-slash-phylogenetics researcher in Chile. Never having (to my knowledge) trained, studied, or *personally* undertaken or overseen research or otherwise (per my experience and analysis) acquired even minimal competence (see Hershkovitz, 2025f, g) in this discipline. She went on to win the Chilean National Science Prize and was awarded honorary Chilean citizenship by a Marxist president.

the longitudinal proximity of these species, the distributional details remain to be resolved population-by-population. The albino *C. behacheliana* is known only from two localities in southern Huasco Province (Atacama Region) separated by ca. 35 km latitudinally. Its relation to pigmented plants from this area, extending perhaps 25 longitudinal km x 50 km latitudinally, remains to be resolved, as does the relation of the pigmented plants to *C. philhershkovitziana*. I originally believed that *C. gbifiana*, from coastal plains of southern to central Huasco Province and La Higuera comuna of Elqui Province, was merely a form of *C. philhershkovitziana* with leaves that were especially rugose owing to environmental conditions. It proves to be the most morphologically distinctive of the four species. Its range is ca. 15 km longitudinally x 50 km latitudinally

Discussion

The two-century taxonomic/floristic oversight of the small acaulescent plants of the *C. philhershkovitziana* complex is more than remarkable. It is sublime. It is true that the taxonomy of *C.* sect. *Cistanthe* has bewildered taxonomists for more than a century (Philippi, 1893; Reiche 1897; Hershkovitz, 1991a, 2019a, 2025a, d). And it is true that, to this day, plants of this section commonly are grossly misidentified (or not identified) in both scientific (Hershkovitz, 2025e) and popular botanical literature and internet resources. But notwithstanding these historical and persistent ambiguities, it also is true that all of the other forms of *C.* sect. *Cistanthe* corresponding to currently accepted species (and then some) at least had been described and named previously. Yet, I find no evidence that any of the *C. philhershkovitziana* complex forms ever has been recognized even informally as distinct. This is despite their combination of notably smaller plant size and comparatively large and conspicuously colored flowers, their frequency and extensive and ± continuous range over 600 km of latitude that includes Chile's most populated metropolitan areas and most visited beaches and highly traversed roadways. Correspondingly, its range includes Chile's highest concentration of botanical researchers and collections. And, besides this, the plants have been collected numerous times over the past 200 years.[8]

---

[8] Rodríguez et al.'s (2018) checklist of the Chilean flora accepted 17 species currently classified in *Cistanthe* (sensu Hershkovitz, 2019a), two of which I consider to be synonyms of other species, leaving 15, 14 endemic. Rodríguez et al. (2018) and its principal sources represented the consensus of then the entire Chilean botanical community. But the *Cistanthe* list actually represents the work of two non-Chileans, Peralta & Ford (2008). Eight years later, I accept 36 species in Chile, 34 endemic, viz. an increase of ca. 20 species, or 133%. Of these 20, eight are newly described and 12 were named/typified 125+ years earlier but not accepted since. Seven of the 20 are species reasonably to exceptionally widespread at 0–1500 m elev in Chile's densely settled central zone, -30–36°. I call attention to these data for three reasons. One, as I remarked in Hershkovitz (2022b), Chilean media habitually report the discovery of "new" Chilean plant species (at least those discovered by researchers with media connections), and only newly named species otherwise are afforded status as "novelties" (e.g., Lavandero & Teillier, 2025). I have pointed out that newly *recognized* species that happen include an individual that had been named and typified merit no less attention. In particular, such species represent the validation of an entity whose existence, while technically or nomenclaturally not unknown, otherwise had been universally *rejected*. Second, for all other purposes of theoretically and applied biodiversity science (including conservation), the scientific validation of such entities modifies knowledge of the biodiversity landscape in ways no less profound that if the species technically had been "new." More to the point, continuous taxonomic *revision* is far more informative and critical to biodiversity science than is the occasional and often sensationalized discovery of a "new" species. The latter misses the point of taxonomy. That leads me to the third point. As I have mentioned elsewhere (e.g., Hershkovitz, 2020b), prominent Chilean biodiversity researcher Dr. Aníbal Pauchard of the Universidad de Concepción, co-author of Rodríguez et al. (2018) and (then president) of the (quite intentionally) socioeconomically and politically hegemonic Millennium Institute of Ecology and Biodiversity (IEB-Chile, www.ieb-chile.cl) asserted in 2019 that "we *already* know" what the species are in Chile. Never mind unknown rare species in remote and poorly accessible localities, *Cistanthe* research since then demonstrates that not even the common species underfoot in well-traveled and well-studied areas were "known." In fact, even a 2025 formal taxonomic revision of the annual *Cistanthe* species in Chile

The present work documents how *C. philhershkovitziana* is not merely a historically overlooked species, but an overlooked species *complex*. This can be viewed two ways, either oversight of not one, but *four* species, or, alternatively, oversight of a *supraspecific* taxon. Either way, the segregation of the complex into four species, like Medusa, raises more questions than it answers. The differences between the species mostly are more subtle than the major differences between the whole complex and remaining *C.* sect. *Cistanthe*. Moreover, some interspecific differences might not be evident from herbarium specimens or inadequate photos.

Additional clarification of the taxonomy of the *C. philhershkovitziana* complex is desirable and technically feasible, but it will require considerable travel and field analysis. One focus is additional study of *C. philhershkovitziana* and *C. reshetiana* populations along the latitudinal length of the Coquimbo Region, though especially in between the latitudes of Ovalle and Coquimbo, where fluvial sandy coastal plains are fairly broad longitudinally. This creates a habitat that ecologically is intermediate between coastal matorral and the littoral zone. In Huasco Province (Atacama Region), additional analysis of *C. behacheliana* and incident more robust red pigmented forms is necessary. And then the differences between the latter and typical *C. philhershkovitziana* must be verified. Other localized variant forms of the complex, mentioned or not mentioned in this work, also require further analysis.

Another challenge is to understand the evolutionary history of the *C. philhershkovitziana* complex. Although the species share their relatively small size and life history characteristics, it is not clear that they are monophyletic. Existing molecular/genomic evidence does not clarify the phylogenetic relations. Hershkovitz (2006) sampled two verifiable *C. philhershkovitziana* complex individuals among 22 samples of *C.* sect. *Cistanthe* species for ribosomal DNA ITS and chloroplast DNA *ycf3-trnS* sequences. The individuals include one from the *C. philhershkovitziana* Type locality (*Hershkovitz 03-06*) and the other from the Las Tacas locality (*Hershkovitz 00-144*; see above). Analyzed separately or in combination, these data yielded no phylogenetic structure within *C.* sect. *Cistanthe*. The nucleotypes of the two samples were identical, but they were shared also by samples of other species. The chloroplast haplotypes were distinct, but each haplotype was shared by a complement of other species distinct from shared nucleotypes.

Chomentowska et al. (2025a, b) performed incarnations of "standard" phylogenetic and multispecies coalescent (MSC) evolutionary analyses of sets genome data for *C.* sect. *Cistanthe*, in particular a data set that included all harvested loci ("whole genome") versus a partial set that included only "coding" sequences (CDS) referenced to a sample they identified as "*C. cachinalensis*" (see below) from near Copiapó (see Chomentowska 2025c, d). Per their own identifications, they did not sample *C. philhershkovitziana* complex species. However, based on reported locality data, Hershkovitz (2025e) re-identified one of the two nominal *C. grandiflora* samples as *C. reshetiana*[9]and the other as *C. lindleyana*.[10] My conclusion that the first collection pertains to *C. reshetiana* bases on both provenance

---

(Teillier [an IEB affiliate] & Ibáñez, 2025) includes multiple errors, omissions, and misidentifications (Hershkovitz, 2025e). I guess they did not consult with Pauchard.

[9] The specimen "Cistanthe_grandiflora_AC03_LPH255" was collected along the Panamerican Highway ca. 14 km (260 m elev.) due N of the *C. reshetiana* Type locality near Puerto Oscuro (230 m elev.) and ca. 3 km NW of another observation at 130 m elev. (https://www.inaturalist.org/observations/279110415). In rainy years, *C. reshetiana* is especially abundant (and conspicuous) along the Panamerican Highway (Hershkovitz, 2022a, reported as *C. philhershkovitziana*), although *C. grandiflora* may occur here also. However, the latter tends to occur on moister sites.

[10] The specimen "Cistanthe_grandiflora_AC130_MO279" is not from the Andean precordillera (as misreported in Hershkovitz, 2025d), but from the coastal ranges at ca. 1100 m elev. along a road known as "Cuesta La Dormida." Interestingly the locality is ca. the same as the destroyed collection "*Hershkovitz 99-977*," which Hershkovitz

and the phylogenomic trees in Chomentowska (2025a, b), which showed the two nominal *C. grandiflora* samples as sister to a clade comprising seven samples identified as *C. cachinalensis* (Phil.) Peralta & D.I.Ford.[11] Based on locality data and phylogenetic results, Hershkovitz (2025e) referred these samples to *C. grandiflora*.[12]

The phylogenomic trees generated using both data sets and an incarnation of "standard" phylogenetic reconstruction[13] were very similar, and both were similar that generated using the CDS data set and all sampled Cistantheae. The trees effectively show the more coastal and mostly geophytic *C. philhershkovitziana* complex sample (viz. *C. reshetiana*) as sister to the more montane/interior subrosettiform hemicryptophytic to chamaephytic *C. lindleyana* sample. This clade, in turn, is shown as sister to the *C. grandiflora* clade sensu Hershkovitz (2025c; viz. *C. cachinalensis* sensu Chomentowska et al., 2025a–d). These terminals collectively are shown as sister to samples of *C. mucronulata*, whose distribution is to the south of all other *C.* sect. *Cistanthe* species (Hershkovitz, 2025d). This clade, in turn, is shown as sister to a clade comprising the more phanerophytic and succulent species *C. crassifolia* and *C. laxiflora* (Phil.) Peralta & D.I.Ford, which range from the Valparaiso to Atacama Regions. Finally, this clade, in turn, is shown as sister to the chamaephytic Peruvian species *C. paniculata*. There appear to be both morphological and biogeographic patterns. These will be discussed in a subsequent work.

An incarnation of MSC analysis using quartets of reduced-linkage single nucleotide polymorphism data[14] yielded a consensus essentially identical to that of the site-wise phylogenomic reconstruction

---

(2018a, 2022a) misidentified (from 1999 notes and memory) as *C. philhershkovitziana*, which is implausible because of both elevation and distance from the coast (ca. 55 km). The only species known from that area and elevation is *C. lindleyana*, though this usually is misidentified as *C. grandiflora* (Hershkovitz, 2025d). However, plants at some coastal range localities at that latitude have nearly smooth rather than embossed leaf surfaces, viz. the leaf veins are not conspicuously elevated above the leaf surface. In any case, at this latitude, *C. grandiflora* is found on the west slope of the coast ranges, but *below* ca. 600 m elevation.

[11] Hershkovitz (2025e) reported that *C. grandiflora* plants from the Atacama and Antofagasta Regions commonly have been identified as *C. cachinalensis*, whereas plants from the Coquimbo Region southward were identified as *C. grandiflora*. Operationally, this is ± accurate. But Marticorena et al.'s (2001) Coquimbo Region checklist (based on an unpublished database) lists *C. cachinalensis* as present throughout Elqui Province, though not in Limarí or Choapa Province. *Cistanthe grandiflora* was listed as present in all three provinces. Correspondingly, Rodríguez et al.'s (2018) national checklist, based on multiple data sources, included the Coquimbo Region in the distribution of *C. cachinalensis*. These checklists provide no species diagnostics or specimen data. Chomentowska et al. (2025a, b) identified as *C. cachinalensis* seven collections spanning ca. -25.3°–32.5°, including two from Choapa Province, one from near the Valparaiso Region border. They provided no diagnostic criterion for its identification. To my knowledge, this is the first literature reference to *C. cachinalensis* for Choapa Province plants.

[12] *Cistanthe grandiflora* (Type from near Coquimbo, ca. -30°) is a facultatively annual subrosettiform chamaephyte distinguished among all *C.* sect. *Cistanthe* species especially by its strikingly angular flowering stems bearing heteroblastic leaves (Hershkovitz, 2025d; cf. 2024). Additional traits distinguish it from particular *C.* sect. *Cistanthe* species, though it also manifests considerable morphological plasticity even locally. Its morphology characterizes plants spanning ca. -20– 34°. As I will elaborate in greater detail elsewhere, no reliable trait permits discrimination of *C. cachinalensis* (Type from near Pan de Azucar, Antofagasta Region, ca. -26°) even locally, much less throughout northern Chile, hence I reduce all of the Chomentowska et al. (2025a, b) *C. cachinalensis* samples to *C. grandiflora*. Notably, one sample is from ca. -30° just east of La Serena, along the very road traveled in 1825 by *C. grandiflora* Type collector James McCrae (see Hershkovitz, 2025d). Despite its morphological variability and genomic diversity, there is not at present a basis for taxonomic division of *C. grandiflora*.

[13] Site-wise maximum likelihood optimal reconstruction over all taxa using a matrix concatenated from some hundreds of loci, the actual number of which depended on filtering for data completeness. Unless I missed it, they did not report the data matrix length or other characteristics (e.g., # of informative characters) for each subclade analysis.

[14] Again, unless I missed it, they did not describe the matrix characteristics for each subclade analysis.

above, except that there is somewhat reduced support for monophyly of the *C. reshetiana*/*lindleyana* clade.[15] In context, this means that some MSC replications using both the whole-genome and CDS data showed this clade as paraphyletic, with one or the other as sister to the *C. grandiflora* clade. An incarnation of genetic clustering analysis of these data inferred especially and considerably greater interspecific allele sharing involving the *C. lindleyana* and *C. reshetiana* samples, with most of the loci sharing ancestry with the *C. grandiflora* samples, a smaller but significant proportion shared with the *C. mucronulata* samples, and minor fractions shared with other species. A separate test concluded that the allele-sharing with *C. mucronulata* owed to introgression rather than lineage sorting.

Above, I merely report Chomentowska et al. (2025a, b) phylogenomic results without criticism other than taxonomic. Otherwise, the genomic data are too large and the statistical analyses are too complex to be addressed in detail here. This is, in any case, beyond the scope of the present work, since the data scarcely address systematics and evolution of the *C. philhershkovitziana* complex. However, this does not mean that *no* commentary will be offered here.

A striking aspect of the Chomentowska et al. (2025a, b) results is how the *C.* sect. *Cistanthe* trees appear as better resolved than trees for the other four Cistantheae subclades.**[16]** The standard phylogenetic and MSC bootstrap values are higher and the MSC tree samples appear more convergent upon the consensus. These observations are reassuring given that the resolution appears as largely robust to analyses using different data subsets and two conceptually distinct methods that make fundamentally different evolutionary assumptions. In contrast, trees of the other subclades appear to be highly sensitive to both data and method.

However, more critical examination reveals that the comparative robustness of the *C.* sect. *Cistanthe* trees may owe more to sampling artifact than inherently superior resolution. Relations among the six *C. paniculata* samples are not robust across analyses: the topologies differ and the MSC tree samples are "messy."**[17]** The samples span ca. 210 latitudinal km (viz. averaging 35 km sampling intervals) of climatically relatively homogeneous and technically tropical SE coastal Peru. The lack of phylogeographic differentiation of the phylogenomic data this is not surprising.

---

[15] The authors reported that, "[in general]…*there was no consistent pattern that could explain differences in topology between exclude and include non-coding regions, or between concatenations and species tree approaches*" (Chomentowska et al., 2025a: 6). In fact, the different data sets and methods impose *systematic* differences in resolving power. Non-coding sequences in general are more variable (and less confidently alignable) than coding sequences at any given level, and the MSC analysis data filtration criterion systematically reduced sequence variability relative to unfiltered data. In particular, towards the objective of reducing linkage, the number of polymorphic sites per locus was reduced to one, and 3–4-state sites were eliminated. The concatenation analyses also applied different stringencies for missing data. However, the effects of these manipulations on resolution depends upon the actual divergence in question, viz. at deeper divergences, CDS data might resolve better, and non-coding data might simply add "noise," whereas at shallower divergences, CDS data might not resolve at all. In other words, there probably *is* a pattern, but detecting it may be complicated.

[16] "*The relationships among the remaining Cistanthe sect. Cistanthe species are strongly supported in both the broader…and subclade-level phylogenies*" (Chomentowska et al., 2025b: 11). By "remaining," the authors referred to the samples of *C. mucronulata* and those they identified as *C. grandiflora* (viz. *C. lindleyana* and *C. reshetiana*) and *C. cachinalensis* (viz. *C. grandiflora*).

[17] Chomentowska et al.'s (2025a, b) figures show two genetically divergent *C. paniculata* samples identified as "…AC42," and these are listed separately in the specimen data with the same collecting locality. I presume that only one of these samples corresponds to the field collection *A. Chomentowska 42*, and that the other is labeled incorrectly.

Meanwhile, the topology of the seven *C. grandiflora* samples appears more robust across analyses, although the bootstrap values and MSC tree samples indicate that it is not so robust. But the seven samples represent four geographically and climatically *disparate* origins (ca. 25°, 28°, 30°, 32°) spanning 800 km of latitude (viz. > 200 km sampling intervals) that range from hyperarid to perennially seasonally moist. Thus, the higher apparent resolution of the trees may reflect the larger distance between the samples. Furthermore, the *C. grandiflora* sister-clade sampled only one individual each of *C. lindleyana* and the *C. philhershkovitziana* complex, both of which have latitudinally broad distributions that are broadly parapatric with *C. grandiflora*.

These observations raise the possibility that more continuous and representative sampling within *C.* sect. *Cistanthe* would yield less well-resolved trees. This is not necessarily true, of course. And we only know that sampling might yield less resolved trees only because considerable unsampled variation and territory exists. If the other populations/species were extinct, we would not know this. Still, the reduced resolution associated with denser sampling of the other Cistantheae subclades, along with the reduced resolution within the better-sampled *C.* sect. *Cistanthe* species, should raise the question of sample adequacy. For example, the *C. longiscapa* complex (sensu Hershkovitz, 2025e) analysis included *twenty* samples from *five* species spanning 450 latitudinal km of the Atacama Desert (viz. averaging 23 km sampling intervals). These trees are scarcely resolved (Hershkovitz, 2025e).

Additional genomic data undoubtedly will shed light on the systematics and evolution of the *C. philhershkovitziana* complex, but this research will require careful execution and interpretation. Crude industrial assembly line and blanket statistical approaches have their limitations. This is true for morphological traits, and it is simply superstitious and uniformed to believe that it is not true for genomic traits. I have discussed elsewhere various and sundry aspects of both the power and pitfalls of genomic approaches (Hershkovitz, 2019c, 2021b, c, 2025f), calling attention to the *ontological* differences between genes and genomes at one extreme and organisms and taxa at the other and their quasi-independent evolution within mutual tolerance limits. And I also have called attention to the *epistemological* limitations of statistical analyses when applied to *biological* problems that violate fundamental statistical assumptions. This is no way constrains the *heuristic* value of bulk "pipeline" approaches, but, in the end, genomic data, like all data, are *explananda* and not *explanans*.

Disclosure statement

The author declares no conflict of interest, viz. this research received no support from a government funding agency or any so-funded research project or academic institution. The present work is entirely that of the author whose contribution to and responsibility for the work is 100%, whose authorship is not "vicarious" or editorially influenced by unacknowledged persons, and whose integrity is not potentially compromised for economic, social, or political expedience.

Acknowledgments

I thank Dr. José Elias Duran Lima (CEPAL) and Chilean thoroughbred horse owner/trainer José Tomás Allende for financial assistance for this research and Fundación Reshet (www.reshet.cl) for continued economic support.

Literature cited

Astorga-Elo, M., Zhang, Q., Larama, G., Stoll, A., Sadowsky, M. J., & Jorquera, M. A. (2020). Composition, predicted functions and co-occurrence networks of rhizobacterial communities impacting flowering desert events in the Atacama Desert, Chile. Frontiers in Microbiology, 11, 571. https://doi.org/10.3389/fmicb.2020.00571

Candolle, A. P. de. (1828). Prodromus systematis naturalis regni vegetabilis, sive, Enumeratio contracta ordinum generum specierumque plantarum huc usque cognitarium, juxta methodi naturalis, normas digesta, vol. 3. Sumptibus Sociorum Treuttel et Wurtz, Paris. https://www.biodiversitylibrary.org/item/7152

Chomentowska, A., Dauerman, S. G., Heaphy, N., Gaspar, L., Molina, P. M., Guilliams, C. M., Ogburn, R. M., Hancock, L. P., Holtum, J. A. M., Moreira-Muñoz, A., Arakaki, M., Sweeney, P. W., Peralta, I. E., & Edwards, E. J. (2025a). Phylogenomic analyses of the diverse desert-alpine plant lineage Cistantheae. bioRxiv, 2025.10.10.680062. https://doi.org/10.1101/2025.10.10.680062

Chomentowska, A., Dauerman, S. G., Heaphy, N., Gaspar, L., Molina, P. M., Guilliams, C. M., Ogburn, R. M., Hancock, L. P., Holtum, J. A. M., Moreira-Muñoz, A., Arakaki, M., Sweeney, P. W., Peralta, I. E., & Edwards, E. J. (2025b). Phylogenomic analyses of the diverse desert-alpine plant lineage Cistantheae. Annals of Botany, mcaf319. https://doi.org/10.1093/aob/mcaf319

Chomentowska, A., Raimondeau, P., Wei, L., Jose, E. G. D., Dauerman, S. G., Davis, V. Z., Moreira-Muñoz, A., Peralta, I. E., & Edwards, E. J. (2025c). A high-quality genome of the Atacama Desert plant *Cistanthe cachinalensis* and its photosynthetic behavior related to drought and life history. bioRxiv, 2024.11.06.622337. https://doi.org/10.1101/2024.11.06.622337

Chomentowska, A., Raimondeau, P., Wei, L., Jose, E. G. D., Dauerman, S. G., Davis, V. Z., Moreira-Muñoz, A., Peralta, I. E., & Edwards, E. J. (2025d). A high-quality genome of the Atacama Desert plant *Cistanthe cachinalensis* and its photosynthetic behavior related to drought and life history. New Phytologist, 247, 388-407. https://doi.org/10.1111/nph.70186

Valdés Durán, A., Velásquez, J., Neculqueo, G., Deckart, K., Cáceres Lillo, D., Navarro Frez, L., Tröger, D., Canales Quezada, A., Buscaglia Solé, M., & Escobar, M. E. (2022). Extreme climatic events in northern Chile and their impact on the geochemical composition of the Huasco River. Journal of South American Earth Sciences, 118, 103927. https://doi.org/10.1016/j.jsames.2022.103927

Ford-Werntz, D. [I.] & Peralta, I. [E.]. (2002). *Cistanthe*. In: Eggli, U. (ed.), Illustrated Handbook of Succulent Plants: Dicotyledons. Springer, Berlin, Heidelberg, New York.

Hershkovitz, M. A. (1991a). Taxonomic notes on *Cistanthe*, *Calandrinia*, and *Talinum*. Phytologia, 70, 209-225. https://www.biodiversity.org/page/12983019

Hershkovitz, M. A. (1991b). Phylogenetic assessment and revised circumscription of *Cistanthe* Spach (Portulacaceae). Annals of the Missouri Botanical Garden, 78(4), 1009-1021. https://doi.org/10.2307/2399741

Hershkovitz, M. A. (1991c). Leaf morphology of *Cistanthe* Spach (Portulacaceae). Annals of the Missouri Botanical Garden, 78, 1022-1060. https://doi.org/10.2307/2399742

Hershkovitz m M. A. (1993). Revised circumscription and sectional taxonomy of *Calandrinia* Kunth and *Montiopsis* Kuntze (Portulacaceae) with notes on phylogeny of the portulacaceous alliance. Annals of the Missouri Botanical Garden, 80(2), 333-365. https://doi.org/10.2307/2399789

Hershkovitz, M. A. (2006). Evolution of western American Portulacaceae in the Andean region. Gayana, 63, 13-74. http://dx.doi.org/10.4067/S0717-66432006000100002

Hershkovitz, M. A. (2018a). *Cistanthe philhershkovitziana* (Montiaceae): a remarkable annual species of *Cistanthe* sect. *Cistanthe* from Chile. Phytologia, 100, 208-221.

Hershkovitz, M. A. (2018b). Additional notes on *Cistanthe philhershkovitziana* Hershk. (Montiaceae). Preprints, 2018120343. https://doi.org/10.20944/preprints201812.0343.v1

Hershkovitz, M. A. (2019a). Systematics, evolution, and phylogeography of Montiaceae (Portulacineae). Phytoneuron, 2019-27, 1-77. http://www.phytoneuron.net/2019Phytoneuron/27PhytoN-Montiaceae.pdf

Hershkovitz, M. A. (2019b). '*Cistanthe* sp. subsp. *subspeciosa*,' a specioid from the Atacama Desert, with comments on the taxonomy, ecology, and evolution of *Cistanthe* sect. *Cistanthe* (Montiaceae). Preprints, 2019040329. https://doi.org/10.20994/preprints201904.0329.v2

Hershkovitz, M. A. (2019c). The 'Holy Grail' in phylogenetic reconstruction: seeing the forest for the trees? EcoEvoRxiv, B9MTN. https://doi.org/10.32942/osf.io/b9mtn

Hershkovitz, M. [A.] (2020a). Bertero's ghost revisited: new typifications of *Talinum linaria* Colla and *Calandrinia gaudichaudii* Barnéoud (= *Calandrinia pilosiuscula* DC; Montiaceae). EcoEvoRxiv, N4D5J. https://doi.org/10.32942/osf.io/n4d5j

Hershkovitz, M. [A.] (2020a.) Systematics of *Calandrinia pilosiuscula* DC a.k.a. *Calandrinia compressa* Schrad. ex DC (Montiaceae–Montioideae). EcoEvoRxiv, WGAF3. https://doi.org/10.32942/osf.io/wgaf3

Hershkovitz, M. A. (2021a). Alain de Trenqualye's photos of *Cistanthe philhershkovitziana* Hershk. (Montiaceae). ResearchGate. https://doi.org/10.13140/RG.2.2.31359.94886

Hershkovitz, M. A. (2021b). Evolutionary insights from DNA sequences from Chaetanthera Ruiz & Pav. and Oriastrum Poepp. & Endl. (Asteraceae; Mutisieae). I. Of molecules and systematics. EcoEvoRxiv, AK68M. https://doi.org/10.32942/osf.io/ak68m

Hershkovitz, MA. Reconciliation of evidence for the Portulacineae "backbone" phylogeny. EcoEvoRxiv, YRDSF. https://doi.org/10.32942/osf.io/yrdsf

Hershkovitz, M. A. (2022a). Distribution and variability of *Cistanthe philhershkovitziana* Hershk. (*Cistanthe* sect. *Cistanthe*; Montiaceae). EcoEvoRxiv, 6UDN5. https://doi.org/10.32942/6udn5/

Hershkovitz, M. A. (2022b). CONFOUND IT! The taxonomy of plants mistaken for *Cistanthe arenaria* (Cham.) Carolin ex Hershk. (MONTIACEAE, *Cistanthe* sect. *Rosulatae* Hershk.). EcoEvoRxiv, X2G593. https://doi.org/10.32942/X2G593/

Hershkovitz, M. A. (2024). Phenological and life history/form idiosyncraticity of *Cistanthe philhershkovitziana* Hershk. (*C.* sect. *Cistanthe*; Montiaceae) in Chile's southern Central Littoral Zone. EcoEvoRxiv, 2024, X2HS6G. https://doi.org/10.32942/x2hs6g/

Hershkovitz, M. A. (2025a). *Cistanthe reshetiana* (*C.* sect. *Cistanthe*; Montiaceae) – a new species from the Coquimbo Region, Chile. International Journal of Advance Research Publication and Reviews, 2(7), 322-331. https://doi.org/10.13140/RG.2.2.11404.01924/1

Hershkovitz, M. A. (2025b). Three new species of *Cistanthe* Spach (Montiaceae) from the Atacama Region, Chile with additional notes on *Cistanthe* taxonomy. International Journal of Advance Research Publication and Reviews, 2(8), 138-155. https://doi.org/10.13140/RG.2.2.14145.06249

Hershkovitz, M. A. (2025c). Idiosyncrasies of *Cistanthe ipniana* Hershk. (*C.* sect. *Rosulatae*; Montiaceae). EcoEvoRxiv, X2SQ1C. https://doi.org/10.32942/X2SQ1C

Hershkovitz, M. A. (2025d). Taxonomic notes on *Cistanthe* Spach. sect. *Cistanthe* and other Montiaceae. International Journal of Advance Research Publication and Reviews, 2(10), 27-39. https://doi.org/10.13140/RG.2.2.1189753606

Hershkovitz, M. A. (2025e). CORRECTED: Notes on *Cistanthe chrysantha* (I.M.Johnst.) Peralta & D.I.Ford and *C. cymosa* (Phil.) Carolin ex Hershk. (*C.* sect. *Rosulatae*; Montiaceae) and related taxa. Published as preprint on Researchgate (https://www.researchgate.net/profile/Mark-Hershkovitz/research) and on OSF (https://osf.io/2ewau/files/osfstorage)

Hershkovitz, M. A. (2025f). Revision of a revised phylogenetic analysis of *Leucheria* Lag. sensu lato (Asteraceae; Nassauvieae) with remarks on theoretical aspects of phylogenetics and phylogenomics. EcoEvoRxiv, X2HK9J. https://doi.org/10.32942/X2HK9J

Hershkovitz, M.A. (2025g). Evolution of *Nassauvia* Comm. ex Juss. (Asteraceae, Nassauvieae): new insights from old data. EcoEvoRxiv, X2PD33. https://doi.org/10.32942/X2PD33

Heselaars, T. (2019). ¿Cómo serán los próximos diez años para la ciencia? Expertos nacionales hacen sus proyecciones. El Mercurio (Santiago, Chile) online edition, 31 December 2019. https://www.emol.com/noticias/Tecnologia/2019/12/31/971904/Proyeccion-investigaciones-cientificas.html

Holtum, J. A. M., Hancock, L. P., Edwards, E. J., & Winter, K. (2021). CAM photosynthesis in desert blooming *Cistanthe* of the Atacama, Chile. Functional Plant Biology, 48(7), 691-702. https://doi.org/10.1071/FP20305

Johnston, I. M. (1929). Papers on the flora of northern Chile. Contributions from the Gray Herbarium of Harvard University, 85, 1-171. https://www.biodiversitylibrary.org/item/125094

Johnston, I. M. (1932). New records for the flora of the Nitrate Coast. Revista Chilena de Historia Natural, 36, 4-8. http://rchn.biologiachile.cl/pdfs/1932/1/Johnston_1932.pdf

Lavandero, N. & Teillier, S. (2025). Novedades botánicas para Chile. II: especies nuevas de flora descritas entre 2021-2025. Chloris Chilensis 28(1), 56-131. https://www.chlorischile.cl/28(1)%20web/Lavandero-Novedades%20II.pdf

Lasègue, A. (1845). Musée Botanique de M. Benjamin Delessert. Notices sur les collections de plantes et la bibliothèque qui le composent; contenant en outre des documents sur les principaux herbiers d'Europe et l'exposé des voyages entrepris dans l'intérêt de la botanique. Fortin, Masson & Cie., Paris, France. https://books.google.cl/books?id=wu7HUHUQdE4C&dq=Las%C3%A8gue+delessert&lr=&source=gbs_navlinks_s

Lindley, J. (1828). *Calandrinia grandiflora*. Edwards's Botanical Register, 14, t. 1194. https://www.biodiversitylibrary.org/item/9050

Marticorena, C., Squeo, F. A., Arancio, G. & Muñoz, M. (2001). Catálogo de la flora vascular de la IV Región de Coquimbo. In: Squeo, F. A., Arancio, G. & Gutiérrez, J. R. (eds.), Libro Rojo de la Flora Nativa y de los Sitios Prioritarios para su Conservación: Región de Coquimbo. Ediciones Universidad de La Serena, La Serena, Chile. https://www.researchgate.net/profile/Francisco-Squeo/publication/266565709_Catalogo_de_la_Flora_Vascular_de_la_IV_Region_de_Coquimbo/links/54b912a30cf28faced626b2a/Catalogo-de-la-Flora-Vascular-de-la-IV-Region-de-Coquimbo.pdf

Martínez-Harms, J., Guerrero, P. C., Martínez-Harms, M. J., Poblete, N., González, K., Stavenga, D. G., & Vorobyev, M. (2022). Mechanisms of flower coloring and eco-evolutionary implications of massive blooming events in the Atacama Desert. Frontiers in Ecology and Evolution, 10, 957318. https://doi.org/10.3389/fevo.2022.957318

Ocampo Painepán, T. R. (2015). Análisis de la geomorfología y sedimentología de la Quebrada Los Choros, Regiones de Atacama y Coquimbo, Chile (29º09' Y 29º33's). Graduate memoire, Universidad de Chile, Santiago, Chile. https://repositorio.uchile.cl/handle/2250/137679

Orellana, H., Latorre, C., García, J.-L., & Lambert, F. (2023). Spatial analysis of paleoclimate variations based on proxy records in the south-central Andes (18°- 35° S) from 32 to 4 ka. Quaternary Science Reviews, 313, 108174. https://doi.org/10.1016/j.quascirev.2023.108174

Ossa, P., Moreno, A. A., Orellana, D., Toro, M., Carrasco-Valenzuela, T., Riveros, A., Meneses, C., Nilo-Poyanco, R. & Orellana, A. (2025). *Cistanthe longiscapa* exhibits ecophysiological and molecular adaptations to the arid environments of the Atacama Desert. Plant Physiology, 197(4), kiaf068, https://doi.org/10.1093/plphys/kiaf068

Peralta, F., Díaz, G., & G. Wood. (1971). Hidrogeología de la quebrada de los Choros : informe preliminar. CORFO, Santiago, Chile. https://bibliotecadigital.ciren.cl/bitstreams/a87a707a-0604-4c3a-bd48-fca6e298a89a/download

Peralta, I. E. & Ford-Werntz, D. I. (2008). Portulacaceae. In: Zuloaga, F. O., Morrone, O., Belgrano, M. J., Marticorena, C. & Marchesi, E. (eds.), Catálogo de las Plantas Vasculares del Cono Sur (Argentina, Sur de Brasil, Chile, Paraguay y Uruguay), vol. 3. Missouri Botanical Garden, St. Louis, MO.

Philippi, R. A. (1893). Plantas nuevas chilenas de las familias rosáceas, onagrariáceas i demás familias del tomo II de Gay: (continuación). Anales de la Universidad de Chile, 85, 167-195. https://www.biodiversitylibrary.org/item/197029

Reiche, K. (1897). Zur systematik der chilenischen Arten der Gattung *Calandrinia*. Berichte der Deutschen Botanischen Gesellschaft, 15, 493-503. https://www.biodiversity.org/page/5001588

Reiche, C. (1898a). Estudios críticos sobre la flora de Chile. Anales de la Universidad de Chile, 100, 327-371. https://anales.uchile.cl/index.php/ANUC/article/view/21255/22524

Reiche, C. (1898b). Flora de Chile, vol. 2. Cervantes, Santiago, Chile. https://www.biodiversity.org/item/27136

Rodríguez, R., Marticorena, C., Alarcón, D., Baeza, C., Cavieres, L. Finot, V. L., Fuentes, N., Kiessling, A., Mihoc, M., Pauchard, A., Ruiz, E., Sanchez, P., & Marticorena. A. (2018). Catálogo de las plantas vasculares de Chile. Gayana, 75, 1-130. https://scielo.conicyt.cl/pdf/gbot/v75n1/0717-6643-gbot-75-01-1.pdf

Squeo, F.A., Olivares, N., Valenzuela, A., Pollastri, A., Aguirre, E., Aravena, R., Jorquera, C., & Ehleringer, J. R. (1999 [“2000”]). Fuentes de agua utilizadas por las plantas desérticas y su importancia en planes de manejo y restauración ecológica. Boletín de la Sociedad de Botánica de México, 65, 95-106. https://doi.org/10.17129/botsci.1600

Stoll, A., Harpke, D., Schütte, C., Stefanczyk, N., Brandt, R, Blattner, F. R., & Quandt, D. (2017). Development of microsatellite markers and assembly of the plastid genome in *Cistanthe longiscapa* (Montiaceae) based on low-coverage whole genome sequencing. PLoS ONE, 12(6), e0178402. https://doi.org/10.1371/journal.pone.0178402

Suijkerbuijk, H. A. C., Sergio E. Ramos, S. E., & Poelman, E. H. (2025). Plasticity in plant mating systems. Trends in Plant Science, 30(4), 424.436. https://doi.org/10.1016/j.tplants.2024.10.013

Teillier, S., & Ibáñez S. (2025). Revisión de las especies de *Cistanthe* Spach sección *Rosulatae* (Montiaceae). Chloris Chilensis, 28(1), 223-260. https://www.chlorischile.cl/28(1)%20web/Teillier-iba%C3%B1ez-Cistanthe-%20sect.rosulatae.pdf

Veldkamp, J. F. (2015). (2346) Proposal to conserve the name *Calandrinia grandiflora* (*Cistanthe grandiflora*) against *Calandrinia glauca* (Montiaceae). Taxon, 64, 174-175. https://doi.org/10.12705/636.20

Villagrán, C., Marticorena, C. & Armesto, J. J. (2007). Flora de las plantas vasculares de Zapallar. Puntángeles y Fondo Editorial U.M.C.E., Santiago, Chile.

Figure 1. *Cistanthe philhershkovitziana*.

Figure 1A. Whole plant unearthed at the Type locality (Humedal de Pichicuy, La Ligua comuna, Petorca Province, Valparaiso Region) and photographed with a Motorola E4 8MP camera. The adjusted flower color (especially) is unnatural, appearing more mauve than in life. The flower was especially large among those present in the population. Only the rosette appears above the substrate. The subterranean stem portion above the caudex apical constriction is the caudical rhizome. Also evident is the downward geotropic reflection of the pedicel following pollination. At anthesis, the pedicel will reorient anti-geotropically. Modified from Hershkovitz (2018a).

Figure 1B. Individual from Punta de Tralca beach (El Quisco comuna, San Antonio Province, Valparaiso Region) unearthed before flowering on 9 July 2024. Only the leaf rosettes appeared above the substrate. Note the rugose leaves and the vein pattern recessed below the adaxial surface. From Hershkovitz (2024).

Figure 1C. Small flowering individual at Playa Hanga Roa, El Quisco (El Quisco comuna, San Antonio Province, Valparaiso Region). The paleness of the petal color is more natural than that in the other photos, but still more mauve than natural. From Hershkovitz (2024).

Figure 1D. Cultivated individual, collected on a dune in Cartagena (San Antonio Province, Valparaiso Region) on 7 December 2023, photographed on 7 January 2025. The originally subterranean caudex branches (caudical rhizome) were planted above the substrate level. Pedicels of pollinated flowers are oriented geotropically downward. From Hershkovitz (2024).

Figure 1E. ± horizontal inflorescence branch on the right side of the plant in Fig. 1D, photographed on 12 February 2025, showing the anti-geotropic reorientation of the pedicel subtending a dehisced capsule. This double re-orientation is characteristic of all Cistanthe species except those with the smallest and most densely packed flowers.

Figure 1F. Seedlings collected on 18 September 2024 (following a late rain) the beach at Punta de Tralca (see Fig. 1B), showing different stages of development of the fusiform root. From Hershkovitz (2024).

Figure 2. *Cistanthe reshetiana*.

Figure 2A. Flowering individual growing in coastal range matorral at the Type locality (Puerto Oscuro, Canela comuna, Choapa Province, Coquimbo Region) on 13 September 2024. Modified from Hershkovitz (2025a).

Figure 2B. Unearthed individual collected on 13 September 2024. Note that the taproot is thinner and not markedly fusiform as in large *C. philhershkovitziana* plants. Note also one (rarely two) heteroblastic foliage leaves in the basal sterile portion of the flowering stem, and that the leaves are less rugose than in *C. philhershkovitziana*. From Hershkovitz (2025a).

Figure 2C. Another unearthed individual collected on 13 September 2024 showing the taproot comparatively thin and not markedly fusiform as in *C. philhershkovitziana*. Note also a branch scar at the root apex.

Figure 2D. Cultivated individual collected on 13 September 2024 and photographed on 18 August 2025. Note that the leaf surfaces are fairly smooth (not rugose) and that the primary vein appears recessed adaxially and emergent abaxially.

Figure 2E. Comparison of flower size of *C. philhershkovitziana* (left) and *C. reshetiana* (right). Both plants had been cultivated side-by-side for more than a year and happened to flower at the same time. The scales on separate photos were equalized (approximately) manually. The size difference shown has been consistent during previous and subsequent blooms. Unfortunately, the colors are inaccurate and could not be corrected. The petals of C. philhershkovitziana always are paler rose and those of C. reshetiana deeper rose towards magenta. The outline of the larger darker center spot of the *C. philhershkovitziana* flower is accurate. This spot is purplish. Other *C. reshetiana* individuals may have a larger and decidedly red center spot (Hershkovitz, 2021a).

Figure 3. *Cistanthe behacheliana*.

Figure 3A. Individual with developing inflorescences photographed at the Type locality (Freirina comuna, Huasco Province, Atacama Region) on 19 September 2025. Note that the major leaf veins are elevated ("embossed") above the adaxial leaf surface, and that the developing inflorescence stems appear comparatively thin. The bulbous swelling at the base of the flowering stem also is evident. This swelling is characteristics of the flowering stems of all Cistanthe species, but it is less evident in C. sect. Andinae Hershk. species. From Hershkovitz (2025b).

Figure 3B. Individual at the type locality on 13 October 2025 after flowering nearly had completed.

Figure 3C. Same individual as in Fig. 3B unearthed. Note the fusiform root. I cannot explain the droplets on the backdrop. Sometimes I get a bit overstimulated, I guess.

Figure 3D. (Pseudo-)sepal. Note that the sepal striations that normally are black or magenta in pigmented *Cistanthe* plants are brownish in the albino form. From Hershkovitz (2025b).

Figure 3E. Polar view of flower. Note that the stigma appears to be 6-lobed. From Hershkovitz (2025b).

Figure 3F. Oblique view of flower showing how the deep folding of the 3 stigma lobes creates the appearance of six lobes in the polar view.

Figure 3G. *Cistanthe behacheliana* and a pigmented plant found at the Type locality. Hershkovitz (2025b) included the pigmented form in the species, but here its status is left undetermined pending further research. The holotype to be deposited will be the albino plant illustrated in Figures 3A and 3B.

Figure 3H. As in Fig. 3G but abaxial leaf view.

Figure 4. *Cistanthe gbifiana*.

Figure 4A. Individual growing some 5 km E of the Type locality (Freirina comuna, Huasco Province, Atacama Region). The basalmost flowering stem appendages are much reduced compared to the basal leaves. Note the major leaf vein pattern deeply recessed in the adaxial surface.

Figure 4B. Individual similar to that in Fig. 4A unearthed. Note the rosettes nearly sessile on the caudex and the horizontal orientation of large roots.

Figure 4C. Individual at the same locality as above, but the sterile portion of the flowering stem bears large foliage leaves, the apicalmost ± amplexicaul.

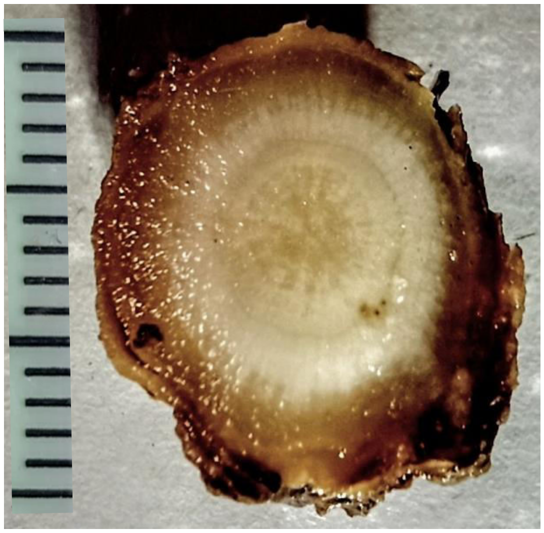
Figure 4D. Individual with flowering stem leaves as in Fig. 4C unearthed. Note the short, thin caudical rhizome and the horizontal orientation of two of the major roots.

Figure 4E. Small, probably first-year flowering individual.

Figure 4F. Seedling showing early development of fusiform root.

Figure 4G. Flower.

Figure 4H. Taproot cross section showing two 2° xylem growth rings. The central circle with a stellate appearance is the 1° xylem (stele).



Appendix 1. Provisional taxonomy of the *Cistanthe philhershkovitziana* species complex

Below is a key to the species of the *Cistanthe philhershkovitziana* complex, followed by species diagnoses, descriptions, and distributions revised from Hershkovitz (2018a, b, 2024, 2025a, b, c).

1A. Life forms rarely hemicryptophytic to more commonly chamaephytic to phanerophytic, stem lengths often exceeding 60 cm and/or normally possessing multiple heteroblastic foliar leaves along the flowering stem, plants of both coastal, interior lowland, and Andean habitats, Chile, Argentina, Peru .... **other *C.* sect. *Cistanthe* species**

1B. Life forms geophytic to scarcely hemicryptophytic, stem lengths < 50 cm and only exceptional individuals possessing multiple heteroblastic foliar leaves along the flowering stem, plants of coastal valleys and plains and the littoral zone, endemic to Chile **2**

2A. Leaves markedly rugose, adaxial surface with velvet-like texture and not glaucous or shiny, 2° vein pattern deeply recessed, flowering stem nodes sometime bearing large leaves, Huasco Province (Atacama Region) .... ***C. gbifiana***

2B. Leaves slightly or not rugose, adaxial surface glaucous to somewhat lustrous, 2° vein pattern somewhat elevated or recessed or not evident, flowering stem nodes normally lacking large leaves; Cardenal Caro Province (Libertador O´Higgins Region) to Huasco Province (Atacama Region)..**3**

3A. Leaf 2° vein pattern somewhat elevated above the adaxial surface or not evident, plants lacking red pigmentation, flowers white, Huasco Province (Atacama Region) .... ***C. behacheliana***

3B. Leaf 2° vein pattern somewhat recessed below the adaxial surface or not evident, plants with red pigmentation, flowers pale rose to magenta..**4**

4A. Plants clearly geophytic, the taproot markedly fusiform, the caudex apex thickened, 1+ cm below substrate surface, abruptly constricted at the origin of the 1° caudex stem (caudical rhizome), flowers pale rose with a purplish center, littoral zone, Cardenal Caro Province (Libertador O´Higgins Region) to Elqui Province (Coquimbo Region).... ***C. philhershkovitziana***

4B. Plants indistinctly geophytic or hemicryptophytic, the taproot thickened but not markedly fusiform, the caudex apex at substrate surface level, not abruptly constricted at the origin of the 1° caudex stem, flowers deep rose to nearly magenta, sometimes with a red center, coastal matorral, Choapa to Elqui Province (Coquimbo Region)..***C. reshetiana***

1. ***C. behacheliana*** Hershk., Int. J. Adv. Res. Publ. Rev. 2(10): 32. 2025. Holotype: CHILE: Atacama Region, Huasco Province, Freirina Comuna, highway C-500 ca. 22 km west of the junction with the Panamerican Highway, loose sandy substrate in washes below sand dune "outcrops" on slopes otherwise covered with shrubby coastal scrub vegetation. -28.967 -71.106, 500 m elev., 19 September 2025, *Hershkovitz s.n.* (to be deposited in SGO).

Diagnosis: Succulent geophytic perennial herb but probably facultatively annual with fusiform taproot and distinct caudical rhizome, differing from other species primarily by its albinism and 2° leaf veins sometimes somewhat elevated above the leaf surface and also the combination of its less rugose leaves, thinner peduncles, and smaller flowers.

Description: Somewhat succulent geophytic rosettiform facultative annuals, flowering the first season after germination and sometimes succumbing to summer drought, otherwise a usually short-lived perennial; rosettes up to 16 cm broad, sometimes few-branched, the branches also rosettiform; albino (lacking red or yellow pigments). **Taproot** fusiform, fleshy (developmental timing of thickening after germination unknown), up to 12 cm long, up to 20 mm broad at the apex, apex truncate. **Caudex** subterranean. **Caudical rhizome** ca. 1 cm long, ca. 5 mm broad, fleshy, elongated 1–2 cm, bearing scaly cataphylls, internodes 1–2 mm apart, in larger plants branched near soil surface. **1° rosette leaves** brachyblastic, simple, ± succulent, glabrous, somewhat glaucous, spathulate to elliptical to ovate to obovate, 5 (–7) cm long and 2(–3) cm broad, the petiolar region tapered, up to 1 cm broad at the base, apex acute to obtuse, green-glaucous, adaxially smooth to shallowly rugose with the 2° veins elevated above the surface. **2° rosettes** often developing in axils of the 1° rosette leaves and otherwise similar to it. **Inflorescence peduncle** (viz. flowering stem) terminal from the rosette, 10–30 cm long, bulbous at the base, sometimes bearing a few brachyblastic cataphylls at the nodes, abruptly constricted above the base, terete, somewhat thinner and less stiff than in other species and sometimes sinuous, usually unbranched, internodes elongated, heteroblastic sterile nodes 1-bracteate. **Inflorescence** a cincinnus, the developing portion somewhat reflexed, bracteate, flowering nodes up to ca. 8, the basalmost 1-bracteate, the succeeding with 2 markedly unequal bracts. **Bracts** up to 5 mm long, amplexicaul, ovate, apex acute, becoming papery with age, striate with pale brown lines. **Flowers** hypogynous, perfect, spontaneously autogamous, nectiferous at anthesis. **Pedicels** at anthesis, ± erect, ca. 20 mm, after pollination reoriented downwards, at dehiscence reoriented upwards, up to ca. 5 cm in fruit. **(Pseudo)sepals** 2, free, broadly ovate, unequal, the larger clasping the smaller, up to 12 mm long, foliaceous and somewhat lustrous after anthesis, marked with pale brownish lines persistent, enveloping the fruit. **Petals** 5, free, white, greenish at the base, spathulate, the apical margin ± crisped, 10–15 mm long and broad, aestivation quincuncial, the petals deaestivating in pollinated flowers, twisting about the ovary and forming a cap that breaks off irregularly during capsule dehiscence. **Stamens** 15–25, filaments pale, ca. 4 mm long, narrowly subulate, papillate basally, spreading at anthesis, later curving inward and touching the stigma, anthers dorsifixed, versatile, yellow, ca. 1.2 mm long. **Pistil** syncarpous, tricarpellate, ovary ovate, green, ca. 3 mm long, style ca. 1 mm long, stigmas 3, the individual carpel stigmatic margins recurved but incompletely fused with the stigmatic margins of adjacent carpels, hence the compound stigma appearing as 6-lobed. **Fruit** a valvate capsule, 8(–12) mm long, dehiscing basipetally, the valves ± woody, recurving. **Seeds** up to ca. 100 but usually less, subglobose, up to ca. 1.1 mm, micropyle hooked, strophiolate, black, densely covered with short hairs.

Distribution: This species is known only from two localities in the arid coastal hills of southern Huasco Province, in between ca. 300–800 m elevation.

Phenology: Plants presumably germinating or reemerging following winter rains in adequately wet years, then flowering in early spring, the above ground tissues senescing after flowering/fruiting, and absent by late spring. Phenology in drought years or years with aseasonal precipitation unknown. Phenology in long-term cultivation not yet known.

Additional observations:

i. The albino plants from the Type locality were misidentified as *C. philhershkovitziana* in Hershkovitz (2022a).

ii. The taxonomic status of similar red-pigmented plant collected at the Type locality and from the coastal plains further west remains unresolved.

iii. Plants collected in September-October, 2025 and later transplanted into containers for cultivation outdoors in El Quisco (ca. -33°) rapidly deteriorated. Although existing rosettes developed inflorescences and flowers, few fine roots developed, and the taproots partially rotted, even with alternating wetting and drying. As of February, 2026, however, several caudices remain alive.

2. ***C. gbifiana*** Hershk., Int. J. Adv. Res. Publ. Rev. 2(10): 34. 2025. Holotype: CHILE: Atacama Region, Huasco Province, Freirina Comuna, grounds around the main facility of Parque Eólico Sarco, ca. 16 km W of the junction of highways C-496 and C-500 and 4 km E of the coast, open shrubby vegetation dominated by *Eulychnia brevifolia* Phil. and *Frankenia chilensis* C.Presl. ex Schult. & Schult.fil. in dense, rocky, coarse whitish sand surrounding the facility, -28.86 -71.42, 150 m elev., 22 Sept 2025, *Hershkovitz s. n.* (to be deposited in SGO).

Diagnosis: Succulent geophytic rosettiform perennial herb but probably facultatively annual differing in its harder (less succulent) taproot and thinner caudical rhizomes, markedly more rugose, obovate to suborbicular leaves that are relatively flaccid and have a suede-like grey-green adaxial surface texture and markedly reddish glaucous abaxial leaf surface.

Description: Somewhat succulent geophytic rosettiform facultative annuals, flowering the first season after germination and probably sometimes succumbing to summer drought, otherwise probably a short-lived perennial; rosettes up to 20 cm broad, branching, the branches also rosettiform. **Taproot** fusiform, thickening soon after seed germination, texture harder (less succulent) than other *C. philhershkovitziana* complex species, up to 12 cm long. **Caudex** subterranean. **Caudical rhizome** up to 1 cm long, ca. 2 mm broad, less fleshy than in other *C. philhershkovitziana* complex species. **1° rosette leaves** brachyblastic, simple, less fleshy than in other *C. philhershkovitziana* complex species, obovate to suborbicular, up to 8(–10) cm long and 5 cm broad, nearly sessile or with a tapered petiolar region, up to 1 cm broad at the base, markedly rugose, somewhat flaccid and wilting rapidly when the plant is uprooted, adaxial surface sparsely papillate, otherwise the surface suede-like to touch, dark gray-green, 2° vein pattern deeply recessed, abaxial surface glaucous, magenta or greenish, apex rounded. **2° rosettes** often developing in axils of the 1° rosette leaves and otherwise similar to it. **Inflorescence peduncle** (viz. flowering stem) terminal from the rosette, 10–40 cm long, bulbous at the base, sometimes bearing a few brachyblastic cataphylls at the nodes, abruptly constricted above the base, terete, sometimes branched, internodes elongated, heteroblastic sterile nodes with small leaf or foliaceous bract, in some plants bearing broadly ovate amplexicaul leaves otherwise similar to rosette leaves, up to 5 cm long. **Inflorescence** a cincinnus, the developing portion somewhat reflexed, bracteate, flowering nodes up to ca. 10, the basalmost 1-bracteate, the succeeding with 2 markedly unequal bracts. **Bracts** up to 12 mm long, amplexicaul, ovate, apex acute, becoming papery with age, striate with black lines. **Flowers** hypogynous, perfect, spontaneously autogamous, nectiferous at anthesis. **Pedicels** at anthesis, ± erect, ca. 20 mm, after pollination reoriented downwards, at dehiscence reoriented upwards, up to ca. 6 cm in fruit. **(Pseudo)sepals** 2, free, broadly ovate, unequal, the larger clasping the smaller, up to 16 mm long, foliaceous and somewhat lustrous after anthesis, marked with black lines, persistent, enveloping the fruit. **Petals** 5, free, deep rose, spathulate, up to 2 cm long and broad, aestivation quincuncial, the petals deaestivating in pollinated flowers, twisting about the ovary and forming a cap that breaks off irregularly during capsule dehiscence. **Stamens** ca. 50, filaments magenta, ca. 5 mm long, narrowly subulate, papillate basally, spreading at anthesis, later curving inward and touching the stigma, anthers dorsifixed, versatile, golden to tinged magenta, ca. 1.7 mm long. **Pistil** syncarpous, tricarpellate, ovary ovate, green, ca. 4 mm long, style ca. 1 mm long, whitish to magenta, stigmas 3-lobed, pale yellow. **Fruit** a valvate capsule, up to 16 mm long, ovate but apex more acute than in other *C. philhershkovitziana* complex species, dehiscing basipetally, the valves ± woody, recurving. **Seeds** up to ca. 450 (plus ca. 200

undeveloped ovules), subglobose, up to ca. 1 mm, micropyle hooked, strophiolate, black, densely covered with short hairs.

Distribution: Occasional populations in coarse sand of coastal plains and littoral and riparian zone of southern to central Huasco Province (Atacama Region) and La Higuera comuna of Elqui Province (Coquimbo Region).

Phenology: Plants presumably germinating or reemerging following winter rains in adequately wet years, then flowering in early spring, the above ground tissues senescing after flowering/fruiting and probably absent by early summer. Phenology in drought years or years with aseasonal precipitation unknown. Phenology in long-term cultivation not yet known.

Additional observations.

i. The Type locality coordinates and elevation are reported correctly here. Hershkovitz (2025b) accidently pasted in those of the *C. ipniana* Hershk. Type locality, a few km to the east.

ii. Plants collected in September-October, 2025 and later transplanted into containers for cultivation outdoors in El Quisco (ca. -33°) rapidly deteriorated. Although existing rosettes developed inflorescences and flowers, few fine roots developed, and the taproots and caudices eventually rotted. One produced a promising flush of new leaves, but this apparently drew upon existing taproot reserves.

3. ***C. philhershkovitziana*** Hershk., Phytologia 100(4): 209. 2018. Holotype: CHILE: Valparaiso Region, Petorca Province, La Ligua municipality, Pichicuy, Humedal de Pichicuy, sands near a prominent rock outcrop on a backdune behind a marsh along the beach, -32.35° -71.44°, 4 m elev., 11 October 2018, *Hershkovitz 18-01* (sent to F with instruction to send isotype to P, but the specimen accessions cannot be confirmed here).

Diagnosis: Somewhat succulent geophytic rosettiform facultative annual with fusiform taproot, distinct caudical rhizome, slightly rugose oblanceolate to obovate leaves, and rose flowers with petals 10–15 mm long.

Description: Somewhat succulent geophytic rosettiform facultative annuals, flowering the first season after germination and sometimes succumbing to summer drought, otherwise a usually short-lived perennial; rosettes up to 16 cm broad, branching, the branches also rosettiform. **Taproot** fusiform, thickening markedly soon after seed germination. **Caudex** subterranean, unbranched or with several branches. **Caudical rhizome** 1–3 cm long, bearing scaly cataphylls, internodes 1–2 mm apart, branch scars sometimes evident at subterranean nodes, in larger plants branched near soil surface. **1° rosette leaves** brachyblastic, simple, ± succulent, glabrous, sometimes glaucous, narrowly oblanceolate to obovate, up to 8 cm long, leaf base decurrent, broadened, apex acute to rounded, adaxial surface smooth to rugose, 2° vein pattern often recessed below the surface. **2° rosettes** often developing in axils of the 1° rosette leaves and otherwise similar to it. **Inflorescence peduncle** (viz. flowering stem) terminal from the rosette, 10–30 cm long, bulbous and pale at the base, bearing a few brachyblastic cataphylls at the nodes, abruptly constricted above the base, stiff, wiry, reddish, terete, usually unbranched, internodes elongated, heteroblastic sterile nodes 1-bracteate. **Inflorescence** a cincinnus, the developing portion somewhat reflexed, bracteate, flowering nodes 8–10, the basalmost 1-bracteate, the succeeding with 2 markedly unequal bracts. **Bracts** up to ca. 10 mm long, amplexicaul, ovate, apex acute, becoming papery with age, densely striate with black resinous lines. **Pedicels** at anthesis erect, up to ca. 20 mm, after pollination reoriented downward, at dehiscence reoriented upward, up to 6 cm in fruit. **Flowers** hypogynous, perfect, spontaneously autogamous, nectiferous at anthesis. **(Pseudo-)sepals** 2, free, unequal, the larger clasping the smaller, 10–15 mm long, ovate, acute, densely striated with black resinous lines, persistent, enveloping the fruit. **Petals** 5, free, imbricate, obovate to flabellate, 1–2 cm long, pale rose, darker purplish towards the claw, spreading at anthesis, the petals deaestivating in pollinated flowers, twisting about the ovary and forming a cap that breaks off irregularly during capsule dehiscence. **Stamens** free, ca. 50, 12–15 mm long, filaments subulate, pale to white at the base, rose above, margins papillate basally, spreading at anthesis, later curving inward and touching the stigma; anthers dorsifixed, versatile, purple; pollen yellow, 1.5 mm long, **Pistil** epigynous, syncarpellate, shorter than to as long as the stamens. **Ovary** greenish, ovate, apex acute, ca. 3 mm long, 3-loculate, placentation axile. **Ovules** ca. 100. **Style** single, 1.5–6 mm long, white. **Stigma** globular, ca. 2x style width, 3-parted, lobed crests undulating, forming sulcate invaginations, yellowish to magenta, papillate; style and stigma withering after anthesis. **Fruit** a valvate capsule, 8–12 mm long, dehiscing basipetally, the valves ± woody, recurving. **Seeds** up to ca. 100, subglobose, ca. 1 mm, micropyle hooked, strophiolate, black, densely covered with short hairs.

Distribution: In Chile's littoral zone at least between ca. -30–34° (Elqui Province, Coquimbo Region to Cardenal Caro Province, LOH Region), possibly also on coastal plains in Elqui Province and also in Huasco Province (Atacama Region)

Phenology: Plants germinating or reemerging following winter rains in adequately wet years, then flowering ca. six weeks later, the above ground tissues senescing after flowering/fruiting and absent by early summer. Plants do not germinate or reemerge in drought years in the more arid northern end of the distribution. Germination/reemergence may be earlier if winter rains arrive especially early, and anomalous late spring rains may cause additional germination followed by flowering perhaps 4 weeks later. In cultivation with continuous irrigation, the plant can become essentially evergreen with episodic to continuous flowering.

Additional observations:

i. Hershkovitz (2018a) reported the petal size as 2–4 cm long. This is the flower diameter, not the petal length.

ii. The distribution of *C. philhershkovitziana* reported in Hershkovitz (2018a, b, 2022a) is erroneous, especially because it includes the distribution of plants later segregated as *C. reshetiana*. The earlier reported distribution also includes two anomalous localities that I now consider doubtful. One is the reported observation from the border between the Valparaiso and Metropolitan Regions. This collection has been destroyed and probably was *Cistanthe lindleyana* (Walp.) Hershk. The other is an 1829 collection by Carlo Bertero mounted on sheets with mixed specimens supposedly from the coast ranges in Quillota (Valparaiso Region). Hershkovitz (2020) discussed the unreliability of locality data associated with Bertero collections.

iii. Plants of various sizes from germlings to perhaps three years old generated fine roots rapidly following transplantation to sandy loam and cultivated out of doors in El Quisco (ca. -33°) and otherwise remained alive for more than a year in black plastic bags.

iv. The flowers open for only 1–3 hours before spontaneously self-pollinating and closing.

4. ***C. reshetiana*** Hershk., Int. J. Adv. Res. Publ. Rev. 2(7): 328. 2025. Holotype: CHILE: Coquimbo Region, Choapa Province, Canela Comuna, Puerto Oscuro, semidesert scrub at the peak of a hill along a trail from a diner along the Panamerican Highway to the ocean, -31.41° -71.59°, 230 m elev, 13 September 2024, *Hershkovitz s.n.* (to be deposited in SGO).

Diagnosis: subrosettiform perennial but probably facultatively annual herbs different from other *C. philhershkovitziana* complex species in having a less obconical/fusiform taproot and caudex not abruptly constricted at the apex; less succulent basal leaves that have more acute apices and a smoother surface and lack a well-defined petiolar region; and flowering stems longer and partially subangular rather than terete. Differing also from *C. philhershkovitziana* and *C. behacheliana* in having leaves about twice as long in comparably sized plants, with 1(–2) rather than no heteroblastic foliage leaves, with several rather than no foliaceous bracts, with petals ca. 50% longer, and with flowers that are either self-incompatible or at least not spontaneously self-pollinating.

Description: Slightly succulent rosettiform hemicryptophytic facultative annuals, flowering the first season after germination and probably sometimes succumbing to summer drought, otherwise a perennial of unknown longevity; rosettes up to 20 cm broad, branching, the branches also rosettiform. **Taproot** tapered but not fusiform, up to ca. 1 cm broad, not spongy-succulent. **Caudex** subterranean, not abruptly constricted at the apex. **Caudical rhizome** relatively thin and short. **1° rosette leaves** brachyblastic, simple, somewhat glaucous, less fleshy than in other *C. philhershkovitziana* complex species, oblanceolate, green adaxially, sometimes tinged purplish abaxially, apices acute, leaf surface smooth to undulating rather than rugose, midrib slightly recessed adaxially, expressed abaxially, 2° veins usually indistinct externally, rarely slightly recessed. **2° rosettes** often developing in axils of the 1° rosette leaves and otherwise similar to it. **Inflorescence peduncle** (viz. flowering stem) terminal from the rosette, up to 50 cm long, bulbous at the base, sometimes bearing a few brachyblastic cataphylls at the nodes, abruptly constricted above the base, subangular especially near the nodes, sometimes branched, internodes elongated, heteroblastic sterile nodes with a subpetiolate small leaf at the basalmost node, transitioning apically into sessile foliaceous bracts with abaxial black striations to amplexicaul membranous bracts with black striations. **Inflorescence** a cincinnus, the developing portion somewhat reflexed, bracteate, flowering nodes up to ca. 10, the basalmost 1-bracteate, the succeeding with 2 markedly unequal bracts. **Bracts** up to 12 mm long, amplexicaul, ovate, apex acute, becoming papery with age, striate with black lines. **Flowers** hypogynous, perfect, not or not spontaneously autogamous, nectiferous at anthesis. **Pedicels** at anthesis, ± erect, ca. 20 mm, after pollination reoriented downwards, at dehiscence reoriented upwards, up to ca. 6 cm in fruit. **(Pseudo)sepals** 2, free, broadly ovate, unequal, the larger clasping the smaller, up to ca. 10 mm long, foliaceous and somewhat lustrous after anthesis, marked with black lines, persistent, enveloping the fruit. **Petals** 5, free deep rose to nearly magenta nearly throughout with a small slightly purplish spot in the claw or with a large red spot in basal quarter, flabellate-cuneate, up to 2.5 cm long and broad, aestivation quincuncial, the petals deaestivating in pollinated flowers, twisting about the ovary and forming a cap that breaks off irregularly during capsule dehiscence, petals in not or ineffectively pollinated flowers inrolling basally after 3–4 days and deliquescing. **Stamens** ca. 50, filaments magenta, ca. 11 mm long, narrowly subulate, papillate basally, spreading, not later curving inward and touching the stigma, anthers dorsifixed, versatile, golden to tinged magenta, ca. 1.7 mm long. **Pistil** syncarpous, tricarpellate, ovary ovate, green, ca. 4 mm long, style ca. 5(–8) mm long, whitish to magenta, stigmas 3-lobed to 3-branched, red to magenta. **Fruit** a valvate capsule, ca. 11 mm long, ovate, dehiscing basipetally, the valves ± woody, recurving. **Seeds** up to ca. 100, subglobose, up to ca. 1 mm, micropyle hooked, strophiolate, black, densely covered with short hairs.

Distribution: In coastal matorral near the coast in between Choapa and Elqui Provinces (Coquimbo Region), possibly also on coastal plains in Elqui Province.

Phenology: Germinating or reemerging following winter rains and flowering in early spring. Not germinating/reemerging during drought years. The behavior in years with aseasonal rains is not known. Most plants collected and transplanted into containers of water and later sandy loam and cultivated in El Quisco (ca. -33°) failed to develop new roots. A few plants did establish and flowered again after 10–16 months in cultivation and then flowered repeatedly every few weeks to nearly continuously.

Additional observations:

i. These plants previously were identified as *C. philhershkovitziana* (Hershkovitz, 2021a, 2022a).

ii. Hershkovitz (2025a) reported the flowering stem length as up to 60 cm. This should be up to 50 cm.

iii. The flowers remain open for at least eight hours and sometimes close only partially and reopen the following day. Unpollinated or self-pollinated flowers in the original field-collected plants remained opened for three days before the petals curved inwards and deliquesced.

iv. Attempts to self-pollinate at least 20 flowers from several collected individuals were unsuccessful. Cross-pollinated flowers yielded no more than 50% seed set. However, four of these individuals later established in cultivation yielded high seed set following manual self pollination. Unlike other the *C. philhershkovitziana* complex species, self-pollination was not spontaneous, because the stamens remained spreading after anthesis and did not recurved inward towards the stigma.