
Notes on two South American *Oxalis*

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The identity and nomenclature of two cultivated *Oxalis* from South America is clarified. *Oxalis* F&W 10584 is identified as *O. arenaria*, and the confusion with *O. articulata* is discussed. *Oxalis squamoso-radica* is reduced to synonymy under *O. laciniata*.

1. *Oxalis arenaria*

A bulbous Chilean *Oxalis* with attractive bright pink flowers has been distributed in cultivation from several Flores & Watson collections as *O. aff. articulata* and more recently as F&W 10584, *O. ?tortuosa*. *Oxalis tortuosa* was illustrated and described by Lindley (1829) from material collected by James McRae near Valparaíso, Chile in October 1825. The resultant plants flowered in the Garden of the Horticultural Society (as the RHS was then known) in June 1828 producing yellow flowers atop a distinct aerial stem with the leaves also arising from the apex, like a miniature tree, quite unlike the plants grown under the label F&W 10584. Flores and Watson explain in their 2003 Seed List no. 10 that, due to lack of time, the material was named by eliminating all other *Oxalis* names from a checklist of the area, commenting that this is not a reliable method of identification.

Material of F&W 10584, collected from the coastal region of central Chile, and grown at Bob Brown's Cotswold Garden Flowers, Evesham, has been examined and determined as *O. arenaria* Bertero, by reference to Lourteig (2000) and Reiche (1896). This was confirmed by comparison with herbarium material at Kew and the London Natural History Museum. It is quite similar in leaf and flower to *O. articulata*, which is likely to account for the confusion with that species. There appears to have been historical confusion of *O. arenaria*

with *O. articulata* (which does not occur naturally in Chile) following the inclusion of *O. arenaria* as a synonym under *O. articulata* in Reiche (1896: 338) while recognising *O. biglandulosa* Steudel as distinct. The latter is treated by Lourteig (2000) as a synonym of *O. arenaria*.

While accepting *O. articulata* and *O. arenaria* as distinct species, Lourteig (2000) does not comment on the confusion between the two. Several modern Chilean Floras which follow Reiche illustrate *O. arenaria* as *O. articulata*, including Hoffmann (1995: 196–197, t.3) and Navas (1976: 244, t. 34 Q–U).

The easiest way to separate the two is by the underground parts. *O. arenaria* produces a bulb which is composed of swollen scale leaves, while *O. articulata* has a solid rhizome. The inflorescence of *O. arenaria* is fewer flowered. The shape of the glands at the sepal apex is also different. While it varies from one individual to another, specimens of *O. arenaria* often develop a gland with several finger-like projections radiating downwards from the sepal apex. At least in cultivated material of *O. articulata* these sepal glands usually consist of a pair of single elliptical structures, one on each side of the midrib. Useful illustrations of *O. articulata* can be found in Clement, E.J. *et al.*, 2005: 186, and *Curtis's Botanical Magazine* **110**: t. 6748 (1884), while *O. arenaria* is depicted in *Curtis's Botanical Magazine* **101**: t. 6193 (1875).

The natural distribution of *O. articulata* is centred on the eastern side of central South America. Various publications treat it as native in the floras of Brazil, Paraguay (Clifton, 2004), Uruguay (Lourteig, 2000) and Argentina, where it is recorded from the provinces of Buenos Aires (where it is particularly abundant), Córdoba, Entre Ríos, La Pampa, Mendoza, Santa Fe, and Tucumán (Cabrera, 1965; Múlgura, 1999), and in south-eastern Brazil from Rio Grande do Sul (Lourteig, 1983, 2000). A record from San Juan (Argentina) adjacent to the Chilean border is attributed to introduced cultivated material

(Lourteig, 2003). Records for Chile are based on cultivated plants, where it may escape from cultivation as it does elsewhere.

2. *Oxalis laciniata* and *O. squamoso-radicosa*

Oxalis laciniata is a frequently grown alpine plant. Cavanilles, who first described it in 1799, stated that it had “foliis profundissime laciniatis; laciniis subduodecim, linearibus...lacinias...utraque extremitate acutas” [“leaves most deeply divided, with about 12 linear divisions, acute at both ends”]. The illustration accompanying the protologue agrees with this, depicting a leaf with narrow entire segments, acute and undivided at the apex. However, this description does not match plants in cultivation, which display leaf lobes that are marginally undulate with a minutely bifid apex; characters which do fit *O. squamoso-radicosa*. The account of *Oxalis* in *Flora Patagonica* (Lourteig, 1988) treats both these taxa as species, without comment. Clear drawings showing the typical leaf lobes for each are provided. However, her later monograph (Lourteig, 2000), while treating both as species, comments under *O. squamoso-radicosa*, “La misma de *O. laciniata*” [“The same as *Oxalis laciniata*”].

Examination of herbarium material at Kew and the Natural History Museum reveals an abundance of plants with marginally undulate lobes and bifid tips, most of which are determined as *O. squamoso-radicosa*, while a few are included as *O. laciniata*. The specimens reveal a range of variation from leaves that are crenate and undulate to those that are almost entire and flat. This variation appears to be correlated with the degree of exposure to strong sunlight. Plants with very strongly crenate and undulate margins are from exposed habitats, while those with almost entire, flat margins were collected “in the center or leeward side of *Verbena* bushes.” (M. E. Blake 193, 1933, in sched., K).

A few examples are provided in Table 1.

Table 1. Illustrative samples from Kew, to show the range of variation

Sheet	Leaf lobes	L × W (mm)	Det.	Note
Blake 125	9–14	7 × 2.5	<i>squamoso-radicosa</i>	Deeply lobed, deeply bifid
Blake 126	7	12–22 × 1.5–2	<i>squamoso-radicosa</i>	Shallowly lobed, slightly emarginate apex
Blake 130	10	24–27 × 0.8–1	<i>laciniata</i>	Margin entire, slightly inrolled, apex acute
Blake 131	9–12	6–7 × 2.5–3	<i>squamoso-radicosa</i> var. <i>pubescens</i>	Deeply lobed, deeply bifid, pink-red margin, hairy

This led N.Y. Sandwith to annotate one of these sheets, “This seems to show that *O. laciniata* and *O. squamoso-radicosa* are perhaps habitat forms of a single species.”

Experience with cultivated plants also leads to a similar conclusion. Erskine (1994) reports cultivating a plant of *O. laciniata* with extremely dark flowers that always produced straight linear leaflets without undulation. “In April 1993 a pan of this clone produced 5 leaves with marked undulation on each leaflet margin, amongst many leaves without.” He commented, “There must, I think, be suspicion that this is one variable species.”

Both these *Oxalis* are geophytes, with a subterranean rhizome composed of fleshy storage scale leaves, which undergoes a period of complete dormancy each year. Studies of other geophytes such as *Podophyllum peltatum* have revealed that the next season’s growth is formed in the developing subterranean resting bud just prior to the onset of dormancy, usually during summer, when the highest temperatures generally occur (DeMaggio & Wilson, 1986). This process appears to be sensitive to temperature, which may account for the variation in leaf shape. Evidently, plants growing in the

shelter of shrubs would experience lower ground temperatures than those in full sun. In cultivation, a plant grown for several years in a small pot is unlikely to experience much temperature variation across a small container; however, when grown in a larger pan, a more pronounced thermal gradient is likely to be experienced across the container. This range of soil temperature within a larger pan may be sufficient to influence meristems in the warmer part of the medium to switch growth pattern, consequently causing both forms of leaf to appear on the same plant as reported by Erskine (1994) and quoted above.

Further corroboration comes from the distribution in the wild, concerning which Erskine (1994) notes, "*Oxalis laciniata* is found in the province of Santa Cruz near both the east coast and the Andes but avoiding the very dry central steppe" with its more extreme range of temperatures. *Oxalis squamoso-radicosa* has a wider distribution and, notes Erskine, "generally seems to predominate when it occurs with *O. laciniata*."

In view of the above, it is here proposed to reduce *O. squamoso-radicosa* to synonymy.

Oxalis laciniata Cav. *Icon.* **5**: 7, t. 412 (1799)

Synonym: *Oxalis squamoso-radicosa* Steud., *Flora* **39**: 443 (1856)

This has the advantage of retaining the name *O. laciniata*, which is currently used for these plants in cultivation and in horticultural literature, including the *RHS Plant Finder*.

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