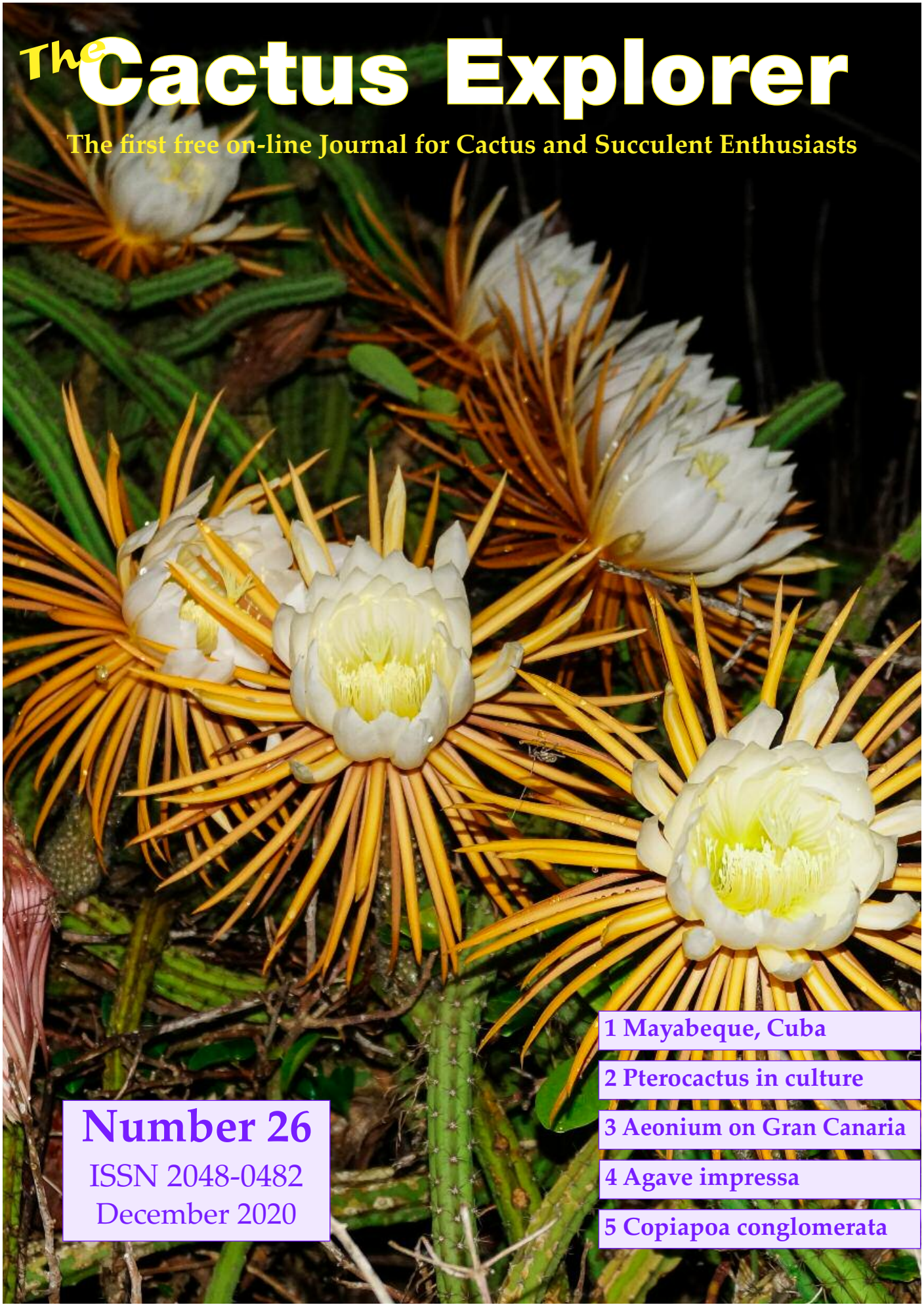
The Cactus Explorer

The first free on-line Journal for Cactus and Succulent Enthusiasts



Number 26

ISSN 2048-0482

December 2020

In this Edition

Cover Picture: *Selenicereus grandiflorus* night blooming at Rotilla, Cuba in May. See *Cactaceae on the North Coast of Mayabeque, Cuba*. on Page 62. Photograph: Diego Salas Pantoja & José Miguel Acuña

The No.1 source for on-line information about cacti and succulents is http://www.cactus-mall.com
The best on-line library of cactus and succulent literature can be found at:
https://www.cactuspro.com/biblio/en:accueil

Invitation to Contributors

Please consider the Cactus Explorer as the place to publish your articles. We welcome contributions for any of the regular features or a longer article with pictures on any aspect of cacti and succulents. The editorial team is happy to help you with preparing your work. Please send your submissions as plain text in a 'Word' document together with jpeg or tiff images with the maximum resolution available.

A major advantage of this on-line format is the possibility of publishing contributions quickly and any issue is never full! We aim to publish your article quickly and the copy deadline is just a few days before the publication date. There will usually be three issues per year, published when sufficient material is available. Please note that **advertising and links are free** and provided for the benefit of readers. Adverts are placed at the discretion of the editorial team, based on their relevance to the readership.

Publisher: The Cactus Explorers Club, Briars Bank, Fosters Bridge, Ketton, Stamford, PE9 3BF U.K.

The Cactus Explorer is available as a PDF file downloadable from www.cactusexplorers.org.uk
The Editorial Team:
Organiser:Graham Charles graham.charles@btinternet.com
Paul Hoxey paul@hoxey.com
Zlatko Janeba desert-flora@seznam.cz
Martin Lowry mrtnlowr@gmail.com

This issue published on
9th December 2020

The genus Aeonium on Gran Canaria

Marco Cristini tells us about the genus *Aeonium* on Gran Canaria and illustrates his observations with excellent pictures. We can see that this popular holiday island has a lot more to offer the plant lover than splendid weather and beaches. Photographs by the author.

Introduction

Gran Canaria is home to a rich flora and hosts several species of succulents which can be found in almost every part of the island. As far as the Crassulaceae family is concerned, the most important genus is doubtless *Aeonium*, with seven species (five are endemic). While the aeoniums of Gran Canaria have been well studied during the last century, chorological data is often sketchy and paths far from major roads can reveal highly interesting populations.

Gran Canaria has been deeply transformed by the Spanish colonization. The laurel forest, which once covered the majority of the island's northern part, has disappeared almost completely and the pine forest was severely reduced before a few attempts at reforestation took place during the twentieth century (Figure 1). On the other hand, man-made structures such as tiled roofs, stone walls or road embankments provided some *Aeonium* species with ideal habitats, enabling them to grow in a greater number of places. Unlike La Palma or El Hierro, human activities have had a lasting impact on almost all areas of Gran Canaria and influenced also the distribution of *Aeonium* species, which is now almost certainly quite different from what it was before the fifteenth century.

Figure 1. Gran Canaria (adapted from Gobierno de Canarias - Consejería de Educación, Universidades, Cultura y Deportes).

Aeonium arboreum ssp. *arboreum* (Linné) Webb & Berthelot

Once known as *Aeonium manriqueorum*, *Aeonium arboreum* ssp. *arboreum* (Figure 2) is an endemic of Gran Canaria where it grows from 200 to 1850m. It is a few-branched subshrub up to 2m tall, with erect or ascending, smooth branches without reticulations. Its rosettes are 12–25cm in diameter during the growing season, but much smaller in summer, when the

Figure 2. Caldera de Bandama, *Aeonium arboreum* ssp. *arboreum*.

Figure 3. Rincón de Tenteniguada, a rosette of *Aeonium arboreum* ssp. *arboreum*.

Figure 5. Path between San Mateo and Valsequillo, *Aeonium arboreum* ssp. *arboreum* (left) growing side by side with *A. undulatum* (centre) and *A. percarneum* (right).

Figure 7. Rincón de Tenteniguada, an inflorescence of *Aeonium arboreum* ssp. *arboreum* in full bloom, 4th August 2020.

Figure 4. Valsequillo, a medusa-like *Aeonium arboreum* ssp. *arboreum*.

Figure 6. Agaete, *Aeonium arboreum* ssp. *arboreum*.

Figure 8. Hoya del Gamonal, *Aeonium aureum*.

Figure 9. Hoya del Gamonal, an offsetting *Aeonium aureum*.

Figure 10. Hoya del Gamonal, a healthy group of *Aeonium aureum*.

Figure 11. Cruz de Tejeda, Monte Constantino, *Aeonium aureum* covers a rocky outcrop at around 1700m.

plant sheds the previous season's leaves and retains almost only the younger ones, tightly appressed to each other (Figure 3). It is widespread in the central and northern part of Gran Canaria, often in areas which were covered by the laurel forest before the Spanish colonization of the island.

Differentiating *A. arboreum* ssp. *arboreum* from *A. undulatum* can seem difficult at first

Figure 12. Path leading from San Mateo to Valsequillo, *Aeonium aureum*.

sight, since both species develop shrubs made up by 10–20 tall stems looking quite similar, especially during the summer dormancy. The main distinguishing feature mentioned in the literature, namely that *A. undulatum* branches only from the base, is often not very helpful, since a damaged specimen of *A. undulatum* can develop several branches and I saw plenty of such plants (see below, Figure 44). However, *A. arboreum* ssp. *arboreum* is usually much more branched than *A. undulatum*, resulting in tangled shrubs with a greater number of stems (Figure 4). In addition, the stems of *A. undulatum* are thicker (see below, Figure 46) and grow often upright, whereas those of *A. arboreum* ssp. *arboreum* can be quite tortuous.

A. arboreum ssp. *arboreum* thrives in sunny and dry locations such as stone walls, rocky outcrops and lava fields (Figure 5). In the literature, I read that it grows up to 1600m, but

Figure 13. *Aeonium aureum* growing on the dam of Embalse de los Homos.

Figure 14. Tenteniguada, near Roque Grande, *Aeonium aureum* (perhaps a cross with *A. undulatum*)

Figure 15. Tenteniguada, near Roque Grande, *Aeonium aureum* (perhaps a cross with *A. undulatum*)

I found it at around 1630m near Mirador de Bécerra and at 1850m east of Pico de las Nieves, growing together with *A. percarneum* in a sheltered position. I saw many healthy specimens of *A. arboreum* ssp. *arboreum* on Caldera de Bandama (an impressive extinct volcano not far from Las Palmas), where I sometimes spotted it growing as an epiphyte on palm trees. On the other side of the island, this succulent grows near Agaete (Figure 6),

Figure 16. Hoya del Gamonal, a quite open rosette of *Aeonium aureum*.

Figure 17. Barranco de la Virgen, Montaña Doramas, *Aeonium canariense* ssp. *virgineum*.

Figure 18. Barranco de la Virgen, Montaña Doramas, a rosette of *Aeonium canariense* ssp. *virgineum*.

Figure 19. Barranco de la Virgen, along the road GC-305, *Aeonium canariense* ssp. *virgineum*.

Figure 20. Barranco de la Virgen, along the road GC-305, *Aeonium canariense* ssp. *virgineum* growing on a road embankment.

Figure 21. Barranco de la Virgen, *Aeonium canariense* ssp. *virgineum* growing in the pine forest.

but only from 400m upwards, whereas it can be found as low as 250m in nearby San Pedro, a few kilometres from the ocean.

The literature is quite inconsistent as far as the flowering time of *A. arboreum* ssp. *arboreum* is concerned. According to Praeger (1932: 162), it flowers between January and February (February–March according to Suárez 1994: 331; November–February according to Maire 1976: 298), whereas Bañares Baudet (2015: 30) prefers autumn (September–November), following Bramwell (1997: 42). Liu (1989: 66, followed by Piens 2002: 114 and Carbonell 2007: 45) writes that the species flowers from October to April, Lodé (2010: 78) includes eight months (November–June) and Muer *et al*. (2016: 272) nine (October–June). On the other hand, Burchard (1929: 136) mentions only spring (April–May) and Kunkel (1978: 44) summer (June–August/September). During my stay on Gran Canaria (early August 2020), I saw many spent inflorescences, but also quite a few in bloom (Figure 7). It seems to me that many botanists observed flowering plants at the time of their visits to Gran Canaria and wrote about the anthesis of *A. arboreum* ssp. *arboreum* accordingly. In my opinion, it is likely that the succulent flowers throughout the year, depending on local circumstances such as water, soil and exposure.

Aeonium aureum (C. Smith ex Hornemann) Mes

Once considered a member of genus *Greenovia*, *Aeonium aureum* is a stemless succulent whose cup-shaped rosettes have a diameter of 8–30(–40)cm and become tightly closed during the dry season (Figure 8). The plant is often solitary, yet if conditions are good it can produce offsets (Figures 9–10). It grows mostly in the pine forest zone, but can be found also in the laurel forest and subalpine zone. It occurs on Gran Canaria, Tenerife, La Gomera, La Palma and El Hierro.

A. aureum is widespread in the central part of Gran Canaria, often covering whole outcrops (Figure 11) or stone walls, also inside towns and villages. I found it from around 700m (Barranco de los Mirales, near San Mateo) up to 1700–1800m (for instance on Monte Constantino or in the area around Roque Nublo). There are many good-looking populations of this species between Hoya Viciosa and Montaña de los Cardos, on the path leading from San Mateo to Valsequillo (Figure 12), growing together with *A. arboreum* ssp. *arboreum*, *A. percarneum*, *A. undulatum* and *Monanthes brachycaulos*. This is one of the most Crassulaceae-rich areas of Gran Canaria and the plants grow on the rocks along the track, so it is very easy to observe and photograph them. At Embalse de los Homos, an artificial lake south of Tejeda, I saw *A. aureum* growing on a huge dam together with *A. simsii* (Figure 13). The species is also common along the path leading from San Mateo to Pico de las Nieves.

Near Roque Grande (Tenteniguada), at around 1300m, I observed a few unusual specimens (Figures 14–15) which were neither folded up like the majority of the neighbouring plants nor open like other *A. aureum* specimens I saw in shaded and damp localities (Figure 16). The rosettes were somewhat compressed, half folded-up and their colour was a shade of green a little brighter than the average *A. aureum*. There were many *A. undulatum* growing nearby, so there exists the possibility that the specimens I saw were a cross between it and *A. aureum*, although it would be necessary to see the plants outside their summer dormancy to be more certain.

Aeonium canariense ssp. *virgineum* (Webb ex Christ) Bañares

Often growing in open clusters of ten to twenty rosettes, *Aeonium canariense* ssp. *virgineum* is an endemic of Gran Canaria, up to 1000m (Figures 17–18); it belongs to a species growing also on Tenerife, La Gomera, El Hierro and La Palma. Its cup-shaped rosettes have velvety, occasionally undulated, 10–15cm long and 5–7cm wide light green leaves sometimes with reddish to yellowish tinge. It grows in the northern part of the island, often on rocks and rocky outcrops.

A. canariense ssp. *virgineum* was in all likelihood much more common before the destruction of the laurel forest, its main habitat. Now it survives only in a few locations scattered throughout the northern part of Gran

Figure 22. South of Cruz de Tejeda, Degollada Bécerra, *Aeonium percarneum*.

Figure 24. Agaete, a small and heavily-branched specimen of *Aeonium percarneum*.

Figure 26. Tenteniguada, near Roque Grande, *Aeonium percarneum*.

Figure 23. South of Cruz de Tejeda, Degollada Bécerra, tall specimens of *Aeonium percarneum*.

Figure 25. San Mateo, *Aeonium percarneum* growing quite happily on a roof.

Figure 27. Tenteniguada, near Roque Grande, *Aeonium percarneum*.

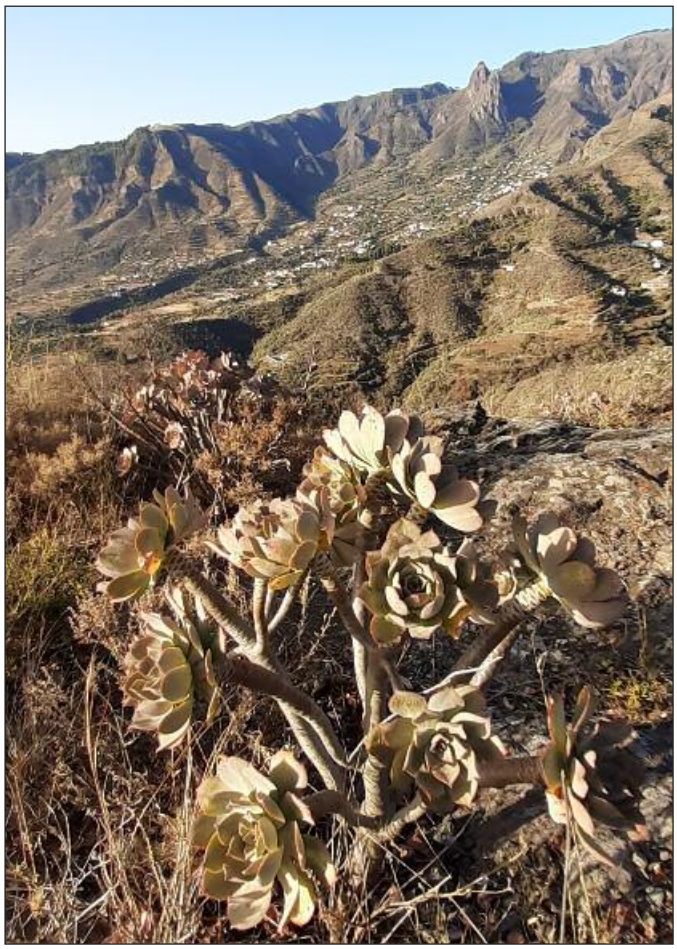


Figure 28. Near Montaña de los Cardos, *Aeonium percarneum*.

Figure 30. Pico de Bandama, *Aeonium percarneum* growing as an epiphyte on a palm tree.

Figure 29. A nice view from Pico de Bandama.

Figure 31. Caldera de Bandama, *Aeonium percarneum*.

Figure 32. Pico de Bandama, *Aeonium percarneum* growing as an epiphyte on a palm tree (close-up).

Figure 33. Hoya del Gamonal, *Aeonium simsii*.

Figure 34. Cruz de Tejeda, *Aeonium simsii*.

Canaria. I observed it only in Barranco de la Virgen, its locus classicus. I first found a few rosettes on Montaña Doramas (around 650m), on the watershed between Barranco de Azuaje and Barranco de la Virgen, then I spotted many more plants on the slopes of the latter barranco, from 500 to 750m. A very good place to observe *A. canariense* ssp. *virgineum* is the road GC-305 (Figure 19). At km 6, there is a rock face covered by it next to the road and the plant is common up to the outskirts of Firgas (Figure 20). It prefers road embankments and rocky slopes, but I found it also in a zone covered by the pine forest, with many specimens half-hidden by pine needles (Figure 21).

This succulent is reported also in the natural park of Tamadaba (Barranco Oscuro, Riscos de Guayedra, Barranco del Palo), yet it seems to grow in areas which are very hard to reach. I tried to walk from Agaete to Tamadaba, but at around 850m I got lost and had to turn back, having found not a single specimen of *A. canariense* ssp. *virgineum* and very few plants of *A. arboreum* ssp. *arboreum* and *A. percarneum*. My Kompass map shows no paths leading to the aforementioned barrancos from the camping area of Tamadaba (which is reachable by road), so I suggest to choose other parts of the island (such as Cuesta de Silva, Cenobio de Valerón, Cabo Verde, Cueva Corcho or Mirador de Andén Verde / Mirador del Balcón) if you are interested in this species.

***Aeonium percarneum* (R.P. Murray) Pitard & Proust**

A shrub up to 1.5m tall, *Aeonium percarneum* is doubtless the most variable *Aeonium* species of Gran Canaria. Its flattish rosettes, 8–25cm in

Figure 35. An open rosette of *Aeonium simsii* in cultivation.

Figure 36. Cruz de Tejeda, Monte Constantino, *Aeonium simsii*.

Figure 37. Roque Nublo; inset: *Aeonium simsii* growing immediately under the peak.

Figure 38. Hoya del Gamonal, over Lomito Blanco, *Aeonium simsii*.

diameter, bear obovate- to oblanceolate-spatulate, apically acute, glaucous leaves which can be almost white, light green, yellowish green or reddish (Figure 22). This succulent is very widespread in central and northern Gran Canaria, where it can be found from 100 up to 1850m. In the literature, I read that the species grows up to 1600m, yet I found many well-developed specimens south of Mirador de Bécerra (at 1700) and at 1850m east of Pico de las Nieves, growing together with *A. arboreum* ssp. *arboreum* in a sheltered position. Its overall appearance and extreme variability are somewhat reminiscent of *A. davidbramwellii* of La Palma. I rarely found unbranched adult specimens, yet the degree of branching and the size of the plants vary considerably: sometimes there are massive specimens almost 2m tall with 4–6 rosettes (Figure 23), other times there are bushes 40–50cm tall with 20–30 little rosettes (Figure 24).

A. percarneum is most likely the first *Aeonium* species to be seen upon arriving on Gran Canaria, since it commonly grows along the main roads of the island. In San Mateo, it can be found on tiled roofs and stone walls (Figure 25), but it thrives almost everywhere there is enough light and soil. I found plenty of healthy specimens between Hoya Viciosa and Montaña de los Cardos (Figure 28), yet the most interesting population I saw is that growing on volcanic soil under Roque Grande (Tenteniguada), around 1100–1200m, where I spotted many different forms of the plant in a quite small area (Figures 26–27), including a possible hybrid with *A. undulatum* (see below). In spite of the arid and sunny environment, the succulents looked healthy, often reaching a considerable size. I suspect that most of the water they need is provided by the clouds coming from the ocean and bringing moisture to the north-facing mountains of the Canary Islands.

Figure 39. Tenteniguada, Roque Grande.

Caldera de Bandama is another good place to look for *A. percarneum*, since the species is widespread both along the road to Pico de Bandama, a mountain with a nice panoramic view (Figure 29), and on the ridge of the caldera itself, where it thrives in a very sunny, arid and windy environment (Figure 31). I was at first surprised to see that *A. percarneum* grows frequently as an epiphyte on the palm trees (*Phoenix canariensis*, if I am not mistaken) bordering the road to Pico de Bandama (Figures 30 & 32), yet the bark of the palm tree is full of fissures and hollows, resembling thereby a rocky outcrop. Together with *A. arboreum* ssp. *arboreum*, I found *A. percarneum* on a few slopes facing the sea in Agaete, but only from 400m upwards, whereas it can be seen as low as 250m in nearby San Pedro, a few kilometres from the ocean.

***Aeonium simsii* (Sweet) Stearn**

One of the most interesting *Aeonium* species, *A. simsii* looks quite similar to a *Sempervivum* at first sight (Figure 33). A caespitose and often stemless plant, it forms low mounds on rocky outcrops, sheer cliffs, stone walls and old roofs. It has lanceolate, highly toothed and thin leaves with longitudinal brownish tannic stripes on the lower face (Figure 34).

Widespread in the pine forest zone, it is said to grow up to the summit of Pico de las Nieves (1950m), although I found it only up to 1800m. It prefers shaded places, but enjoys a remarkable resistance to drought and frost. It occupies the same ecological niche of many *Sempervivum* species. During the summer dormancy many plants look dried up and seem dead, yet they are only trying to reduce to the bare minimum the loss of water by protecting the core of the rosette with a shell of dried leaves, a strategy adopted also by *A. aureum*. Unlike this species, however, I was unable to spot "open" rosettes of *A. simsii* (see Figure 35).

A. simsii can be found very easily in the central part of Gran Canaria, over 900m. It is widespread around Cruz de Tejeda (where I spotted a possible hybrid with *A. undulatum*, see below), especially on Monte Constantino

Figure 40. Tenteniguada, near Roque Grande, *Aeonium spathulatum*.

Figure 41. Hoya del Gamonal, *Aeonium spathulatum*.

Figure 42. Tenteniguada, near Roque Grande, *Aeonium spathulatum*.

Figure 43. Barranco de la Virgen, along the road GC-305, *Aeonium undulatum* growing in the pine forest.

(Figure 36), and I found a nice population at the very end of the path leading to Roque Nublo, immediately under the peak (Figure 37). Another good place to look for *A. simsii* is the path leading from San Mateo to Pico de las Nieves. This species is very widespread near Hoya del Gamonal and higher up (between 1700 and 1800m, see Figure 38) it grows together with an *Umbilicus* species which I was unable to identify with certainty since there were only dried inflorescences in August. However, I think that it could be *U. heylandianus*. *A. simsii* is common also in Tenteniguada, from the last houses of the village up to 1400m. The path leading from Tenteniguada to Paso de la Caldera crosses one of the most botanically interesting areas of the island (Figure 39) and allows a glimpse of all

Figure 44. Hoya del Gamonal, a branched *Aeonium undulatum*.

Figure 45. Rincón de Tenteniguada, an *Aeonium undulatum* growing on a stone wall bordering a cultivated field.

Figure 46. South of San Mateo, *Aeonium undulatum* (note the thickness of the stem).

Figure 47. The so-called "sea of clouds" covering central Gran Canaria shortly after dawn.

Figure 48. Near Montaña de la Caldereta, a group of *Aeonium undulatum* growing in the pine forest.

Figure 49. Tenteniguada, near Roque Grande, *Aeonium* ×*bollei* (*A. percarneum* × *A. undulatum*).

Aeonium species of Gran Canaria except *A. canariense* ssp. *virgineum*. Like *A. aureum*, *A. simsii* does not dislike man-made structures: I found it on roofs, stone walls and even on the dam of Embalse de los Homos.

***Aeonium spathulatum* (Hornemann) Praeger**

A densely branched shrublet up to 60cm tall, its rosettes are flattish during the growing season but entirely folded up in summer (Figure 40), when the stems can sometimes be wholly bare. With obovate-spatulate, ciliate and not very succulent leaves, *Aeonium spathulatum* is often found in the pine forest zone, under the trees, on rocks and stone walls. It grows on all the Canary Islands with the exception of Lanzarote and Fuerteventura, up to 2400m.

Reported only in Tenteniguada in the literature, I found it in two other localities, namely near Montaña de los Cardos (on the path leading to Valsequillo, at 900m) and near Hoya del Gamonal (Figure 41), in two places between 1350 and 1550m (for more information, see my forthcoming paper about the distribution of *A. spathulatum* on Gran Canaria). The best place to observe this species is doubtless the area of Tenteniguada. I spotted it only twice in a nearby hamlet, but it is quite common under Roque Grande (on the path towards Paso de La Caldera, see Figure 42), between 1150 and 1450m, where it is often sheltered by surrounding vegetation.

A. spathulatum is not easy to find in summer since its rosettes are tightly folded up and the plant looks like a dried shrublet from a distance. The best way to quickly identify it is to look for its dried inflorescences, which are usually upright, undoubtedly aeonium-like and taller than the stems. I often found this plant on stone walls on the other islands, so it was quite interesting to see it growing on the ground and reaching a height of almost a metre on Gran Canaria. Although I observed it together with *A. percarneum* and *A. undulatum*, I was unable to spot any hybrid.

Figure 50. Tenteniguada, near Roque Grande, *Aeonium ×bollei* (close-up).

Aeonium undulatum Webb & Berthelot

Growing up to 2m, *Aeonium undulatum* is one of the tallest species of the genus (Figure 43). According to the literature, it is often unbranched or produces only basal side branches, yet I observed plenty of specimens which had developed branches after the stem has been damaged (Figure 44), for instance by grazing animals. Its rosettes, 10–25cm in diameter, are formed by oblanceolate-spatulate or oblong-spatulate, apically acute, dark green leaves. It grows in the northern part of Gran Canaria between 300 and 1600m, on rocky outcrops or north-facing slopes, often in the laurel or pine forest. It prefers somewhat cool and wet places, but I found it also in arid environments such as under Roque Grande, where it possibly thrives thanks to the moisture brought by the "sea of clouds" (see Figure 47).

During my stay on Gran Canaria, almost all rosettes I saw were quite small because of the summer dormancy. *A. undulatum* does not fold up entirely like *A. aureum* or *A. spathulatum*: its rosettes become somewhat cone-shaped (Figure 46), with all surviving leaves tightly packed in order to avoid any unnecessary loss of water through evaporation. On the other hand, I observed a few more open plants growing near gardens or farms (Figure 45), benefiting from the irrigation water.

One of the most characteristic *Aeonium* species of Gran Canaria, *A. undulatum* is not always readily distinguishable from *A. arboreum* ssp. *arboreum*, especially during the summer dormancy, yet after seeing a few plants of both species the identification becomes easier (see above, the paragraph about *A. arboreum* ssp. *arboreum*). I found plenty of *A. undulatum* on the path from San Mateo to Valsequillo, especially between Hoya Viciosa and Montaña de los Cardos, and on the path leading to Pico de las Nieves, especially from Montaña de la Caldereta to Hoya del Gamonal (Figure 48). On this track, the succulent grows also in the pine forest, where it reaches a sizeable height (1.5 or even 2m). Near Roque Grande (Tenteniguada) I spotted a possible hybrid with *A. percarneum* (see below). *A. undulatum* grows up to 1500–1600m near Cruz de Tejeda, sharing the same habitat with *A. simsii* and sometimes crossing with it.

Figure 51. Tenteniguada, near Roque Grande, *Aeonium ×bollei* differs considerably from neighbouring specimens of *A. percarneum*.

Hybrids

During my stay in Gran Canaria I was able to observe crosses between different species of *Aeonium* only a couple of times. I possibly found *Aeonium ×bollei* Kunkel ex Bañares (*A. percarneum* × *A. undulatum*) under Roque Grande (Tenteniguada) at around 1200m (Figures 49–50): I spotted a plant as tall as *A.*

Figure 52. 1km east of Cruz de Tejeda, *Aeonium ×praegeri* (*A. simsii* × *A. undulatum*).

percarneum, but with not as many rosettes and leaves of a lighter colour, different from all other specimens growing nearby (Figure 51). Since *A. percarneum* and *A. undulatum* are both common in this area, I believe that the plant I saw is *A. ×bolle*i.

While walking from Cruz de Tejeda to Las Lagunetas, I observed another unusual aeonium growing in the middle of a group of *A. simsii* around 1400m (Figures 52–53). It looked like a small *A. arboreum* or *A. undulatum*, less than 10cm tall, but its leaves showed the characteristic tannic stripes of *A. simsii* (Figure 54). I observed *A. undulatum* nearby, so there is a good degree of likelihood that I found a specimen of *Aeonium ×praegeri* Kunkel (*A. simsii* × *A. undulatum*).

Bibliography

Bañares Baudet, A. (2015). *Las plantas suculentas (Crassulaceae) endémicas de las Islas Canarias*. Santa Cruz de Tenerife.

Bramwell, D. (1997). *Flora de las islas Canarias: guía de bolsillo*. Madrid.

Figure 53. Close-up of the rosette of *Aeonium ×praegeri*.

Figure 54. The leaves of *Aeonium ×praegeri* are intermediate between those of *A. simsii* (with long tannic stripes and cilia, inset above left) and *A. undulatum* (usually without or with very short tannic stripes and cilia, see inset below right).

Borgmann, W. & Brandt, T. (2018). *Zwischen Drachenbäumen und Vulkanen. Sukkulenten der Kanarischen Inseln.* Adelsdorf.

Burchard, O. (1929). *Beiträge zur Ökologie und Biologie der Kanarenpflanzen*. Stuttgart.

Carbonell, E. (2007). *Cuadernos de succulencia. Barcelona.*

Cristini, M. (in press). The distribution of *Aeonium spathulatum* on Gran Canaria. *Sedum Society Newsletter*.

Kunkel, G. (1978). *Flora de Gran Canaria, vol. 3: Las plantas suculentas*. Las Palmas.

Liu, H.Y. (1989). *Systematics of* Aeonium *(Crassulaceae)*. Taichung (Taiwan).

Lodé, J. (2010). *Plantas Suculentas de las Islas Canarias. Santa Cruz de Tenerife*.

Maire, R. (1976). *Flore de l'Afrique du Nord, vol. 14*. Paris.

Mottram, R. (2015). *Aeonium* nothospecies. *Crassulacea* 4: 1–43.

Muer, T., Sauerbier, H. & Cabrera Calixto, F. (2016). *Die Farn- und Blütenpflanzen der Kanarischen Inseln*. Weikersheim.

Nyffeler, R. (2003). *Aeonium*, in U. Eggli (ed.), *Illustrated Handbook of Succulent Plants: Crassulaceae*. Berlin, pp. 15–23.

Piens, E.J.M. (2002). *The Genus* Aeonium *Webb & Berthelot*. Merelbeke – Gent.

Praeger, L.R. (1932). *An Account of the Sempervivum Group*. London (reprinted New York 1967 and Stuttgart 2012).

Schulz, R. (2007). Aeonium *in Habitat and Cultivation.* San Bruno (California).

Suárez Rodríguez, C. (1994). *Estudio de los relictos actuales del monte verde en Gran Canaria. Las Palmas de Gran Canaria*.

Appendix 1

Selected locations of Aeonium species growing on Gran Canaria

In the following appendices, I indicate the position of most *Aeonium* species which I observed in Gran Canaria. Of course, I make no claim to completeness; these data refer exclusively to the parts of the island which I visited in 2020.

Agaete: *A. arboreum* ssp. *arboreum*, *A. percarneum* (both from 400m upwards).

San Pedro: *A. arboreum* ssp. *arboreum*, *A. percarneum* (both from 250m upwards).

Cruz de Tejeda: *A. arboreum* ssp. *arboreum*, *A. aureum*, *A. percarneum*, *A. simsii*, *A. undulatum*.

Monte Constantino: *A. aureum*, *A. simsii*.

Las Lagunetas: *A. arboreum* ssp. *arboreum*, *A. aureum*, *A. percarneum*, *A. simsii*, *A. undulatum*.

Embalse de los Homos: *A. aureum*, *A. percarenum*, *A. simsii*.

Roque Nublo and path leading to La Culata: *A. aureum*, *A. simsii*.

La Culata – Tejeda: *A. percarneum*, *A. simsii*.

San Mateo: *A. arboreum* ssp. *arboreum*, *A. aureum*, *A. percarneum* (growing often on roofs), *A. undulatum*.

Barranco de Mireles – La Bodeguilla: *A. arboreum* ssp. *arboreum*, *A. aureum* (only in the lowest part of the barranco), *A. percarneum*, *A. undulatum*.

Between La Asomada and Hoya del Gamonal: *A. arboreum* ssp. *arboreum*, *A. aureum*, *A. percarneum*, *A. simsii*, *A. spathulatum*, *A. undulatum*.

Between Hoya Viciosa and Montaña de los Cardos (path leading to Valsequillo): *A. arboreum* ssp. *arboreum*, *A. aureum*, *A. percarneum*, *A. spathulatum*, *A. undulatum*.

Near Embalse Toronjo: *A. arboreum* ssp. *arboreum*, *A. percarneum*, *A. undulatum*.

Valsequillo: *A. arboreum* ssp. *arboreum*, *A. percarneum*.

Tenteniguada – Roque Grande: *A. arboreum* ssp. *arboreum*, *A. aureum*, *A. percarneum*, *A. simsii*, *A. spathulatum* (from 1050m, especially near Roque Grande), *A. undulatum*.

Caldera de Bandama: *A. arboreum* ssp. *arboreum*, *A. percarneum* (growing often as an epiphyte on palm trees).

Barranco de la Virgen – Montaña Doramas: *A. canariense* ssp. *virgineum* (common in the lowest part of the barranco until Firgas), *A. percarneum*, *A. undulatum*.

Appendix 2

Aeonium species growing on Gran Canaria

Aeonium arboreum ssp. *arboreum*: Agaete, San Pedro, Cruz de Tejeda, Las Lagunetas, San Mateo, Barranco de Mireles – La Bodeguilla, between La Asomada and Hoya del Gamonal, between Hoya Viciosa and

Montaña de los Cardos, near Embalse Toronjo, Valsequillo, Tenteniguada, Caldera de Bandama.

Aeonium aureum: Cruz de Tejeda, Monte Constantino, Las Lagunetas, Embalse de los Homos, Roque Nublo and path leading to La Culata, San Mateo, Barranco de Mireles – La Bodeguilla, between La Asomada and Hoya del Gamonal, between Hoya Viciosa and Montaña de los Cardos, Tenteniguada – Roque Grande.

Aeonium canariense ssp. *virgineum*: Montaña Doramas (750m), Barranco de la Virgen (along the road GC-305 from km 6 until the outskirts of Firgas, 500–650m, also in the pine forest).

Aeonium percarneum: Agaete, San Pedro, Cruz de Tejeda, Las Lagunetas, Embalse de los Homos, La Culata – Tejeda, San Mateo, Barranco de Mireles – La Bodeguilla, between La Asomada and Hoya del Gamonal, between Hoya Viciosa and Montaña de los Cardos, near Embalse Toronjo, Valsequillo, Tenteniguada – Roque Grande, Caldera de Bandama, Barranco de la Virgen – Montaña Doramas.

Aeonium simsii: Cruz de Tejeda, Monte Constantino, Las Lagunetas, Embalse de los Homos, Roque Nublo and path leading to La Culata, La Culata – Tejeda, between La Asomada and Hoya del Gamonal, Tenteniguada – Roque Grande.

Aeonium spathulatum: near Montaña de los Cardos (path leading to Valsequillo, 900m), Hoya del Gamonal (between 1350 and 1550m), Tenteniguada (on old stone walls and a ruined house, 1050–1100m), under Roque Grande (1150–1450m).

Aeonium undulatum: Cruz de Tejeda, Las Lagunetas, San Mateo, Barranco de Mireles – La Bodeguilla, between La Asomada and Hoya del Gamonal, between Hoya Viciosa and Montaña de los Cardos, near Embalse Toronjo, Tenteniguada – Roque Grande, Barranco de la Virgen, Montaña Doramas.