Cactus & succulent REVIEW

The online magazine for cactus and succulent enthusiasts Issue 35 December 2022



Contents

5 Click to read
Lophophora jourdaniana
Graham Evans

7 Click to read
An odd Sempervivum from Bulgaria
Ray Stephenson

13 Click to read
The history and flowering of Agave ×leopoldii
Colin C. Walker

17 Click to read
Termite mounds – homes for succulents
Sue Allan

21 Click to read
MacDougall's flower
Graham Evans



24 Click to read
Mammillaria mainiae
Vicky Davies

27 Click to read
Some exotics – more or less succulent genera
Jörg Ettelt



32 Click to read
Sulcorebutias in my collection – Part 2
Kathy Flanagan



41 Click to read
Aeonium and Sempervivum and a possible link between them
Mellie Lewis





The top of the flower spike of *Agave ×leopoldii*
See 'The history and flowering of *Agave ×leopoldii*' Page 13

47 Click to read
The sky's the limit – one year on
Paul Spracklin



55 Click to read
Tucson cactus rescue
Donna Ellis



Editor's notes

Welcome to the December issue of the *Cactus and Succulent Review*.

In this issue I am pleased to include the second in Kathy Flanagan's series of articles on *Sulcorebutia*. The series is alphabetical, and we are still on 'A', so there is plenty more to come.

I have an erratum to report however. In her first article, in March's issue of the *Cactus and Succulent Review*, Kathy mentioned Sulco-passion an excellent website with information on *Sulcorebutia* by Johan de Vries. The website is actually owned and run by Claude Bourleau not Johan de Vries as we stated. With thanks to Willy Verheulpen for pointing this out.

Plants formerly designated as *Sulcorebutia* are now considered to be included in the genus *Weingartia* (which is the older name) but because so many people still think of this group of plants as *Sulcorebutia* we continue to retain the name in the CSR.

We were delighted at the response to the Cactus at the Castle event held at Lullingstone Castle in September, and I was also very pleased to meet some of my readers there.



Sulcorebutia azurduyensis in Kathy Flanagan's magnificent collection

A warm welcome to those of you who subscribed to the *Cactus and Succulent Review* through the event. I hope that you will find the CSR enjoyable and of interest.

We are repeating Cactus at the Castle next year on 16 and 17 September. This time we will be joined by the Mammillaria Society on the Sunday which will now include an open competitive show for *Mammillaria* and allied genera. Please see page 26 for some initial details and further details will appear in future issues. Please visit the website for more information on the Mammillaria Society.

Finally, as always in the December issue, I would like to thank everyone who has supported me during the year, including those of you who have given up your time to write articles for me, anyone who has helped by supplying photographs, and my two proof readers who work so hard at sorting out my mistakes.

Sheila Cude

Cactus&Succulent REVIEW

The Cactus and Succulent Review is a free quarterly magazine published in pdf format in March, June, September and December.

Contact

Editor Sheila Cude
25 Macleod Road
London N21 1SW
Phone 020 8340 1928
Email **Sheila Cude**

Subscribe

Join our free mailing list to receive an email notification of each issue. To subscribe please visit our **website**

Back issues

All back issues are available to download from the website.



© Copyright authors and photographers. The Cactus and Succulent Review may be freely distributed but permission is required for other than personal use.



Opuntias in an ancient civilisation

How juice extracted from opuntias was used in the construction of pyramids

Approximately 1,500 years ago an unknown Mexican civilisation built three pyramids. These remarkable structures are located in the Valley of the Virgin, about 30 miles outside the city of San Miguel de Allende in Mexico's central highlands. The largest pyramid, known as the House of the Thirteen Heavens, stands some 15m high.

The pyramids are constructed from tufa rock, decorated with polished limestone pieces. It was for these that opuntia juice was used.

Apparently, if opuntia pads are chopped up and left in water they become sticky. This substance was then mixed with mortar to form an adhesive which still holds today.

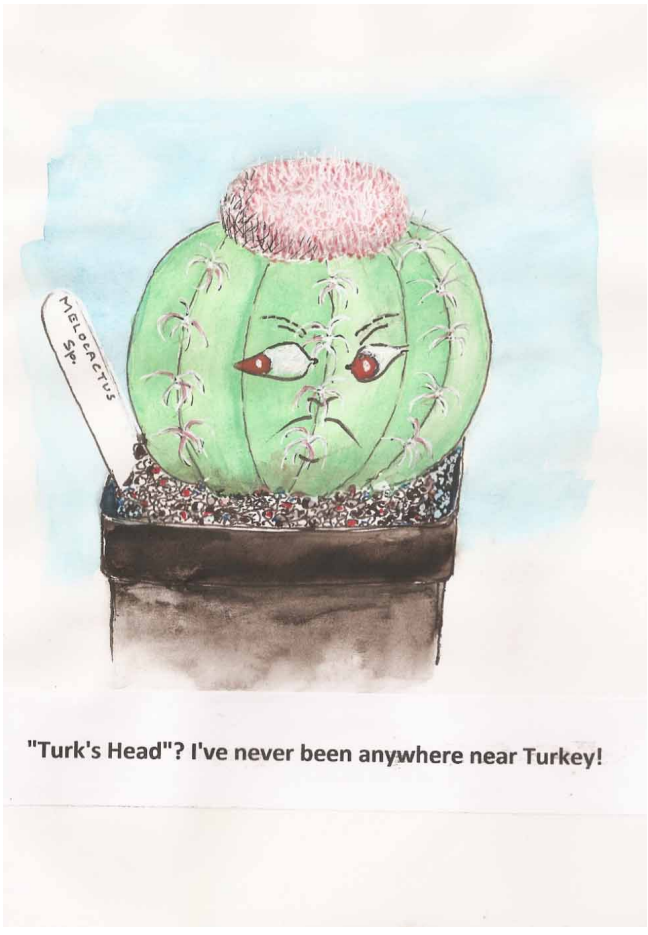
There is no indication of which opuntia species was used.

Tony Clifford sent me the following link to a fascinating BBC article on the pyramids.

Mexico's 1,500-year-old unknown pyramids by Lina Zeldovich

Image: Jarkko Laine CC-BY-20

Tony Porter's CACTUS CAPERS





What they say to each other

Lophophora jourdaniana

by Graham Evans

In the article 'Managing Mexican Miniatures' in September's issue of the *Cactus and Succulent Review*, I briefly overviewed the genus *Lophophora* and made mention of *L. jourdaniana*. Unfortunately it was not possible to include any pictures at that time but here we make amends.

The most striking aspect of *L. jourdaniana* is its attractive bright pink flowers produced in several flushes throughout the summer, a feature it shares with *L. fricii*. Less obvious, perhaps, but quite unique, is the visible presence of small residual spines on the areoles of young seedlings and small offsets.

Plants are clump-forming and normally the same blue-green colour as most other lophophoras but there is also a grassy green clone in cultivation.



A typical blue-green plant with pink flowers, developing tufts and small spines on the young offsets

L. jourdaniana flowers at least as prolifically as its relatives but unfortunately it is self-sterile and even if fruits can be produced they contain far fewer seeds than other species, normally just a handful. For this reason, most cultivated plants are propagated from cuttings, frequently grafted as they can be difficult to root. This means that there are probably only a limited number of clones in collections – certainly the near-identical appearance of so many plants suggests vegetative propagation – which, of course, further hinders the prospect of viable seed production.

L. jourdaniana grows well on its own roots, maybe even a little more quickly than some other lophophoras, but it is just as susceptible to the red menace (red spider spite) and constant vigilance is recommended. Grafted plants offset more profusely but sometimes elongate and may not develop such pronounced woolly tufts from the areoles, probably on account of the accelerated growth.

The name itself is dubious. It dates back to 1975 when it was erected by Vlastimil Habermann in the Czech journal *Kaktusy* but unfortunately the description appears to have been from a plant in cultivation and there is no known wild population attributable to the taxon. It may therefore be a cultivar or even a horticultural hybrid, which would explain its notorious sterility. *Lophophora jourdaniana* remains, however, the only published name for this mysterious plant and infraspecific combinations under *L. williamsii* or *L. diffusa* are merely nursery names. In any case, the flower colour might imply a closer relationship with *L. fricii*, also erected by Habermann, and reportedly *L. jourdaniana* will not cross pollinate with *L. williamsii*.

Photos: Graham Evans



A grass green clone offsetting profusely when young due to grafting but clearly displaying the residual spines

An odd Sempervivum from Bulgaria

by Ray Stephenson

I am no expert on *Sempervivum* but like to think I can identify any I find in the wild. This is much easier than with plants in cultivation where there is a myriad of hybrids; at least in the field, armed with a decent flora, there can be few problems.



Fig. 1

Sempervivum ciliosum in the Struma Valley c.800m. The Bulgarian form is often referred to as var. *borisii*



Fig. 2

Sempervivum ciliosum near Ochrid, c700m, North Macedonia.

My wife and I have been to Bulgaria six times (15 weeks in total), always to mountainous areas and always with plenty of time to explore the flora.

In 2007 we visited the edge of a uranium mine in the process of being decommissioned and, on a spoil-heap, found a huge colony of *Sempervivum* with extremely pale flowers. I photographed them and described them as a bit of a mystery in the *Sedum Society Newsletter* **85**:62 (2018).

The *КОНСПЕКТ НА ВИСШАТА ФЛОРА НА БЪЛГАРИЯ* (*Conspectus of the Bulgarian Flora 2012*) lists: *Sempervivum ciliosum*, *S. erythraeum*, *S. leucanthum*, *S. marmoreum* and *S. zeleborii* as being native.

Sempervivum ciliosum is an extremely striking pale, yellow-flowered species, rather different to the same species growing in both Macedonia and Greece (Figs. 1, 2 and 3).

Sempervivum erythraeum (Figs. 4, 5 and 6) is a velvety, glandular-pubescent, purple-flowered species with ciliate leaves. It is often considered to be just a subspecies of *S. marmoreum.*

Sempervivum ciliosum Voúrinos, 1620m, Greece

Fig. 3





Fig. 4

Sempervivum erythraeum, Belika (Yakoruda district) c.1260m. Flowers have white stripes on the edges of petals

Fig. 5

Sempervivum erythraeum flower.

S. marmoreum (Fig. 7) is very similar to *S. erythraeum* except its leaves are glabrous, somewhat shiny and the flowers are purple but lack the white striped edges.

After I discovered the plants near Elesnica, *Sempervivum* expert Klaus Schropp was rather excited by my find. He had recently had DNA studies carried out on *Sempervivum leucanthum,* which Praeger discovered in the Rila Valley. Nowadays finding such a plant in an isolated pocket should ring warning bells. Is it a relict (last pocket of a species once more widespread) or is it a hybrid?

Schropp's studies determined that *S. leucanthum* is a hybrid. This of



Fig. 6

Sempervivum erythraeum in the Struma Valley starting to elongate into inflorescence



Fig. 7

Sempervivum marmoreum near Dospat in the Rhodope Mountains c.300m



Fig. 8

The Elesnica *Sempervivum*. The red *Sedum* is *S. album*

course raises the question, 'What are its parents?' As *S. leucanthum* has pale yellow flowers and grows within a short distance of *S. ciliosum*, this seems a most likely parent.

Schropp visited the Elesnica site I pinpointed for him and declared, "This is the long-lost *S. zeleborii* of which only vague mentions are made for Bulgaria". He was happy to conclude that *S. leucanthum* was the result of crossing between the Elesnica species and *S. ciliosum*.

(See the table below). Geographically this made a great deal of sense as the type locality of *S. leucanthum* is midway between where *S. ciliosum* grows and Elesnica.

Josef Ježek is a *Sempervivum* expert familiar with *S. zeleborii* in habitat in Serbia. Trading photographs with him, it is obvious that the Elesnica plant is definitely not *S. zeleborii* which has red bases to the petals, has much longer leaves, is far less succulent, and far less hairy.

S. ciliosum	S. leucanthum hybrid	Elesnica plant
Leaves incurved, densely glandular-pilose on front, back and edges with much longer hyaline glandular hairs on the back and edges. Praeger says petals greenish yellow and hairy – they look very pale yellow to me. Stolons long and thin.	Leaves curved, erect in upper part, densely glandular-pubescent on both faces, ciliate on edges with longer glandular hairs of unequal length. Praeger says pale yellow or greenish yellow and hairy. Stolons long and stout.	Leaves succulent, incurved with dense covering of trichomes. Petals white, hairy. Stolons short and stout



Fig. 9

The petals of the Elesnica species are pure white

I would like to think that the Elesnica plants (Figs. 8, 9 and 11) could be the long-lost parent of *S. leucanthum* (Fig. 10), but it too, could be a hybrid. If it is proved to be a hybrid, there still seems to be a lost parent. Another possibility is the presence of a high degree of radioactivity in the area. We realise that radiation causes plants to mutate and it is a method used in the Bulgarian Green Revolution to attempt to produce better food crops. The Elesnica site has barely a blade of grass and the only three species able to grow there are *Sedum album*, *S. urvillei* and the odd *Sempervivum*. We returned in 2022 and found the site almost unchanged. Gone were the 'danger' signs but the plants, in full flower, were flourishing. ■

Photos: Ray Stephenson

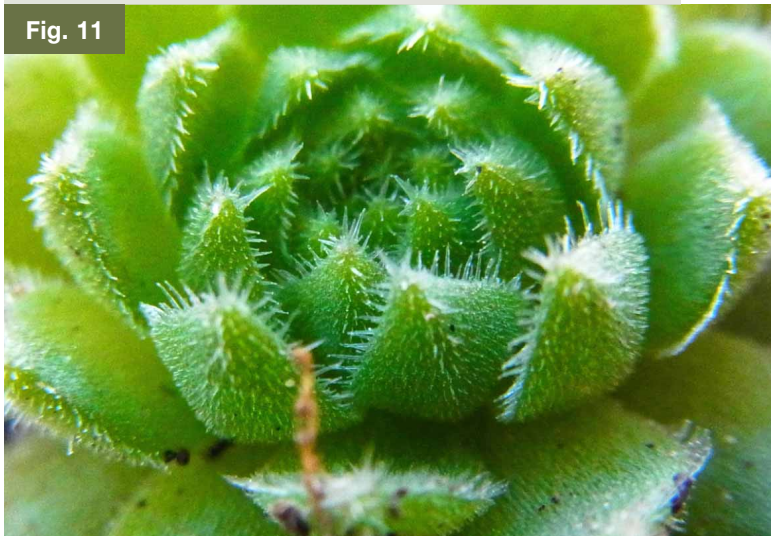
Sempervivum leucanthum also has very pale-yellow flowers

Fig. 10



The leaves of the Elesnica plants are very downy with large trichomes

Fig. 11



The history and flowering of **Agave ×leopoldii**

by Colin C. Walker

Agave ×*leopoldii* is an attractive garden hybrid and hence unknown in the wild.

This cultivar was first described in 1893 by the renowned Victorian gardener William Watson at Kew, having been raised by Dr W.B. Kellock in his garden at Stamford Hill, London, around the mid 1880s. It was named in honour of King Leopold II of Belgium (king from 1865 to 1909), who saw and admired the plant when it was exhibited at the Royal Horticultural Society Show in Islington in 1893 (Figueiredo & Smith, 2013).

According to Drummond (1912):

> "Mr. Kellock believed it to have originated as the result of crossing *A. filifera*, SalmDyck, with *A. princeps*, Hort. … What the identity of '*A. princeps*,' suggested as one of the parents of our plant, may be it has been impossible to ascertain, but the matter is not now of material consequence, since it is found, now that the plant has flowered, that its characters negative the suggestion that it is a hybrid…On the contrary these characters clearly point to its being a perfectly valid species".

This he named and illustrated as *A. disceptata* (Fig. 1) for its 'deceptive' status. This name, however, and its species status have never been widely accepted and it is now considered to be a synonym of *A.* ×*leopoldii* (Figueiredo & Smith, 2013).

In summary, the parentage of this hybrid is recorded as *Agave filifera* × *Agave princeps* but the latter is a name of uncertain status not currently recognised by any agave authority. Whatever its parentage, *A.* ×*leopoldii* has, for over a century, proven



Fig 1

Agave disceptata (from Drummond, 1912)



Fig 2

Agave ×leopoldii in a 30cm-diameter black-glazed ceramic pan

to be robust in cultivation, readily propagated and hence reasonably well known.

This hybrid is one of the filiferous agaves, a group of attractive plants that are characterised by the production of fine or broad fibres or threads that peel off from the leaf margins (Walker, 2020). In contrast to many other agaves these do not produce prominent sharp teeth on their leaf margins. Short sharp terminal spines are also produced which are dark when newly formed but turn grey with age. Another general characteristic leaf feature is the production of prominent bud-imprints which result from the new leaves being produced in tight buds.

To date there has been no satisfactory explanation provided to account for the production of the numerous threads on these plants. Unlike the prominent and often fierce marginal teeth and terminal spines produced by other agaves, the fibres of filiferous agaves are unlikely to deter herbivores from feeding on the plants.

My largest specimen of *A.* ×*leopoldii* (Fig. 2) has grown reasonably quickly to form a rosette about 55cm in diameter. Over the years it has produced a few offsets which have been removed to maintain the symmetry of a single rosette, providing propagating material so the plant is easily maintained in cultivation.

New leaves form a tight 'bud' that is angled to one side of the rosette. Of the filiferous agaves in my collection, *A.* ×*leopoldii* has the longest and narrowest leaves: these are numerous, fibrous, up to 45cm long and narrow, only 1cm across at the base with white stripes on both sides, tapering to a sharp tip.

The principal appeal of *A.* ×*leopoldii* comes from the filaments produced along the leaf margins that are pure white and detach at their tips from the leaves to become curiously curly. These have a fine, straw-like texture, not at all hair-like.

For this architectural plant I chose a chunky, glossy black-glazed pan to contrast with the delicate white filaments. I am delighted to report that this plant received the accolades of first prizes in the unrestricted pot class for an *Agave* at two British Cactus and Succulent Society Glasgow Branch shows.

In June 2022 this large specimen of *A.* ×*leopoldii* flowered (Fig. 3) after 10 years in the collection. It has the typical unbranched spike of flowers of *Agave* subgenus *Littaea*. The spike reached only 1.35m tall and so this is of relatively modest dimensions compared to many agave flower spikes, the most impressive of which can be up to 10+m tall!

Flowers (Fig. 4) are produced in clusters of two, three or four, each being up to 6cm long, of which 3cm is the narrow flower tube bearing six strongly recurved and curled lobes. The flowers open from the base of the spike upwards, with dozens of flowers opening simultaneously. Young flowers are pale green fading to pale pink at the margins with slightly darker green mid-stripes. In contrast older flowers are dusky pink with darker brown mid-stripes. The top of the flower spike, with only a few unopened buds remaining, is shown on the front cover.

As with all agaves the flowering rosette is monocarpic, meaning it flowers once and then dies. However, my plant of *A.* ×*leopoldii* has produced a number of offsets over the years and two remained attached to the main rosette.

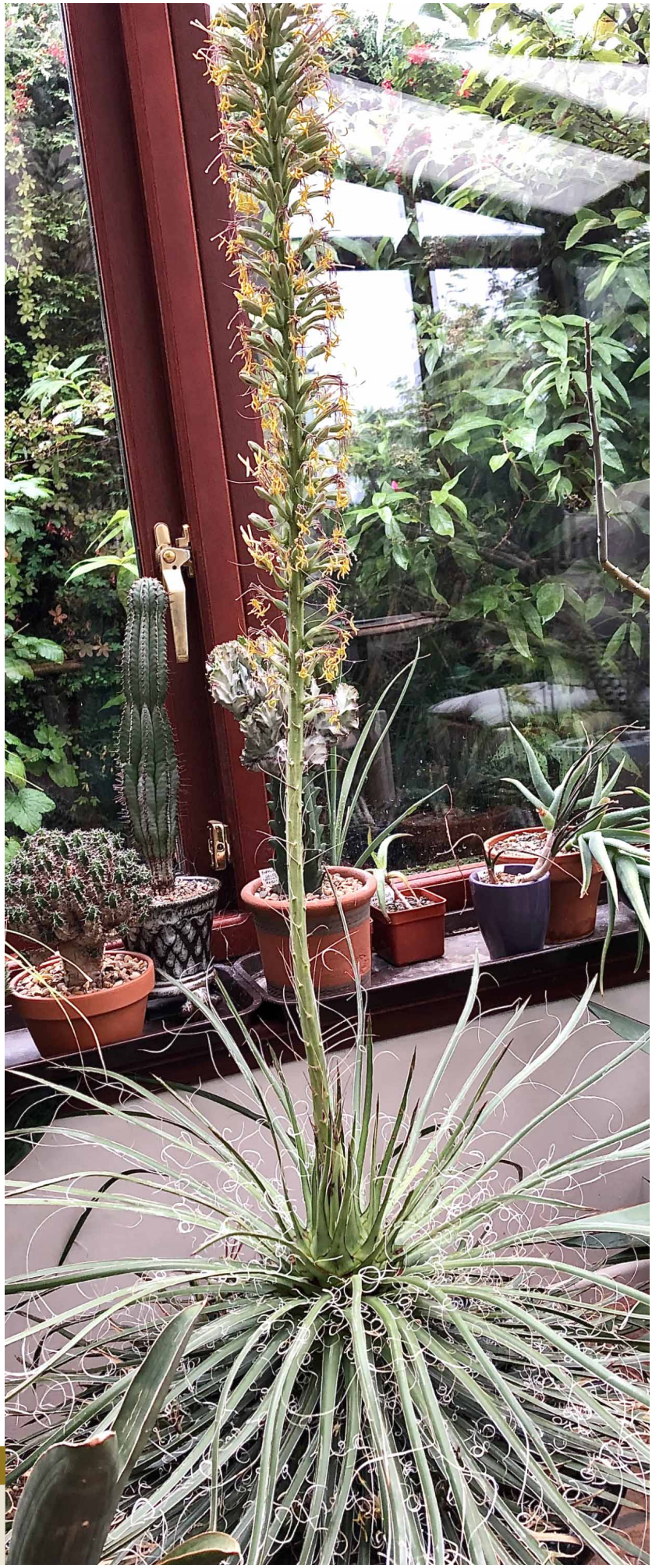


Fig 3

Agave ×*leopoldii* in flower in the conservatory, August 2022

After flowering these were removed and potted up, while the main plant was consigned to the compost heap. Its attractive pot was used to accommodate another architectural agave.

There is also a variegated cultivar named *A.* ×*leopoldii* 'Hammer Time'. It is similar to the typical *A.* ×*leopoldii* but differs in having pale green marginal stripes (Fig. 5). In my limited experience it is, not unsurprisingly, slower-growing. My plant is currently about 25cm in diameter and readily produces offsets which again I remove to maintain symmetry and to provide cuttings.

This cultivar was named in honour of the renowned American plantsman Gary Hammer "who discovered this form on a trip to Mexico" (Spath & Moore, 2019). However, since the original *A.* ×*leopoldii* was a hybrid produced in a London garden, a variegate found growing naturally in Mexico cannot be a form of it! This variegate is, therefore, more appropriately named simply as *Agave* 'Hammer Time'.

Agave ×*leopoldii* is relatively frost hardy and will survive winters in the UK in unheated glasshouses if kept completely dry. I have yet to test the frost-hardiness of *A.* 'Hammer Time'. ■

Photos: Colin C. Walker



Fig 4

Close-up of the flowers of *Agave* ×*leopoldii*

References

Drummond, J.R. (1912) *Agave disceptata*. *Curt. Bot. Mag*., **138**: t.8451.

Figueiredo, E. & Smith, G.F. (2013) Proposal to conserve the name *Agave* ×*leopoldii* W. Watson against *A. leopoldii* Rafarin (Agavaceae/Asparagaceae). *Taxon*, **62**: 1061.

Spath, J. & Moore, J. (2021) *Agaves. Species, cultivars & hybrids.* Privately published by the authors, USA.

Walker, C.C. (2020) Filiferous agaves. *CactusWorld*, **38**: 41–48.



Fig 5

Agave 'Hammer Time' in a 20cm-diameter pan

Termite mounds
homes for succulents

by Sue Allan



An old termite mound in the Masai Mara Game Reserve, showing its size, with impala in the background

In the arid regions of Kenya, various species of termites are to be found, the most common being those of the genera *Odontotermes* and *Macrotermes* of which there are several species. *Odontotermes* build what are called 'blister' mounds, not rising much above the surface, while *Macrotermes* construct tall 'towers' to house their subterranean colonies.

They are generally considered to be pests and few understand the importance of these insects. In the process of colony building they aerate and improve soil structure and the infiltration of moisture, essential after extended periods of drought. As fungus-growing termites, with a highly evolved social system, they will process dead plant remains and faecal material. Research has shown that they can translocate up to a tonne of soil per hectare of land per year, encouraging some delicious mushrooms in the process! By playing a role in changing the soil structure, they form an important part of the ecosystem, converting organic matter into wonderful loamy and nutritious soil. Nitrogen-rich bacteria in their gut allow them to transfer essential nitrogen to the soil and the use of termites to improve crop yields is well recognised.

This is important in areas of sparse rainfall where this enriched soil provides a substrate to a diverse range of succulent species. Before the process of developing new colonies begins, swarms of winged alates, the reproductive stage of termites, disperse in large numbers from the mound, typically triggered by rainfall, providing a



Desmidorchis speciosa, found in northern Kenya on an old mound



Huernia keniensis var. *nairobiensis*

short-lived but rich food source for birds and other creatures. The birds may scatter seeds from previous feeding activities, which will in turn add to the biodiversity on the termite mound.

By burrowing through the soil, termites will bring up lower layers of soil to protect the colony and the food that they eat, building as they do so. The mounds made by the

A dwarf mongoose using a termitary for shelter.

It can be seen poking its head out of a hole in the mound towards the bottom left of the picture





termites form anything from simple mounds to highly elaborate structures – tall towers rising to several metres high, their colours revealing those of the subsoil below. Other genera, seen in West African forests and Sudan, form miniature mushroom-like structures that resemble places in Cappadocia (Turkey), known for its enchanting cave dwellings.

These intricate termite mounds, often up to about six metres in diameter with vertical shafts up to two metres deep and connected underground, will remain intact for years, providing useful shelter for mongooses, aardvark and various reptiles including cobras. Termite saliva is used for cementing soil particles and has such strength and resilience that it has been analysed for its use in road building in southern Africa.

Eventually the termite structures will collapse and the remains will be left on the ground to form a mound, providing sustenance initially for a 'nurse' plant. This could be a new tree such as the pioneering *Dodonaea angustifolia*, *Croton dichogamus*, *Rhus natalensis* or various acacia species, which in turn will provide shade, shelter and nutrition for any opportunistic succulent seeds that may land there. When fossicking in the bush, old termite mounds often provide an unexpected diversity of species including various *Sansevieria*, *Aloe* and *Kalanchoe* species, stapeliads, *Kleinia*

New growth beginning to establish itself on an old termite mound in the Masai Mara Game Reserve



Termitary providing sustenance for an *Acacia* sp. Tsavo East National Park



gregorii, *Kleinia petraea*, and *Cissus quadrangularis* which might clamber on the 'nurse' plants. Even the elusive terrestrial orchid, *Eulophia petersii*, can be found.

In 'black cotton' soil habitats, termite mounds will often harbour creepers from the Cucurbitaceae and the succulent *Cotyledon barbeyi*. A termite mound will also offer an element of protection for succulents during a grass fire and provide good drainage during the rainy seasons.

Analysis of termite-modified soil structure is subject to continued research; however termites in Kenya appear to prefer dead wood, grass or the bark of a tree but do not necessarily kill the tree. They are simply ridding the tree of its old bark.

So, for anyone with termites in a garden, please do not kill them but, if you must, a pyrethrum-based product is the safest. Soil science is important and we need to protect the balance of essential minerals and micro-organisms that these 'eco-engineers' have provided. ■

Photos: Sue Allan

Acknowledgements

Many thanks to Dr. Dino J. Martins - Entomologist and Chief Executive Officer Turkana Basin Institute, and to Charles Dewhurst, for their kind advice and encouragement.

Bagine, Richard K.N., 1984. *Soil Translocation by Termites of the Odontotermes (Holmgren) (Isoptera: Macrotermitinae) in an arid area of Northern Kenya*.

Darlington, J.P.E.C., 1997. *Comparison of nest structure and caste parameters of sympatric speciesof Odontotermes (Termiti dae,Macrotermitinae) in Kenya*.

Kirchmair, I., Schmidt M., Zizka G., Erpenbach A., Hahn K., 2012. *Biodiversity Islands in the Savanna – Analysis of the Phytodiversity on Termite Mounds in Northern Beni*n.



Eulophia petersii, a robust terrestrial orchid with leathery leaves found on an old termite mound



Kleinia petraea, a creeping succulent, with a small *Caralluma arachnoidea* to the lower left of the photo



MacDougall's flower

An introduction to *Ortegocactus macdougallii* by Graham Evans

Ortegocactus macdougallii is a cactus of unique countenance with a striking appearance quite unlike any other. It possesses a distinctive pale green, unusually textured epidermis that makes it instantly recognisable and stand out from the crowd of other mammillarioid species.

Its habitat was discovered by the Scottish-born, American-domiciled horticulturalist and explorer Tom MacDougall in 1951 after many years of searching, having apparently been brought a specimen of the plant by a Native American guide named Francisco Ortega in 1938. MacDougall found it growing near the then village of San José Lachiguiri in the state of Oaxaca in south western Mexico.

Its limited distribution is high altitude (over 1600m) and the substrate is limestone partially covered with grasses, lichens and small rocks, between which the cactus seeks its home in thin, open soil.

Although MacDougall introduced his discovery into cultivation fairly quickly it was not until 1961 that it was formally named in the *Cactus and Succulent Journal* of the Cactus and Succulent Society of America. E. J. Alexander erected a completely new genus to honour the provider of the first specimen and coined the specific epithet after Tom MacDougall.

Ortegocactus macdougalli is described as low growing and caespitose with shortly elongated stems of a pale greyish green.

Above: A black-spined seedling

It has flattened, more or less rhomboid tubercles, sometimes with a groove, and woolly areoles. There are 7–8 radial spines, normally whitish with a black tip, although in some specimens the darker colour can extend almost their entire length, and often a single central spine of similar appearance but rather shorter. The flowers, which are the crowning glory of this remarkable species, are a beautiful intense yellow offset by a distinctive deep green stigma. They are borne at the base of the tubercles near the crown of the plant.

Some clones are self-fertile while others are self-sterile, the latter therefore requiring pollen from a different clone, i.e. not a vegetative propagation from the same specimen, in order to produce viable seeds. The fruits are almost elliptical, quickly drying and a dull red-brown colour.

Unfortunately, the species is not easy in cultivation and is rarely offered these days. It has weak roots and is consequently often grafted but this does not seem to alter the appearance in any way. Plants remain solitary for a few years before clumping quite prolifically, initially from the base but later from further up the stems, but the offsets are difficult to root; grafting providing a perhaps irritating but doubtless beneficial alternative.

The potting medium needs to be open and free draining, not unusual for plants with poorly developed roots, and a position with plenty of bright sunshine is essential. Its habitat gives us a clue to its other requirements, the high altitude suggesting that good ventilation in required and the grasses and lichens indicating that our subject likes water. Both assumptions would be correct but *Ortegocactus macdougallii* will not tolerate excessive moisture for prolonged periods, so those adages of watering lightly but frequently in good weather and using pots of just sufficient depth to accommodate the roots can be well applied.

A small clump growing and flowering well



The most irritating trait of this species is undoubtedly its propensity to mark. It has a well documented habit of acquiring red blemishes across the epidermis, an especially annoying mannerism given that its hue is one of its most attractive features. It is, however, a fact that these marks are prevalent on plants in habitat and, while displeasing and likely to induce much tutting in show judges, are entirely natural. In my experience, plants that are kept well-hydrated during the growing season and cool and well-ventilated in winter are less prone to this behaviour. It may also be that regular watering with a standard cactus fertiliser, supplemented a couple of times a year with calcium and magnesium trace elements, provides additional protection. Calcium nitrate and magnesium sulphate products are useful for this purpose. Grafting makes no difference.

Our species has, however, been placed in *Neobesseya* (Kladiwa, 1974), *Escobaria* (John & Řiha, 1981, nom. inval.) and most recently by Peter Breslin & Lucas Majure (2021) into their revised concept of *Cochemiea*, which they have expanded to include most of the predominately large-flowered, hooked-spined *Mammillaria* subgenera and species.

As a collectors' plant, *Ortegocactus macdougallii* is undoubtedly distinctive, albeit a challenge to grow well. It is a species with a singular attraction and well worth a space in any cactus greenhouse (sadly, it is not suitable for windowsills) and the endeavour of trying to cultivate it to its very best. The rewards are practically palpable! ■

Photos: Graham Evans

Despite its idiosyncratic appearance, *Ortegocactus macdougallii* has become increasingly controversial taxonomically. DNA analyses have suggested a relationship with *Mammillaria schumannii* but there appears to have been no attempt to transfer it into this genus, perhaps because *Mammillaria macdougalii* (note the single 'l') is already taken for a plant in the *M. heyderi* complex, or perhaps because *Mammillaria* does not have a grooved tubercle.



An older clump, just beginning to exhibit some red blemishes

Mammillaria mainiae

by Vicky Davies

When I first started collecting cacti nearly 20 years ago, my initial acquisitions came from specialist nurseries and the odd garden centre. It wasn't long before I was hit by the seed-growing bug as it offered a way to grow so many more species than I could find locally.

The seeds were purchased because it was nice to have that species in the collection and, at the time, I often didn't know if they were considered difficult to grow as either seedlings or adult plants. I discovered that some were difficult myself! Sometimes, however, it wasn't until I was asked by others how I managed to grow a particular species successfully that I realised that perhaps they were not so easy. One of the first plants that gave me this experience was *Mammillaria mainiae*.

Commonly known as the Counter-clockwise Fishhook cactus or Main's Nipple-cactus, *Mammillaria mainiae* was discovered by Mrs F. M. Main in the Mexican state of Sonora, south of Nogales. The name was published in 1900 as *M. mainae* (notice the second i is missing) by Katharine Brandegee in *Zoe: a Biological Journal*. Subsequent collectors have found this species in Sinaloa as well as in Arizona, USA.



Mammillaria mainiae

According to the Red Data List published by the IUCN, when the species was assessed in 2010, the population was found to be stable, falling into the category of least concern. It identified the main threat to this species as the introduction of non-native buffelgrass which increases the risk of fire.

The classification of the genus *Mammillaria* has always been complex due to its size and it has often been split up by taxonomists. This has seen *M. mainiae* moved between genera over the last 120 years: *Neomammillaria mainiae* (K. Brandegee) Britton & Rose (1923), *Chilita mainiae* (K. Brandegee) Orcutt (1926), *Ebnerella mainiae* (K. Brandegee) Buxbaum (1951) and most recently *Cochemiea mainiae* (K. Brandegee) P. B. Breslin & Majure (2021). For now, the generally accepted name remains *Mammillaria mainiae*.

It may come as no surprise that this species is placed in the subgenus *Chilita* (acc. Hunt) or Series Ancistracanthae (acc. Luthy) which contains a number of mammillarias that can be considered tricky. It is one of the larger growing species in the series with hemispherical to ovate stems that are usually simple, between 10 and 12cm high, but occasionally clumps will form in cultivation. John Pilbeam, in his book *Mammillaria*, mentions clumps of 20cm high and wide. My oldest plant, now over 12 years old, remains a solitary stem.

Tubercles are arranged in spirals of 10–18, often red in the naked axils. The common name relates to the central spines which number one or two. They are stout, strongly hooked and twice the length of the radial spines. The centrals are twisted on to their side giving the appearance that they spiral in a counter-clockwise direction. Central spine colour varies from yellowish with a dark tip to all black as seen in the form from Sinaloa.

Flowers are 10–20mm and are described as pinkish white in *The New Cactus Lexicon*. The flowers on my plants (a mixture of ages and from different seed sources) all have a darker pink mid-stripe. The stigmas are bright pink/purple in colour. I have found the plants do have an annoying habit of aborting their flowers while the buds are developing; I am still trying to work out the reason for this.

Mammillaria mainiae has proved a popular plant when we have offered it for sale at C&V Cacti (see page 65) and so it is one of the *Mammillaria* species that we sow most years. Due to limited space, we only sow small batches of each species so that we can offer a good range of plants. I have found that *M. mainiae* germinates well compared to some of the other species in the series. We have a standard compost mix which we use for all of our seed sowing. It has varied slightly over the years and has become more inorganic. Currently we use equal parts John Innes compost, fine vermiculite and molar clay. The John Innes compost is sieved to remove any big lumps. The brand we use is still loam and peat-based and does not contain green waste alternatives. We sow into two-inch BEF pots and the seeds are left uncovered. Normally we sow early in the year under lights in a large, heated propagator.



Success in a British Cactus and Succulent Society Branch show

Seedlings leave the propagator at 6–8 months old. I have found *M. mainiae* to be thirsty seedlings but they dislike sitting wet for too long and it can prove awkward at times to get the balance right. At about 12

months old we prick out the seedlings into seed trays to grow on. Sometimes they have grown so rapidly that they can be potted individually into 6cm pots. This is probably the riskiest time and occasionally some seedlings will sulk for a while before getting going or they may succumb and head to the great compost bin in the sky. The youngest *M. mainiae* I have flowered was three years old and still in a 6cm pot.

Our mix changes slightly for mature plants housed in the main collection with the addition of one part coarse grit and the vermiculite becoming a mixture of fine and medium grades. This mix is open and free draining which seems to suit *M. mainiae*. Watering normally takes place every 14 days between March and late September using tap water acidified with distilled vinegar. As our compost mix is highly inorganic we feed at every other watering.

M. mainiae needs good light in order to properly develop its spines, which are one of its attractions, and to encourage flowering. As with other members of *Chilita*/Ancistracanthae, plants need to dry out between waterings and a dry winter rest away from damp conditions is essential.



A smaller plant already flowering well

In conclusion *M. mainiae* is not especially difficult to cultivate and, with a little care, large apple-sized plants can be achieved in a few years from seed. Certainly, it is one of my favourite mammillarias, so thanks to Mesdames Main and Brandegee for introducing it. ■

Photos: Vicky Davies

A MEXICAN CELEBRATION WEEKEND

Largest cactus mart in the south-east

Cactus at the Castle 2023

Saturday 16 & Sunday 17 September



Lullingstone Castle
Eynsford, Kent
DA4 OJA

Following the success of this year's event the Cactus and Succulent Review is delighted to present Cactus at the Castle 2023.

Plans are already under way for this great event which will include:

- The largest Cactus Mart in the south-east with over 20 leading cactus and succulent nurseries
- Tours of Lullingstone's renowned World Garden led by its creator, Tom Hart Dyke



- A chance to meet friends and talk to expert growers in the attractive surroundings of Lullingstone Castle.

More details, including a list of sellers and information on reduced price entry for CSR readers, will be available as soon as possible.

We are very pleased to welcome the Mammillaria Society on Sunday 17th.

The Society is planning to run an open competitive show for *Mammillaria* and allied genera, plus talks and plant sales from Society members.



Cactus at the Castle

Some exotics –
more or less succulent genera

'Never go to a doctor whose office plants have died'
Erma Louise Bombeck

Cacti and other succulents often have a special charm which is not easy to describe. I will try to get closer to this question by looking at some of those exotic plants that are usually (for various reasons) not seen too often in our collections. Let's start with a 'classic' cactus but one that is practically impossible to find in hobbyists' collections, although it might be seen in a few botanical gardens.

Pereskia horrida

Fig. 1



Pereskia horrida

Pereskia horrida (Fig. 1) can form trees up to six metres high. This is one reason why the species is not found in hobbyists' collections! As a young shrub it is easy to overlook in nature; its thin, green, long, heavily-spined stems are hardly noticeable. If it had not been in flower, I would probably have walked past it in Peru without noticing it (see Ettelt & Wittner 2010).

The flowers often appear before the leaves, which will quickly fall off again. As a tree, the species can be more eye-catching, the thicker trunk that forms also bears long spines. The exotic nature of these plants stems from their extreme growth and the small, delicate and fragile flowers. I think the Cactaceae thrives on these contradictions – the (different) strategies of defence against predators (spines, camouflage, toxins, etc.) and the often overwhelming beauty of the delicate flowers.

Brighamia insignis

Another exotic, *Brighamia insignis* (Fig. 2), probably offers somewhat different charms: the strangely upward tapering stem with the terminal large and delicate leaves and the filigree flower with the extremely long calyx. The fact that these plants are only found on a few Hawaiian islands adds to their attraction. Their natural pollinator is now extinct, so every year climbers abseil down the almost vertical cliffs to artificially pollinate the last remaining specimens in their habitat.

In culture the plants are not easy. They do not quite fit into cactus collections in terms of their cultural requirements – and they are a perfect magnet for red spider mite. The latter is, as far as I can tell, often a reason to give up these plants. It seems that they are able to attract every spider mite in the nearby vicinity.

Peperomia nivalis

Peperomia species probably offer quite different attractions again. The genus is found all over the world, especially in tropical areas, and comprises more than 1500 species. Peru is a hotspot with numerous succulent representatives. Among them are very beautiful species, some of which have coloured leaves, although the leaf colouring of the Asian representatives, which are not succulents, is unbeatable (see Ettelt 2011).



Fig. 2

Brighamia insignis

Peperomia nivalis

Fig. 3



Peperomia nivalis (Fig. 3) can be found in Peru. Its succulent leaves are vertical so as not to offer a large surface to the almost overhead sun. Leaves of these species (you can see it in the illustration too) often have translucent upper leaf surfaces to allow light to enter, much like some mesembs in southern Africa. Unfortunately, the flowers of this genus are very inconspicuous; the plant pictured is in flower and the flowers are tiny.

The one seed that develops from the flower is quite large – in some cases very large. The peppercorn used in our kitchens is such a seed; this plant is called *Piper nigrum*, a pepper plant, Latin Piperaceae, the family to which *Peperomia* also belongs.

Succulent species of this genus can be cultivated quite well with our other succulents. They need a little more water and not quite so much direct sun but still plenty of light. If you look closely at the plants in the picture, you can see the mealybugs trying to get to the young flower shoots to enjoy the sap. The photo was taken in habitat in northern Peru.

Plectranthus ernstii

Our wild journey through very different plant families continues with the labiates (Lamiaceae). Most representatives are not succulent but a few species show more or less succulence – *Plectranthus prostratus* with thick succulent leaves for example (Ettelt 2017) or *P. ernstii* with succulent stems (Fig. 4).

Plectranthus species usually give off a more or less pleasant, relatively intense fragrance. There are hairs on the upper parts of the plant. The flowers have the shape of classic labiates like our native dead nettles. They grow quickly, flower abundantly for a long time and are very easy to propagate by cuttings. It is a little regrettable that they are not found more often among enthusiasts' plants. Personally I love to run my hand through the leaves and enjoy the aromatic smell.

Portulaca eruca

Let's jump to the Caryophyllales. The genus *Portulaca* is the only genus in the family but it spans the globe, occurring worldwide except in the polar regions. The numerous, over 100, species can be

Plectranthus ernstii

Fig. 4





Fig. 5

Portulaca eruca

annual, biennial or perennial. Many have succulent characteristics. Some varieties have found their way into our gardens and delight us with their colourful flowers.

Portulaca eruca (Fig. 5) is a representative from South America. It forms uneven and bulbous rhizomes with dark brown bark. From these arise shoots that can grow up to 10–12cm long. The large flowers can reach 2.5cm in diameter with five petals that grow to 1.0–1.5cm, sometimes to 2cm, and are bright magenta in colour. The main centres of species diversity of the genus are Africa and South America. There are still multitudes of very interesting species in *Portulaca* that I could introduce.

Puya raimondii

I would like to conclude with a non-succulent but huge plant, *Puya raimondii* (Figs. 6 and 7). This has a stem that grows up to five metres high and bears hundreds of narrow, well-toothed leaves that are more than one metre long and only 8cm wide. When it is mature the plant starts to produce an inflorescence that can grow up to eight metres high.

It is the largest bromeliad, also known as the Queen of the Andes. It occurs in a few areas in the White Cordillera, Peru and often in large numbers. You can tell by the size of the plants how many favourable years there have been for seeds because you can usually see three or four ‘generations’ growing on a slope. If you are lucky, the oldest ones will be in flower.

You have to be very careful with this plant. A friend who wanted to clear the leafy mop of litter could not get out of the dense leaves on his own afterwards. The teeth on the edges of the leaves all point inwards, and when he tried to pull his arm out, they bored into his clothes and skin. Escape would only have been possible in a very bloody way; fortunately there were other people present who were able to free the entangled person carefully.

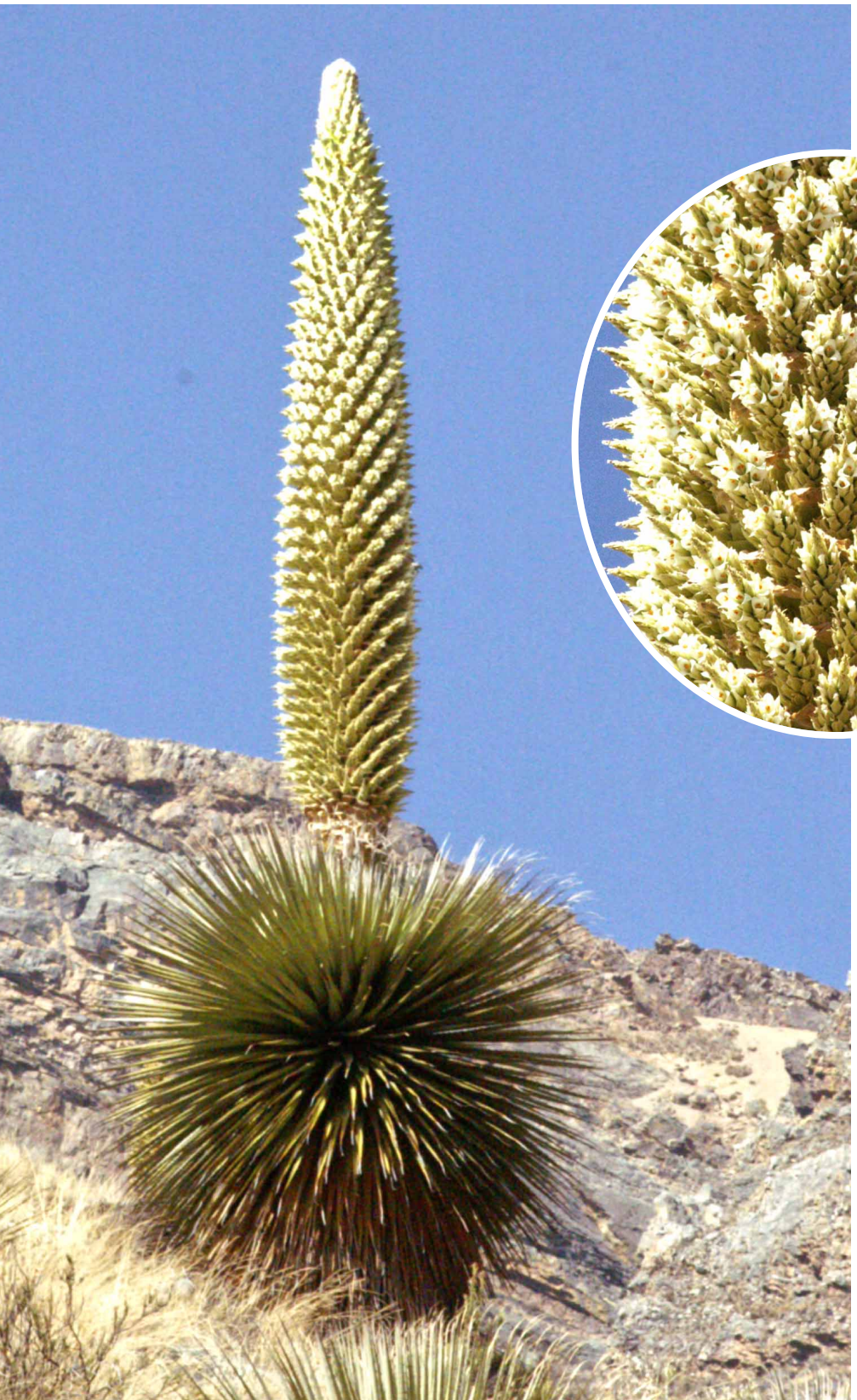
Once they have flowered, the huge plants die. After some time only a remnant of the stem remains, which interestingly can be taken apart in rings. Something similar to an old rubber tyre can be detached and may roll down into the valley with force –

not entirely harmless and above all probably not appropriate for the wonderful species.

It is better to observe the endless number of flowers, which are visited by numerous insects but mainly by hummingbirds, including the largest of its genus. The inflorescence is so cleverly arranged that the hummingbirds can sip nectar from the flowers while sitting (Fig. 7). A beautiful service at the high altitude of the Andes, as our species grows between 3000 and 4800 metres above sea level. Seeing these plants in their native habitat is one of the most exciting and impressive experiences a plant lover can have.

Our excursion into the exotic world of our plants comes to an end without having presented even a fraction of what is worth mentioning. But perhaps more on that later. ■

Photos: Jörg Ettelt



Figs. 6 & 7

Puya raimondii and infloresence. Note the hummingbird sitting among the flowers

References

Ettelt, J.; Wittner, H. (2010): Der beinahe unsichtbare Kaktus: *Pereskia horrida* – Streiflichter aus dem Kakteenparadies Nordperu. *Kakt. u. and. Sukk*. **61** (5):132–134.

Ettelt, J. (2011): Arten der Gattung *Peperomia* in Peru. *Kakt. u. and. Sukk.* **62** (10): 267–274.

Ettelt, J. (2017): *Plectranthus prostratus* Guerke. *Avonia* **35** (1): 16–17.



Fig. 1

Sulcorebutia arandiae nom. prov. MAP16

Sulcorebutias

in my collection – Part 2

by Kathy Flanagan

The first four species discussed come from the same area south of Sucre, while *Sulcorebutia arenacea* is from the Cochabamba region of Bolivia

Sulcorebutia arandiae nom. prov. MAP16

This plant is found in Colavi, a mining district with a town of about 400 inhabitants, in the Departments of Chuquisaca and Potosí.

Sulcorebutia arachnites VZ571, VZ463

These plants are found about 95km east of Sucre in an area called östlich (east) Presto in the Department of Chuquisaca, at around 2710m altitude.

Sulcorebutia arachnites VZ571

Fig. 2



Sulcorebutia arachnites VZ571 (flower)

Fig. 3





Fig. 4

Sulcorebutia atrospinosa VZ657

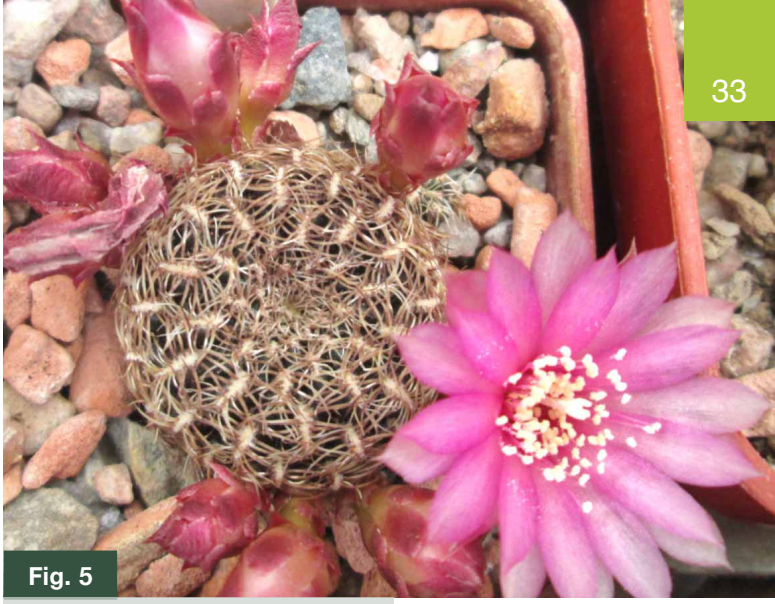


Fig. 5

Sulcorebutia atrospinosa VZ704

Sulcorebutia atrospinosa VZ657, VZ704, VZ705, VZ780

These plants are found in Manchachi in the general area where, if I am not mistaken, you will also find *S. crispata*. This is also in the Department of Chuquisaca, Province Tomina to the south of El Villar at 2000m altitude. It is difficult to find the locations on the tiny maps generated by my laptop (especially when your eyesight is as bad as mine).

The mode of growth, body shape etc. of *S. atrospinosa* is like that of *S. crispata*. My plants all look different in spine colour and flower colour, but what I like about this particular species is the beautiful flower colours which seem to have an iridescent quality about them.

I have found them difficult to keep going. I think perhaps they require a very quick-draining compost as they do not like to be wet for very long. I have been told by others who have grown them that they too lost them quite quickly which is a real shame. I have always found them to be a very beautiful species.

Sulcorebutia atrospinosa VZ780

Fig. 6





Figs. 7 & 8

Sulcorebutia azurduyensis VZ264

Sulcorebutia azurduyensis VZ264, VZ435

I originally ordered two plants from Johan de Vries but only received one, which was very beautiful even before it flowered. When it flowered WOW, did I love this plant! The flowers were such a stunning colour, neither yellow nor gold, but they glow, they really stand out.

Later I ordered four more plants, two with the collection number VZ264 plus two more with the number VZ435. They look the same, the spination is certainly like my original *S. azurduyensis*, and one has flowered but sadly the flower colour is pretty much the same as that of *S. arandiae* and *S. arachnites*. I think the three species live in fairly close proximity to one another.

Sulcorebutia azurduyensis VZ264 a completely different flower colour



Fig. 9

I now have four plants but only two have flowered so far, so I will keep my fingers crossed that maybe there is another with this truly beautiful flower.

Many of my plants, including those mentioned in the first part of this article, came from Johan de Vries and the names and collection numbers quoted are those he gave me.



Fig. 10

Sulcorebutia azurduyensis VZ264 the original plant



Fig. 11

Part of the *Sulcorebutia arenacea* collection

Sulcorebutia arenacea

This was one of the first sulcorebutias I ever owned back in the 1980s. At that time it was only available in two forms. The body was either a green colour with quite a strong dark yellow flower or a very dark brown with a more golden flower.

They now seem to come in every shade of green from a light green, with what seems to be snow white spination, through to a very dark green body colour or a dark chocolate brown. What were short pectinate spines are now sometimes much longer spine clusters, some of which can

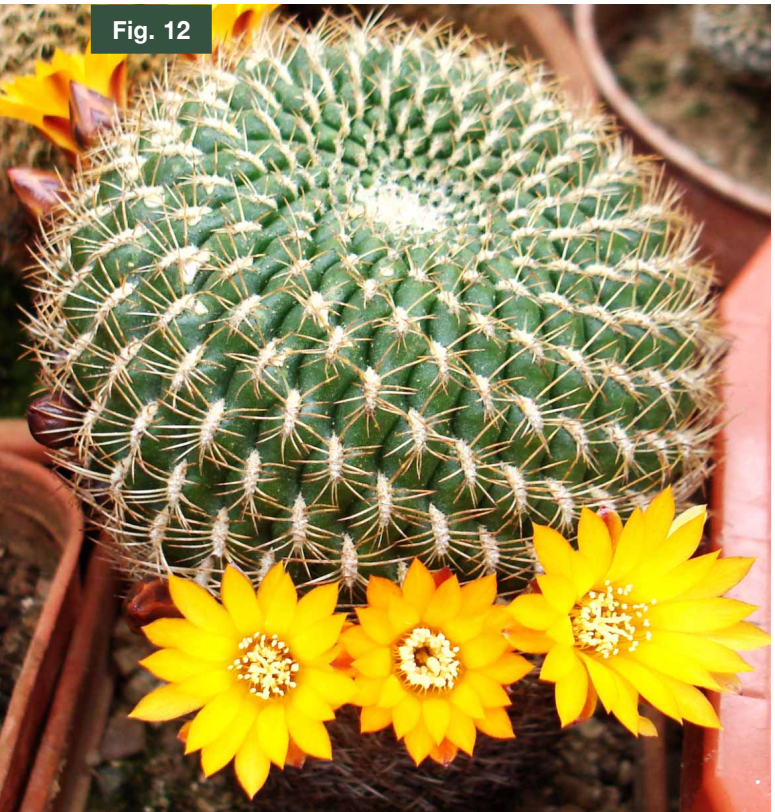


Fig. 12



Fig. 13



Fig. 14



Fig. 15

be seen in Fig 16. Figs. 12–16 show some of the many different body colours and flower varieties within this species.

The collection HS30 was found by Heinz Swoboda in 1982, and became available to collectors in the early 1990s. I was lucky enough to go on a trip to Kakteen Centrum Oberhausen where I made a beeline for the sulcorebutias and found a lovely little plant about the size of an egg with beautiful golden spination. I was amazed to see it was *S. arenacea* HS30 (Fig. 17) a longer-spined form of *S. arenacea*. Some years later, once it had made a nice clump, I put it in the British Cactus and Succulent Society National Show several times, but it was never placed. I do not think the judges recognised it for what it was.

Figs. 12–16 different forms of *Sulcorebutia arenacea*



Fig. 16



Fig. 17

Sulcorebutia arenacea HS30

I recently bought a collection of sulcorebutias from someone who had been growing them since the early 1980s. He only really grew sulcorebutias and had been to Bolivia and travelled around with Brian Bates. He was downsizing to a much smaller property and would no longer have room for them.

Among them was a very old plant of *S. arenacea*. He had obviously watered with tap water, which I guess was very hard, as many plants had a very white base caused by the build-up of limescale. I can only presume that this plant, because of its tight pectinate spination and capillary



Fig. 18

Sulcorebutia arenacea with an unusual circle of offsets around the base

action, had been affected more than most. It will be interesting to see if, with the use of water with a low pH, the green colour reappears and the limescale starts to reduce.

Around the bottom of the plant you can see lots of nice little offsets making a complete coronet of pups, something I have never had around an *S. arenacea*, as they usually offset randomly from higher up the body.

It is also just starting to show something that *S. arenacea* in particular does with age. The growing point becomes 'Y'-shaped, which I think is sometimes referred to as a bishop's mitre. I have not found many other sulcorebutias that do this, although I am sure it is possible.



Fig. 19

The magnificent *Sulcorebutia arenacea* belonging to Alice Vanden Bon



Fig. 20

The same plant in flower

The plant shown on the previous page, (Figs. 19 and 20) belonged to my very good friend Alice Vanden Bon who had shown it for many years with great success. It even won a Royal Horticultural Society award one year. Sadly it eventually came to the point when it was too big for her to manage so now many of us have a piece of this once majestic plant.

The group pictures are from my bench over the years and include *S. candiae* with very pale lemon flowers, *S. menesesii,* long-spined plants with yellow flowers and a plant which was known as *S. caineana* (at the back in my collection) which seems to be a taller and thinner plant.

The plant with the reddish flowers is a hybrid that appeared as a seedling. I believe *S. haseltonii* is one of its parents, which is a much more upright and larger-growing plant in this series which I have not seen for years. Unfortunately, or not, a bee must have visited something red before pollinating the parent. It has grown quite big and branched quite haphazardly in the past and I have now taken offsets off and started it again at least three times.

One plant with a really orange flower is *S. menesesii* Lau 974 which was given to me by John Donald many years ago. ■

Photos: Kathy and Keith Flanagan



Fig. 21

Aeonium and Sempervivum

and a possible link between them

by Mellie Lewis

Sometime back in the late 1980s a friend and work colleague reached into the compost heap in the garden where we both worked and threw a plant in my direction calling out, “this looks like a Mellie plant”.

Anything thrown on the compost heap was up for rescuing, the alternative was leaving it for nature to do its recycling work. The plant thrown in my general direction was a succulent that had the appearance of a small tree. I had never seen the like before and I was smitten. I took the plant home, potted it up and popped it into my plant conservatory; and I have not been without an *Aeonium* ever since.



Garden escapees, semi wild *Sempervivum* growing over the walls in our small town

Fig. 1

Going back further as a child, I grew up in a cottage which had multiple, higgledy-piggledy outbuildings. From my bedroom window I had a fine view of this unlikely plant habitat. Mosses, lichens and sedums thrived along with sempervivums (houseleeks or hens and chicks), their roots finding grip and nourishment between the roof slates where debris got caught, rotted and provided enough growing medium for succulents to thrive.

In diabolical weather they would often become dislodged and roll from the roofs into the garden below. I would gather them up and press them into nooks and crannies around the garden and find joy at watching them grow and multiply. In late summer the roofs would buzz with bees visiting the tall flowering spikes that emerged from the main rosettes of the sempervivums, untouched by human hands. In a harsh habitat they are born survivors.

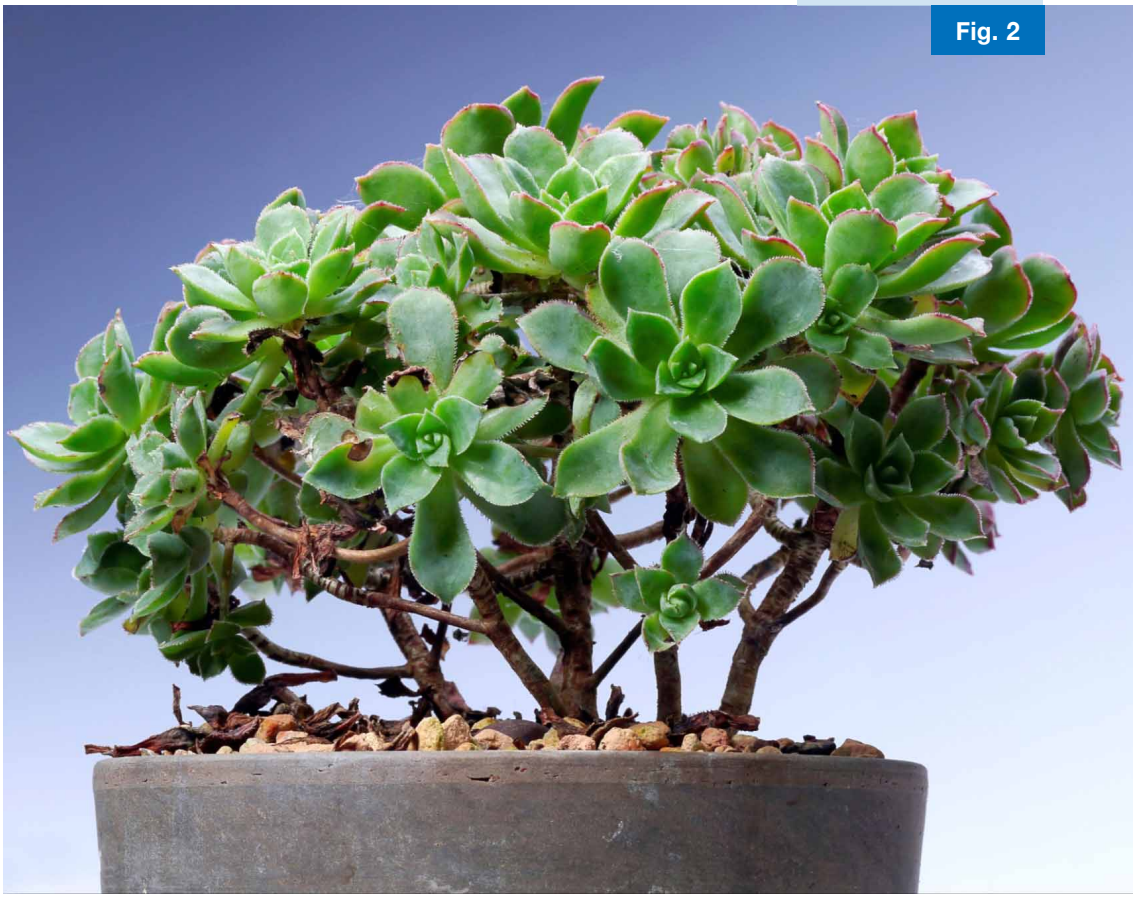
All my life I have grown sempervivums; without these joyful and easy plants life would not be so enriched, they are a link to my past and a link to my other passion.

Many years later, long after my own children had grown, I became even more interested in *Aeonium* and my collection expanded significantly. I was thrilled to find out, while researching the genus, that many years ago it was believed that *Aeonium* and *Sempervivum* were the same genus. Aeoniums were called 'giant houseleeks', houseleek being a common name for sempervivums. Indeed, they do belong to the same family, the Stonecrop or Crassulaceae, but the two genera were separated and categorised separately many years ago, although 'giant houseleek' is still a term often used for aeoniums.

The majority of *Aeonium* species are found in the Atlantic islands of Macaronesia (Canary Islands, Azores, Madeira and Cape Verde), however *Aeonium* are also found in a disjunct distribution in East Africa and Yemen. They may originally have been more widespread throughout the Mediterranean and North Africa, but desertification and the spread of the Sahara destroyed their habitat leaving the genus separated. East African aeoniums are the least researched and sadly many of these countries are now too dangerous for plant researchers and botanists to venture.

Sempervivums are more widespread. They exist from Morocco to Iran, through the Iberian mountains, the Alps, Carpathians, Balkan mountains, Turkey, the Armenian mountains, in the north-eastern part of the Sahara Desert and the Caucasus. Their ability to store water in their thick leaves allows them to live on sunny rocks and stony places in the mountain, subalpine and alpine belts.

I am now lucky enough to be able to hold a National collection of *Aeonium,* both species and cultivars, but *Sempervivum* are also still of huge interest to me. So, you can imagine my delight when, back in 2017, I caught wind of an exciting new plant to add to my collection. The plant name was *Aeonium* 'Cornish Pixie' (Fig. 2), but what was different was that this plant is an intergeneric cross. It was found growing in a Cornish garden between its parents, a



Aeonium × 'Cornish Pixie'

Fig. 2

Sempervivum and *Aeonium haworthii,* a species from the island of Tenerife. The rosettes are not dissimilar to *Aeonium haworthii* but generally the plant is much neater and forms a lovely little mound over time.

The plant was put into cultivation and quickly became a popular choice plant for collectors.

In 2019 I had the idea to have a go myself at making a cross between the two genera. For my experiment I used the pollen from *Aeonium* 'Suncup' (Fig. 3), which is a variegated form of A*eonium castello-paivae,* and an unlabelled *Sempervivum* growing on my garden wall. Amazingly I had success with a single seedling, yeah just one! It has thrived and I call it 'Clunk' after the two rivers in the small Welsh Marches town where I live; the river Clun and the river Unk. At the time of writing it has grown a single rosette 20cm across, which is a much larger rosette than either of its parents. It is a lovely fresh apple green in colour but also has a fine coating of farina in summer which vanishes during winter and spring. Note the fine, tiny and abundant cilia around the leaf margins (Fig. 4).

I then heard that staff at Surreal Succulents, the nursery in Cornwall which had put 'Cornish Pixie' into cultivation, had also been experimenting with the same genus cross and had some absolutely stunning results using *Sempervivum* 'Green Ice' and pollen from *Aeonium* 'Ice Warrior', creating what they have called 'semponiums' marrying the name *Sempervivum* and *Aeonium* together.

The varieties so far include ×*Semponium* 'Destiny'. This beautiful specimen with dark purple glossy leaves won RHS plant of the year at the Chelsea Flower Show in 2022. There are two more to enjoy ×*Semponium* 'Sienna' and 'Diamond'. These plants are good strong growers and are meant to be much hardier than aeoniums and able to tolerate a degree of frost, a characteristic of sempervivums.

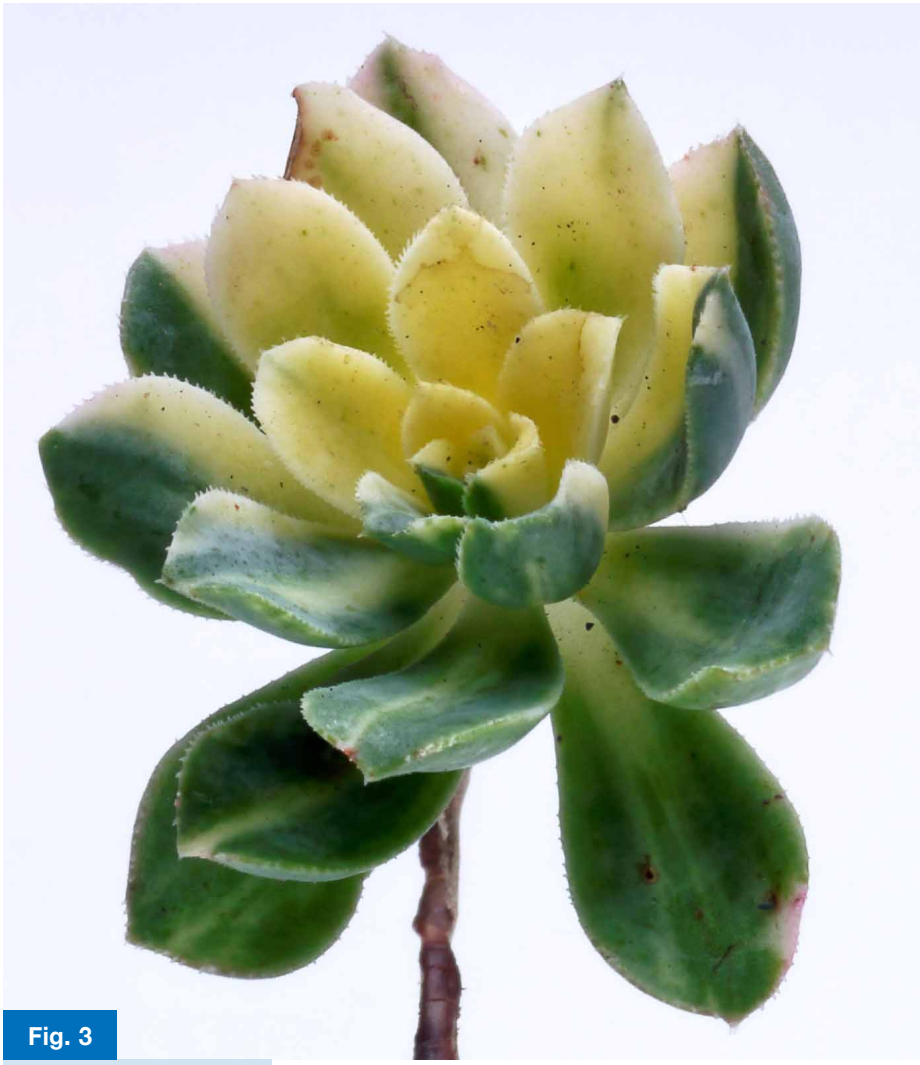


Fig. 3

Aeonium × 'Suncup'

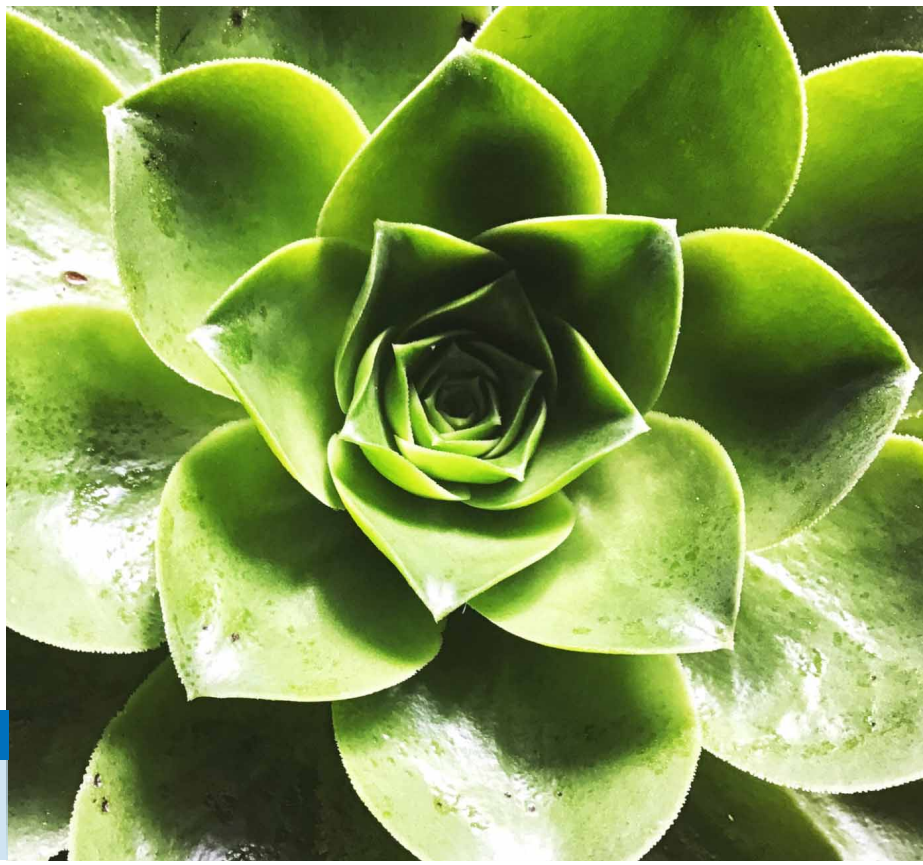


Fig. 4

The one and only *Aeonium* ×'Clunk'



Fig. 5

Aeonium goochiae

In 2020 I had another go at an intergeneric hybrid, this time using the pollen from *Aeonium goochiae*, a species from LaPalma, (Fig. 5) and again whatever sempervivum was in flower at the time in my garden. This was just for fun after all, I had no intention of competing with Surreal Succulents. I am absolutely not in their league! I may add at this stage that in order for nature not to interfere with my experiment the flowering stalk was removed from its rosette and garden setting and placed in a jam jar (a vital piece of equipment for any wannabe botanist).

Aeonium 'Alas Verde', *Aeonium goochiae* × *Sempervivum*

Fig. 6



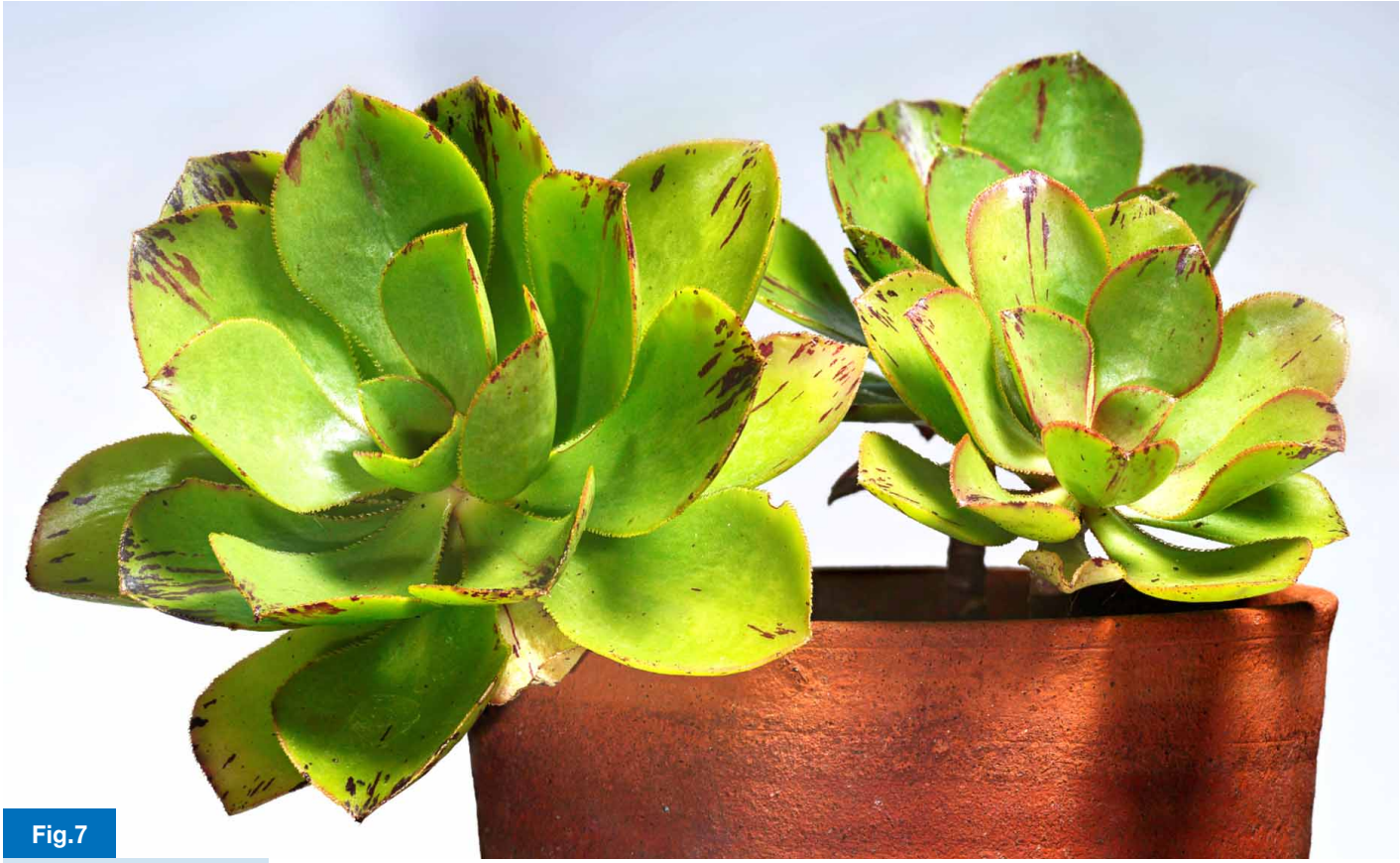


Fig.7

Aeonium glutinosum

Open flowers were snipped off from the stalk with nail scissors and then isolated to prevent pollination by invertebrates and the wind.

Again success! This time five seedlings that grew rapidly and gave me tremendous pleasure. I called this plant 'Alas Verde' or, in English, 'green wings' as when I watered the plant its leaves would rise up like wings about to take flight (Fig. 6). These seedlings looked very different to 'Clunk' but this was no surprise as the aeoniums used were very different, as you can tell from the photographs. *Aeonium goochiae* is quite different to many aeoniums and has the appearance of a miniature shrub, with small sticky leaves.

One day I was watching a live broadcast on Instagram from Surreal Succulents when it was mentioned that semponiums have strongly pronounced veins on the leaves. This is a characteristic of a *Semponium*, but wait, I had seen strong veining on a few aeoniums in my collection. I decided to go and explore my collection to see which had pronounced veining.

The plant leaf here in the foreground is Aeonium goochiae × *Sempervivum* and behind it *Aeonium glutinosum*. You can see the cilia, hair like structures around the leaf margin which are also exceedingly similar, in size, shape, count and form.

Fig. 8





Fig. 9

Sempervivum atlanticum

I was looking closely at *Aeonium* ×'Alas Verde' which I had noticed had these strongly pronounced veins and was suddenly struck with its resemblance to another *Aeonium* in my collection *A. glutinosum*, a species from Madeira, (Fig. 7); but how could they be so similar?

Both plants have some very similar characteristics including sticky but glossy leaves with red tannic markings. The rosettes have a much looser leaf arrangement than many aeoniums. The stalk is very similar in both plants, having pronounced and slit-shaped leaf scars. The stalk is dark brown in both and they share pronounced veining.

This got me thinking, and a question arose; could some *Aeonium* species actually be intergeneric crosses albeit maybe from millions of years ago? How could it be possible that this cross I made looks so much like *Aeonium glutinosum*? We know that *Sempervivum atlanticum* (Fig. 9) grows across the Atlas Mountains in Morocco within close range of many of the Macaronesian islands and, therefore, aeoniums.

Could other sempervivums once have inhabited what is now the Sahara desert or even the Macaronesian islands?

The *Greenovia* section of *Aeonium* is a group of stalkless aeoniums which are very similar in growing habit to sempervivums. This section of *Aeonium* splits the experts as some believe that they should not be categorised as *Aeonium*. Do they have a closer genetic link to *Sempervivum*? *Aeonium simsii* also has a striking resemblance to *Sempervivum,* i.e. clump-forming stalkless rosettes which produce outside shoots or 'stolons'. The flowers of *Aeonium castello-paivae* (there are four forms) are exceedingly similar in shape and colour to those of *Sempervivum globiferum* subsp *globiferum*.

I am not a botanist or even a horticulturalist, but I am very aware that many plants can have very similar characteristics but a different DNA code. I do feel, however, that further investigations are needed into the molecular structure and possible close relationship between *Aeonium* and *Sempervivum*. ■

Photos: Mellie Lewis

The sky's the limit – one year on

by Paul Spracklin



Echinopsis 'Flying Saucer'

The December 2021 edition of the *Cactus and Succulent Review* contained a short article on a project of mine. I had bought the plot next door, demolished the house and planted a large range of cacti, succulents and other drought-tolerant plants in the rubble. Many plants were transplanted from my existing overcrowded garden, augmented by new plants that I already had, gifts from friends or newly purchased. So how has it all fared one year on?

A blaze of June colour



The past 12 months have seen some very mixed growing conditions here in south-east Essex. Autumn 2021 was quite wet but warm; winter was incredibly mild with the lowest temperature in the new area of just 0.6°C. Plants continued to grow steadily. A broadcast sowing of Californian poppies saw fabulous germination all through winter and into spring and, for the most part, the other plants seemed to be getting their roots down and adapting to the new conditions.

The first half of this year was all about colour, which started in April with *Tulipa linifolia* and a bright orange *Lampranthus aureus*, swiftly followed by deep purple reticulate iris and a lemon-yellow lampranthus.

But it was May and June that saw the main event – sheets of colour from the Californian poppies, magenta and cerise lampranthus providing contrast. These plants provided the perfect fillers while the succulent plants steadily established and occasionally joined in the floral display. Rainfall for the first half of the year was below average and we had lots of warm sunny days.

October sunshine



July and August were very interesting. Like the rest of the country we had not a single drop of rain, accompanied by an unprecedented spell of unrelentingly hot weather, with a shade reading of 38°C and more consecutive days in the low to mid 30s than I can ever remember.

I had planted one or two additional plants earlier this year which received a bit of water, but the vast majority of the planting was left to its own devices. After all, that was the whole point – and I have to say, the new garden thrived. No signs of stress, just beautiful hard strong growth.

Several plants that had seemed almost dormant for many years rewarded me with flushes of growth. A few cycads (*Encephalartos lehmannii* in particular) were clearly enjoying their new positions on the hot, sunny slope. A rooted pad of the massive *Opuntia robusta* that had sat in my greenhouse for several years without



Opuntia robusta – snail ravaged but growing

Encephalartos lehmannii showing bright, tight new growth



growing now boasts two tiers of new growth, albeit distorted by snail damage.

I have tried many times over the years to grow *Yucca rigida*, never successfully, and still had one remaining potted and rooted plant to try that had been going backwards ever since I bought it. It seemed to me that within a week of going into the rubble its fortunes turned around and it is now growing spectacularly well.

A starter plant of *Echium candicans,* planted in June 2021 from a 9cm liner, is now a tight 1.5m dome of growth. The tender giant *Agave tecta* has nearly doubled in size, as have small plants of *Agave ovatifolia* and *Agave gentryi*.



An uncommonly contented *Yucca rigida*



Echium candicans now a small shrub from a 9cm liner



Marcetella moquiniana powering away

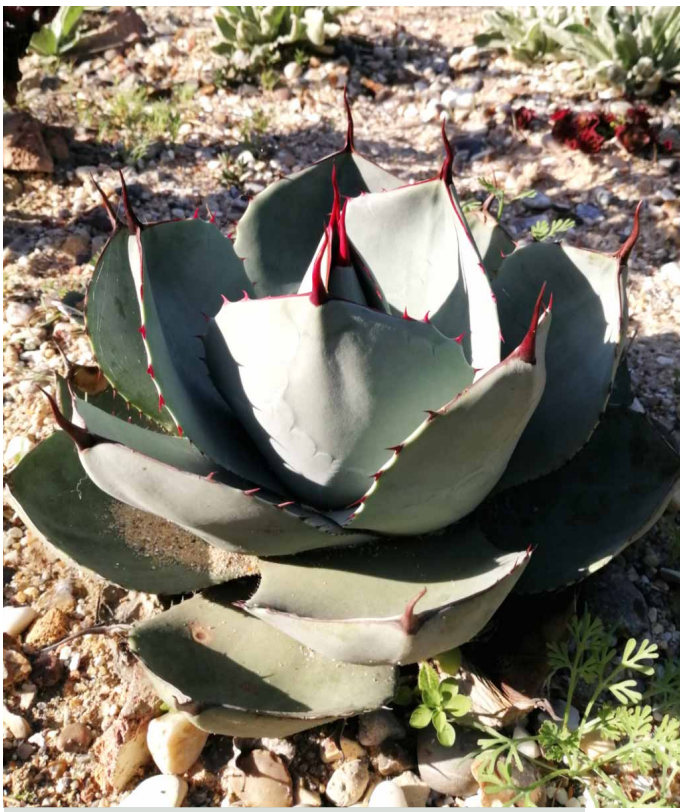
Across the board, the growth of cacti and succulents has exceeded my wildest hopes.

There were one or two failures. I had transplanted two *Nolina nelsonii* from the old garden and they died without making any new roots. A potted, fully rooted small plant, by contrast, raced away. The Mexican palo verde *Parkinsonia aculeata* did not make it through winter, although the disappointment was offset by the surprise burgeoning growth of the Tenerife native 'Stick of Blood' *Marcetella moquiniana*. Not a failure, as such, but a transplanted palm *Chamaerops humilis* 'Cerifera' sulked majorly and the middle went rotten – the dreaded 'spear pull'. After an application of hydrogen peroxide into the crown it has now pushed out the damaged centre and started to grow new healthy leaves.

The drought broke at the very start of September, during which month we received more rainfall than the whole of June, July and August combined. It was like a second spring had arrived with many plants launching into new growth.

Self-sown *Verbena bonariensis,* that had appeared at the start of the year from who-knows-where, are currently enjoying a second lease of life as I type – every bit as fresh as the first flowering.

There is now a low green carpet of poppy seedlings waiting to perform next year, self-sown from the earlier flowering. I cut the *Lampranthus* back by three quarters after flowering last year and the plants are now almost the same size again so will no doubt continue to spread.



Agave parryi var. *truncata* showing good form



A compact form of *Agave gentryi*



Agave tecta gaining momentum

I have been gardening for an awfully long time but these past 18 months, I think, have given me more pleasure than any other period I can recall. To see my favourite plants growing healthier and happier than they have ever been is just a joy. Aside from plants, we had a summer house built at the very top of the new plot in spring and it is here that my wife and I settle most afternoons and evenings, watching the sun set. Using materials recycled from the old house I have also built an outdoor kitchen area with a wood-fired pizza oven and a tandoor so this new area has rapidly established itself as the main locus for our lives here.

No doubt future years will bring their own challenges but I am massively excited by the prospect of how the garden will cope and slowly mature. ■

Photos: Paul Spracklin



A scarred old *Trichocereus pasacana* enjoying its new life in the sun



Soehrensia bruchii impersonating a golden barrel



Beautiful, strong spination on this *Trichocereus* sp.

Tucson cactus rescue

by Donna Ellis

What is ‘cactus rescue’?

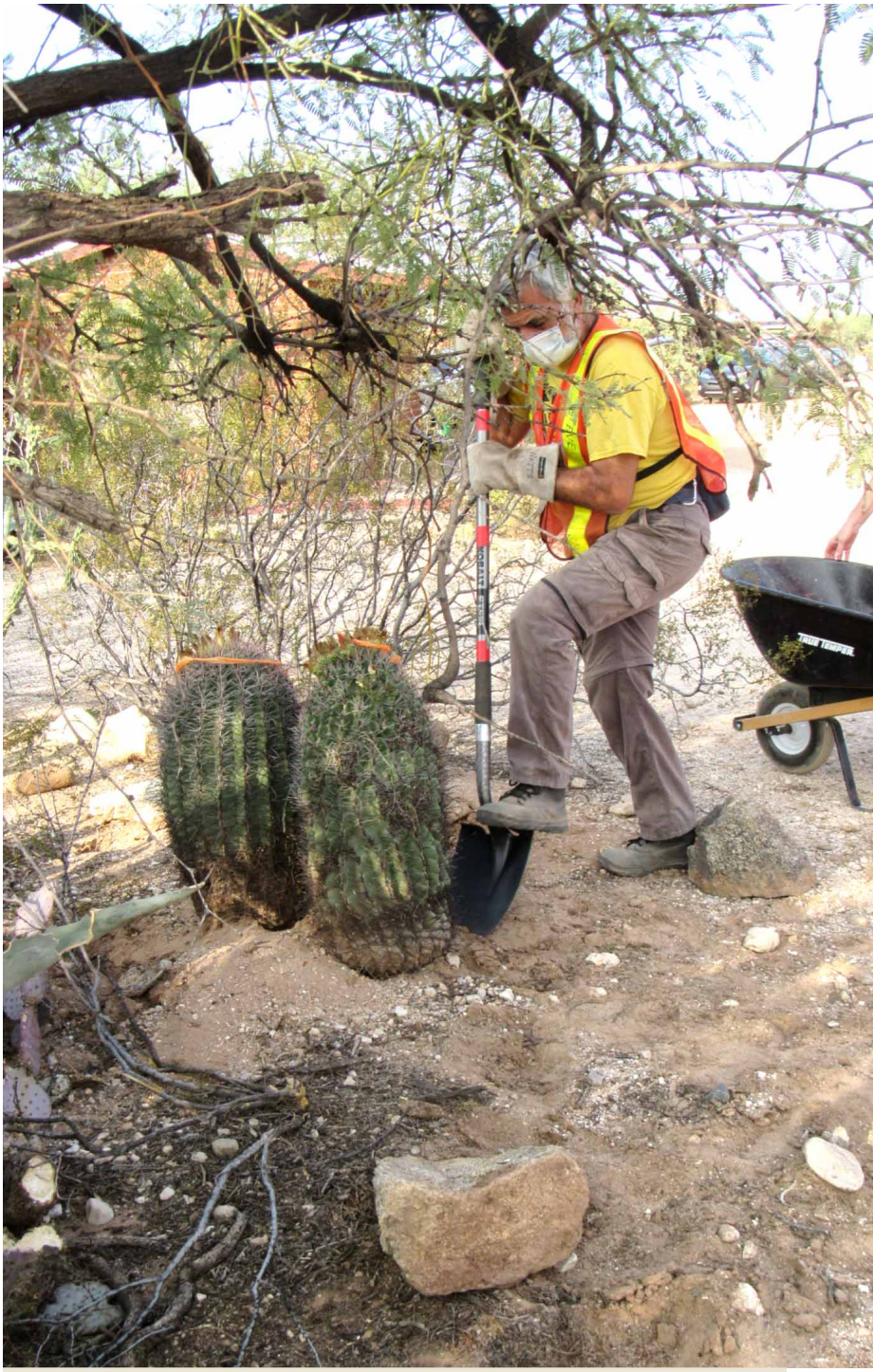
Twenty-three years ago, when construction of housing, schools, office complexes, roads, powerlines and shopping centres boomed in Tucson, developers routinely and legally bulldozed thousands of small native plants into mounds of rubble on their construction sites.

They did so because, at the time, there was no economically feasible way to save plants such as small saguaros, ocotillos, barrels, hedgehogs, pincushions or night-blooming cerei These plants would have taken a prohibitive amount of expensive human labour to dig up, transport, replant and sell.

The state of Arizona did have native plant protection laws that required developers to save a certain percentage of native trees and medium-sized saguaros for future replanting at a project site but that still allowed the destruction of hundreds of smaller plants.

In 1999 Chris Monrad was an electrical engineer working on a development project for a new elementary school where hundreds of plants were destined for bulldozing. Chris was also a member of the Tucson Cactus and Succulent Society (TCSS). “Why couldn’t we get volunteers from the Society to rescue plants?” he wondered.

So in July 1999, with the permission of the developer, TCSS ran its first rescue with four volunteers. The crew got an Arizona state permit to legally remove and transport native plants. They paid for the required plant tags. One of the volunteers, Dick Wiedhopf, now the Society’s President, recalls what happened next as word spread about the rescue. “Everybody wanted to keep doing more, and the rescue programme just snowballed after that. Volunteers came out of the woodwork.”



Rescuing a *Ferocactus wislizeni* (Fishhook Barrel) from a site in east Tucson



TCSS cares for rescued barrels (*Ferocactus*) under partial shade in a temporary holding area. The state of Arizona requires salvagers of protected native plants to tag the plants before removing them from the construction site; you can see these yellow tags attached to each plant. (Photo: Steve Watts)

He added, "Developers wanted us to work on their projects. People from out of town mailed us money because they wanted to support our work. Our club membership doubled every year."

Neighbourhood associations began notifying the rescue crew about pending developments. Over time the Society learned how to build working relationships with local utilities, home builders, mines and school districts, along with county and city transportation departments.

Now, by 2022, the TCSS rescue crew has run over 658 rescues, saved over 130,530 plants and spent over $290,720 purchasing tags from the state of Arizona. The rescue crew usually tallies 600-700 volunteers every year on its rolls. The current total TCSS membership remains steady at 1,800–2,000 members per year.

What happens to rescued plants?

The volunteers who dig plants have first choice to obtain a proportion of the plants rescued by the crew. The volunteers tag plants they take home and only pay the cost of the tag, between $1–$8 depending on type and size. The crew tags the remainder and loads them on to trailers for transport to a temporary holding sales area with partial shading. The crew heels the plants into soil with good drainage. A group of volunteers takes care of the plants until the Society holds its next sale.

The Society uses mailing lists, its website, and Facebook to announce sale dates, which vary due to the availability of plants. It normally holds about four sales per year. Sometimes the organisation has special sales if the crew acquires large numbers of ocotillos, which the Society sells as soon as possible. Ocotillos re-establish themselves best if they undergo transplanting within one to three weeks after rescue.

Every year, TCSS donates 10 to 20 of the smaller saguaros to the Arizona Native Plant Society for transplantation at its Waterman Restoration Site located northwest of Tucson in Ironwood Tree National Monument.

The Society donates other plants to the Pima County Native Plant Nursery, to Pima Prickly Park in northwest Tucson, or to local schools.

Now, by 2022, the TCSS rescue crew has run over 658 rescues, saved over 130,530 plants and spent over $290,720 purchasing tags from the state of Arizona.



A crew wraps a saguaro with carpet prior to digging out the roots. The carpet helps protect spines on the plant during transport and re-planting and increases safety for rescuers. (Photo: Crystal Cannon)

How does TCSS initiate each rescue?

TCSS contacts developers early in the process when builders have finished the work required by the local Native Plant Protection Ordinance (NPPO). During this process, plant specialists identify which cacti must legally remain in place or undergo transplanting onsite when the developer finishes the project.

The remaining plants become available for rescue.

The rescue crew coordinators initiate the permitting process with the state. They walk the site with the landowner or project manager to identify parcel boundaries, vehicle access, project deadlines and the type and quantity of plants that salvagers may remove.



Preparing to load a large saguaro on to a flatbed truck. The rescuers have tied the wrapped saguaro to a ladder to support the plant and prevent it from splitting or sustaining spine damage during transport.
(Photo: Crystal Cannon)

The coordinator and landowner submit a Native Plant Removal application to the Arizona State Department of Agriculture.

Once the state approves the application and issues the permit and tags, the coordinators schedule the rescue and notify the crew. The coordinators often schedule rescues on weekends to stay out of the way of heavy equipment and other construction crews.

Who is eligible to volunteer for a typical rescue?

Volunteers must be active, paid-up TCSS members to qualify for insurance and meet liability requirements. Rescues usually take place on virgin terrain, which can be rugged, sloped, rocky and filled with cholla cactus.

Tucson is famous for its long summer season when temperatures often exceed 100°F (about 37°C) or hotter.



Rescuers encase heavy saguaros with carpet padding and guy-ropes to ensure the spiny plant does not topple over while one of the rescuers is digging out the roots



Rescue crew members use welding gloves and slings when moving Fishhook Barrels (Photo: Steve Watts)

What happens during the rescue?

Crew members show up at the dig site at daybreak wielding handheld battery-powered digging tools and saws, picks, shovels, gloves, hats, water, hand trucks and wheelbarrows.

They sign a liability waiver, receive safety instructions and review maps showing property boundaries. Rescue crew leaders explain what types of plants the diggers may remove.

Experienced instructors are available at each rescue to show newcomers the safest way to dig and transport each type of plant. Instructors help new volunteers identify plants and evaluate whether the plant is healthy enough to survive transplantation.

After the rescue crew has dug plants for three hours, the team moves all the plants to a central work area in the field for sorting and tagging. Each protected native plant must have the Arizona native plant tag attached to it. The state considers it illegal to transport any protected native



A rescued *Ferocactus wislizeni* exhibits an Arizona Dept of Agriculture tag as required by law

The rescue crew brings barrel and hedgehog cacti to a central area at the dig site for tagging, sorting and loading on to trailers





Flagging an ocotillo for rescue prior to a construction project at the Pima County Fairgrounds



Cutting canes from an ocotillo that is too large to salvage intact. Canes can grow to heights of 20 feet

plant from the construction site until salvagers tag it or mark it for donation to a public entity.

Once the crew has tagged plants, they load them into trailers for transport to the holding area.

What are ocotillos?

One of the protected desert plants that TCSS rescues is the ocotillo, *Fouquieria splendens*. While not a cactus, the ocotillo is a semi-succulent that grows indigenously in the Sonoran and Chihuahuan deserts of the southwestern United States and Mexico. During long dry periods of the year, the plant looks like an arrangement of large, spine-covered dead sticks. With rainfall the plant quickly sprouts a lush growth of small leaves which can remain green for weeks. In the spring, the plant produces bright crimson flowers



Bundling canes from large ocotillos



Transporting intact ocotillos rescued from a development area southeast of Tucson

Panels made of ocotillo canes serve as an outdoor room divider



that attract hummingbirds and bees. Desert areas southeast of Tucson often contain forests of ocotillos that number in the thousands.

When TCSS conducts rescues in such forests, the crew tries to maximise the number of intact rooted ocotillos that they remove. However, the task becomes daunting when diggers encounter large, very heavy mature ocotillos growing in rocky soil. In addition, as with all rescues,

An ocotillo cane fence creates a trellis for flowering vines



the crew has limited time to work before the developer begins blading the area. In such cases, TCSS rescues just the canes of the larger ocotillos, which can go into the ground bareroot to create 'living fences', which gardeners use as dividers, screens or backdrops for other plants.

What is a 'Queen of the Night'?

'Queen of the Night' is the common name for the night-blooming cereus *Peniocereus greggii.* It constitutes one of the plants most sought after and prized by cactus rescuers. It grows cryptically in the undergrowth of mesquite, creosote and palo verde trees. The only parts of the Queen that are visible above ground are long, ashy grey stems that camouflage themselves in the litter as just another dead stick.

The largest part of the plant grows underground as a fat tuber. The plant typically blooms for one night in midsummer, creating large, spectacular, fragrant white blossoms that attract pollinators such as sphinx moths and beetles. The pollinated flowers turn into bright red fruits, which makes the Queen easy to find. (Finally!) Pima Prickly Park and other parks in Tucson schedule special public viewing events to highlight their populations of Queens on the nights when all the plants bloom about the same time.



Rescue crew member Anne Neuenschwander carries a large *Peniocereus greggii* (Photo: Steve Watts)



TCSS plant expert Rob Romero teaches classes for new members on how to spot and dig the elusive *Peniocereus greggii* (Queen of the Night) which camouflages itself as a dead stick underneath mesquite and creosote bushes

How did the COVID pandemic affect the cactus rescue programme?

The cactus rescue coordinators initially curtailed rescue activities but as soon as it became clear that people could safely work outside with masks and social distancing, we modified our policies to avoid large gatherings of people in close contact. We successfully resumed rescue activities from 2020 through 2022 by focusing on small teams that arrived and left at separate times.

What does TCSS do with cactus rescue profits?

Profits from the sale of rescued plants fund a variety of educational and conservation activities. TCSS offers school and research grants, student cash prizes for Southern Arizona Science Fair projects (grades K to 12), paid internships for college-age students to work at the Pima County Native Plant Nursery, adult education classes at Pima Prickly Park and conservation efforts in Arizona and Mexico.

The Society also uses profits to support future rescues, including the purchase of slings, vehicles, trailers, tools and storage containers at the holding area and Pima Prickly Park.



Affixing an Arizona state tag to a *Yucca baccata*



Salvaging a large saguaro skeleton in the early morning light

TCSS is a non-profit educational organisation. All members are non-paid volunteers.

What is Pima Prickly Park?

Pima Prickly Park is a seven-acre public venue in Pima County that the Society is developing and maintaining as a showcase for desert plants through a cooperative agreement with Pima County. TCSS has donated and transplanted hundreds of rescued plants in the park. TCSS volunteers perform the weekly upkeep and care of the plants.

How do developers benefit from having TCSS rescue plants from their construction sites?

Conscientious environmental engineers and project managers in charge of development projects often seek out TCSS to assist their company in maximising the salvage of native plants over and above the requirements of state law and local ordinances.

TCSS works hard to ensure that salvage efforts do not delay project deadlines or interfere with construction work. Developers and landowners incur no liability or out-of-pocket expenses for salvage operations, and TCSS always pays for Arizona state permits and tags in compliance with the law.

How do homeowners benefit from TCSS rescues?

Over the 23 years that the rescue programme has been in existence, thousands of gardeners have been able to buy cacti and other native plants at fair prices.

The purchasers also get practical advice on how to establish low-water-use landscapes and gardens. TCSS volunteers help gardeners learn to care for rescued plants to ensure their survival before and after transplantation by providing appropriate soil, supplemental water, or extra shade. ■

Photos: as credited or members of TCSS

Interested in learning more about TCSS?
Check out our website:
Tucson Cactus and Succulent Society



Four crew members carry a heavy 3-foot saguaro to the tagging area

UK local

C&V cacti



Seedling cacti grown in West Sussex

All our plants are UK grown. We do not buy in plants to sell on.

A wide variety – from collectors' cacti to plants suitable for beginners.

Visit our website www.cvcacti.co.uk

Woodside Cacti

Quality plants at affordable prices.

Cacti and succulents grown in our nursery.

Our main love is succulents – particularly Echeverias and Haworthias – propagated from our own collection.



Visit our website www.woodsidecacti.co.uk



Ian & Sarda Woolnough

Cacti, succulents and seed sales

Formerly Eau Brink Cacti, visitors are welcome to view the collection and sales plants by appointment.

We will be selling at a number of major cactus marts and other events.

Contact us for further details.

Twickers, Eau Brink Road, Tilney All Saints, King's Lynn PE34 4SQ

Tel: 01553 617132 Email: Ian Woolnough

TONY IRONS cacti

QUALITY CACTI AND SUCCULENTS

Cacti, Lithops & Succulents

For collectors and amateurs



Phone +44(0)1275 846239
Email tonyironscacti@talktalk.net
Web www.tonyironscacti.co.uk

Address 17 White Lodge Park
Portishead, Bristol, BS20 7HH

ebay /tonyironscacti1 /tonyironscacti