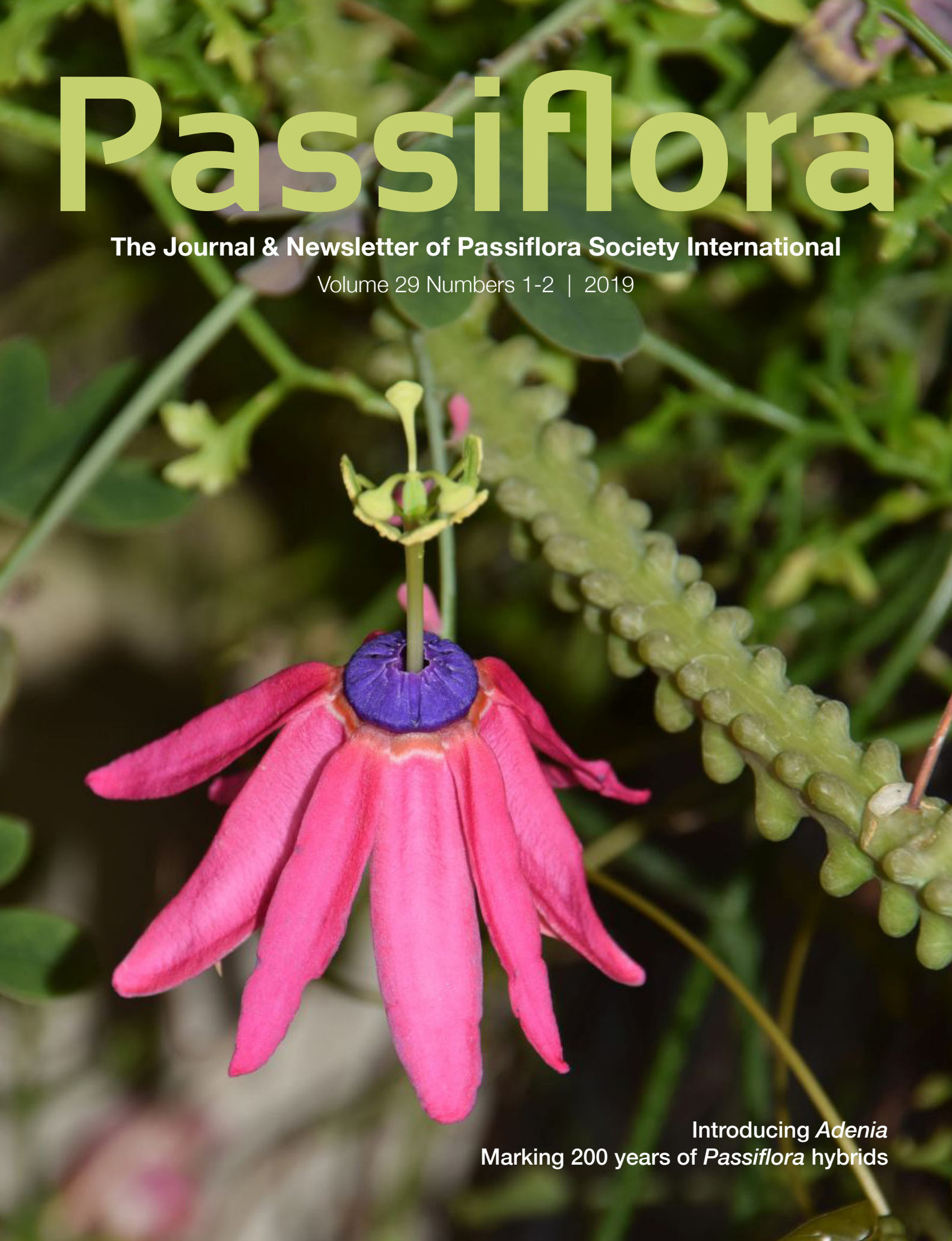

Passiflora

The Journal & Newsletter of Passiflora Society International

Volume 29 Numbers 1-2 | 2019

Introducing *Adenia*

Marking 200 years of *Passiflora* hybrids

PASSIFLORA
SOCIETY INTERNATIONAL

Volume 29, No. 1/2 - Spring/Autumn 2019

SUBMISSIONS: *Passiflora* welcomes articles on all aspects of *Passiflora* and related subjects from PSI members and others. Please email them to the Commissioning Editor in MS Word. Photographs should be high resolution and references in the modified Chicago Author-Date style - see examples in this issue.

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Front cover: *Passiflora edmundoi* with *Adenia lobata* stem in background. Photo by Markus Varga.
Back cover: *Adenia globosa*. Photo by Rainer Martin.

Passiflora Society International

Our Mission

PSI is dedicated to the conservation of the genus ***Passiflora*** through

- The sharing of knowledge of the genus, its species and cultivars throughout the world
- The promotion of cultivation and propagation of living collections
- Encouraging the creation and registration of cultivars for their flowers, fruit and other characteristics
- Seeking ways to ensure the survival of endangered species and cultivars

Update from the President & Vice-President

John Vanderplank
President

Robert Rice
Vice-President

Dear members of PSI...

As you know, there have been a number of changes to PSI over the last couple of years, so we thought it was time to give you a brief update on where we now stand, and what we plan (with your support!) for the future.

At the AGM on 16th June 2019, a new constitution was adopted to give the society and its officers the clarity and flexibility to meet its needs as they change over the years. A new management committee was elected, whose members you will see set out alongside other officers on page 2 opposite. An EGM was then held on 12th October 2019 to complete the technical aspects of these changes.

The ethos which has served the society so well since its foundation in 1991 has, of course, needed no changing; but we have taken the opportunity to introduce a clearer statement of our mission, and this you will also find on page 2. There are four strands, all relating to conservation: let us take each in turn.

PSI is dedicated to the conservation of the genus *Passiflora* through...

1. the sharing of knowledge of the genus, its species and cultivars, throughout the world

Historically, PSI has achieved this through meetings, personal networking, the journal and more recently the website and (to a limited extent) Facebook. Covid-19 has brought the first of these to a halt, though we still hope to hold a meeting at St Jory in 2021, and are exploring possibilities for an American meeting soon after, maybe even before; personal networking continues but not, for the time being, face to face. So for now we are concentrating on the journal and the website.

The journal had got behind, so to help us catch up, we have produced a series of double issues, of which this will be the last. Thereafter, apart from the occasional special issue, we will revert to two separate issues per year, of which every fourth issue (including the next, 2020.1) will be the cultivar register.

We plan to have some regular features: **Recipes** started last issue, and the first **Butterfly Corner** and the **Species Factsheet** (here on *P. edmundoi*) appear in this. We might also start a **Letters page** - but first you need to write to us! **Reports on conference, fieldtrip and other events** will depend on their being possible, but we are pleased in this issue to include a report on the Bochum conference and John and Jorge's fieldtrip to Mexico, both pre-Covid-19. **Anniversaries** may not fall every year, but we will try to mark them when they do: for 2019 Les King commemorates the bicentenary of the first published cultivar, *P.* ×*violacea*. And then there will be **feature articles and news**. In this issue we have an overview of *Passiflora*'s sister genus *Adenia* from Matt Candeias, followed by a detailed practical guide to this neglected but fascinating genus by Markus Varga ; and there is Christian Houël's article commemorating François Thuys.

All (or almost all) issues are now available for download by premium members on the website. In addition, we are building a reference library of useful articles. The *Passiflorunde* archive (see article by Axel Frank in this issue) has already proved its value helping Markus find material on *Adenia*; future uploads will include Killip, Masters and *Passiflora* descriptions and illustrations from Curtis's Botanical Magazine. Let us know what else you would like to see.

2. the promotion of cultivation and propagation of living collections

Once again, Covid-19 is a hindrance, in this case limiting exchanges of plants and cuttings, but we have been able to reopen our seedbank in Europe, and soon hope to have one again in North America, and perhaps even one in South America. The speed of deforestation and destruction of plants' natural habitats, not to mention civil unrest, make it essential to ensure that seeds and other material (and the knowledge and experience to make use of them) can continue to be distributed, in accordance with CITES, Nagoya and other plant protection regulations, to those best placed to propagate and preserve them, not least

the members of PSI. Not only will this keep the many threatened species from extinction, whether in their original habitat or overseas, but with these species new cultivars can be created with improved characteristics, ensuring the continued vitality of the genus as a whole.

3. encouraging the creation and registration of cultivars for their flowers, fruit and other characteristics
Where valuable new cultivars have been created, it is important that they in turn are not only propagated and distributed but also documented on a permanent basis (useful though social media may be for sharing information). PSI is the International Cultivar Registration Authority for *Passiflora*, and fulfils this role by publishing a periodical register of new cultivars, subject to the completion of an application form on the cultivar website, where copies of previous registers can also be inspected. To facilitate their use, we plan to produce a single integrated cumulative version available online and updated throughout the year.

4. seeking ways to ensure the survival of endangered species and cultivars
In addition to acting ourselves, we should also support initiatives such as the International Union for the Conservation of Species, which evaluates the extinction risk of biological species throughout the world, although at present its coverage of *Passiflora* is quite limited; perhaps this is something PSI can address.

More pro-active schemes, such as National Plant Collections, already operate in a number of countries, often hosted by PSI members; apart from conserving the plants they contain, their official status serves to raise awareness of the genus: if there is not one in your country, why not start one? On a smaller scale, the UK charity Plant Heritage operates a Plant Guardian scheme, under which volunteers promise to ensure the preservation of one or two individual species or cultivars. Following a recent article by John, the first few *Passiflora* guardians have now been appointed under this scheme. Perhaps it is one that PSI might emulate in the future.

Finally, we hope to add a PSI-sponsored fieldtrip as a regular event to our annual calendar. Such trips help to identify new species and provide more information about those we already know; without such trips we cannot begin to ensure the conservation of the species in question.

How you can help

It will be apparent that all four strands are interlinked and support each other, but none of them can be effective without members and volunteers. Mission statements all too often sound pious and do-gooding, and this may well be no exception: but the great thing about PSI and its activities is that they can also be fun.

So, spread the word! To make membership easier and more affordable, we have introduced a number of new options, details of which will be found on the back cover: do encourage your friends to take advantage of them and join.

At the same time, please think how you can help the society fulfill its mission. Here are some ways:

- Grow species for seed and propagation, donating the results to the seedbanks (see inside back page) and/or exchanging them with your fellow-members and others.
- Propagate, distribute and register your own hybrids; if you don't, your hybrids will soon be forgotten, however beautiful they look now on social media.
- Contribute articles and photos to the website and journal. Don't be shy: even a few sentences about some insight you may have will be welcome, whether as a letter or an article; and pdfs and links to descriptions and other useful information will help grow our online reference library.
- Help running PSI. Our team is far too small right now: we need volunteers not just with botanic and horticultural knowledge, but also professional skills: in your day job maybe you are an expert on websites, databases, social media, finance and accounts, marketing, languages, photography, publishing, scientific and other academic research, you name it! Tell us what you know, and we'll find a use for it.
- Let us know, too, what you would like from PSI. Would you, for example, like more meetings? Local as well as international? More information on the website? More generally, what are we doing right, and what could be improved? We need your feedback!

To let us know what you think, and how you might help, please login and complete the form at:
www.passiflorasociety.org/psi-and-me

We look forward to hearing from you; meanwhile, read on and enjoy this issue!

Passiflora Society International

Meeting 2018

Bochum

Germany

By Rob McPhail

Left: *Passiflora edmundoi*, pink form, with stem of *Adenia lobata* in the background
Below: Large tropical greenhouse at Bochum Botanical Garden, with the turtle pond in the foreground. Photos by Markus Varga

Group photograph, left to right:
Back row: Jan Rasche, Gerard Olijslager, Oliver Czernia, Paul Verkuijl, Robert Rice, Martin Drews, Jan & Timo Riering.
Middle row: Maurizio Vecchia, Martin Siaw, Stephane Fehr, Christian Houël, Didier Stephany, Diana Jaramillo, Sergio Lloreda, --, --, Henk van Aalst, François Thuys, Nadine van Rüschen, Elsa Peterson, Niels Jørgen Petersen, Martin Wills, Rob McPhail.
Front row: Henk Wouters, Eladio Gonzales Blanco, Markus Varga, Annalisa Giovannini, Tanıl Dinçsoy, Sal LaDelfa, Mui van Aalst Le, Klaas Kingma, Arjen Lommen, Dusha Hayes. Photo by Martin Drews

The Passiflora Society International conference 2018 was held from 14th to 16th September in Bochum in northern Germany and hosted by Martin Drews. We had a great turnout: 34 members, many with partners, from countries all over Europe, as well as Singapore, Turkey and Colombia.

Martin is the proud holder of the well-known *Passiflora* collection founded by Bettina & Torsten Ulmer which he public-spiritedly took over in 2014. He continues to care for the plants in his own nursery, and to propagate from them.

Martin and his parents had arranged a busy programme, with help from his friends from the Botanical Garden, Bochum.

Most likely *P.* 'Temptation' in the temporary display in the water lily house. Photo by Markus Varga

Our first day of activities was a day out to the Botanical Garden with guided tours by horticulturists Jan & Timo Riering and Jan Rasche. The gardens were founded in 1968 and are currently maintained under the aegis of Ruhr University, Bochum.

The garden's outdoor area contains some 13,000-square metres of cultivated plants organized into geo-botanical regions, including forests, coasts, meadows, prairies, and marshes from the Americas, Asia, and Europe.
Members particularly admired the Chinese garden, created from 1986-1990, and renovated in 2001, by skilled gardeners whose services were donated by Tongji University, Shanghai as a token of friendship. It is named Qian Yuan (Qian Garden), in memory of the "Fields and Gardens" poet Tao Qian (365-427 AD), and is laid out in the southern Chinese style. A pond covers half of its area.

The garden's extensive greenhouses contain collections of succulents from *Euphorbia* and other genera, *Cycadaceae*, plants from the Canary Islands, *Eriocaulaceae*, alpine plants - and, of course, *Passiflora*.

In the evening, once the gardens had closed to the public, a fabulous Spanish buffet dinner was served in the Tropical Greenhouse. Daylight faded and all of the spot lights came on, illuminating the gardens in a magical display.

On Saturday the group went to Martin's nursery, only a 30-minute drive away. The day was left open to explore the nursery and its beautiful surrounding gardens. The nursery houses Martin's collection of *Passiflora,* as

The usual PSI troublemakers, Robert especially!
Left to right: Paul Verkuijl, Sergio Lloreda, Stephane Fehr, Robert Rice.
Photo by Rob McPhail

Maurizio Vecchia and Annalisa Giovannini selecting passionflowers in the *Passiflora* nursery. Photo by Markus Varga

Passiflora conzattiana in the temporary display. Photo by Markus Varga

Peek a Boo! Martin Drews photographing *Passiflora microstipula*. Photo by Markus Varga

well as being a working area for propagation and other activities. Martin has over 300 different *Passiflora* species and hybrids, which he uses for propagation, offering the plants he produces for sale on his website.[1] During our visit Martin set out a wide selection of *Passiflora* from his stock - we had great fun going through them all and gathering plants to purchase.

Martin's parents had arranged and set up an excellent barbecue lunch with traditional German cuisine for those attending, after which we all headed back to the hotel in Bochum to begin the official PSI Meeting.

The meeting was called to order at about 4:00pm by Rob McPhail, the President, who welcomed those present, including many of the PSI's officers. John Vanderplank, vice president, Stefania Mattiuzzo, treasurer, and Jorge Ochoa, seed bank administrator, sent their apologies for not being able to make it. Rob then moved on to activities during the year and the various issues currently being tackled by the officers, particularly the website and difficulties in making payments from countries such as Russia, China, and Turkey.

Robert Rice followed with his report as Registrar. 13 applications had been accepted for the 2016/7 register, which would be issued shortly, and he encouraged members to submit their future applications using the form on the cultivar website. He reminded members that although the form might look rather long at first sight, it is very much simpler than its predecessor, and a large number of the questions are optional.

Robert then moved on to report that the committee had discussed the society's constitution and concluded that

The Botanical Gardens of Bonn. Photo by Rob McPhail

Succulent House at Bonn Botanical Gardens. Photo by Rob McPhail

it needed amendment to allow for general meetings between AGMs if required to cope with vacancies and other issues arising in the course of the year.

Rob McPhail then resumed the floor to announce that the committee was currently hoping to hold the 2019 meeting in Mexico, and the 2020 meeting in France, hosted by Christian Houël. The session was then thrown open for general discussion, after which the formal part of the meeting closed.[2]

Arjen Lommen and Henk Wouters examining Martin Drew's plants. Photo by Markus Varga

We were then treated to two fascinating presentations:

- *Biotechnologies in ornamental passionflowers (genus Passiflora)* by Annalisa Giovannini, in which she discussed her research in San Remo and her new cultivar *Passiflora* 'Moonlight.'[3]

- *Adenia - an unnoted genus of Passifloraceae* by Markus Varga.[4]

Following this, we all went out for the evening, taking over the entire terrace of a Greek restaurant. This was a very pleasant occasion where members could sit down, drink good wine and talk (almost) exclusively about passionflowers.

The final day, for those who had not already left by car or to catch a flight home, was a trip to the Botanical Garden, Bonn.

This garden goes back to about 1340AD and originally

formed the grounds of the Archbishop of Cologne's castle. Some three hundred years later the grounds were refashioned as a renaissance garden. In 1720 the site was again reworked, this time as a baroque garden, and this forms the basic structure it still has today, including the rococo Poppelsdorf Palace completed in 1746 by Archbishop Clemens August.

Today the garden cultivates about 8,000 plant species, ranging from endangered local species from the Rhineland - such as Lady's Slipper Orchids - to protected species like *Sophora toromiro* from Easter Island.

The garden also contains about 0.5 hectares of greenhouse area. Within the Victoria house one can find the giant water lily *Victoria regia*, *Nymphaea*, *Aristolochia* and *Passiflora*, tropical bog plants, and a fine specimen of *Amorphophallus titanum*.

After an afternoon tea sitting in the sun the conference closed and we all went our separate ways.

We are very grateful to Martin, Jan Rasche, and the brothers Jan and Timo Riering for the professional organizing and effort they put into this Bochum meeting. We also owe special thanks to Martin's parents for arranging the lunches and drinks on the second day, and for making sure everyone was happy and welcome in Germany.

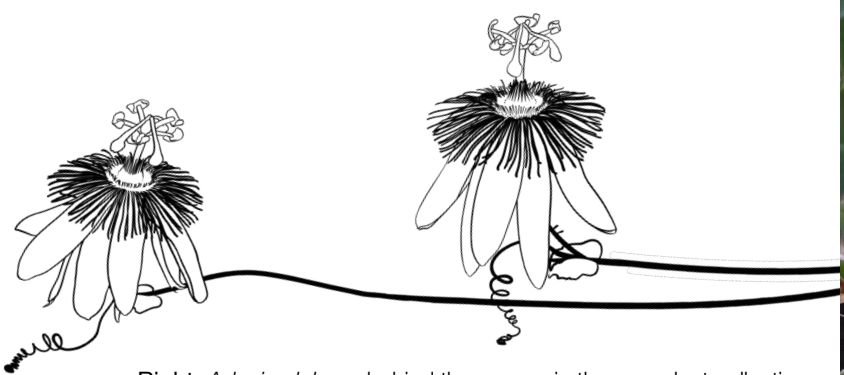
FOOTNOTES

1 www.blumen-passiflora.de

2 More detailed minutes are available at www.passiflorasociety.org/psi-meetings

3 Calevo, Jacopo, Annalisa Giovannini, Laura de Benedetti, Luca Braglia, Francesco della Cuna and Aldo Tava. 2016. Chemical composition of the volatile oil from flowers and leaves of new *Passiflora* hybrids. *International Journal of Applied Research in Natural Products* 9:21-27

4 See pp. 24-35 for a much expanded version of Markus' presentation.



Right: *Adenia globosa* behind the scenes in the succulent collection
Below-right: *Adenia glauca* in the succulent collection
Below: Martin Drews and Jan Riering in Martin's passionflower nursery
Photos by Markus Varga

Passiflora ×*violacea*: The First Hybrid

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INTRODUCTION

The earliest known *Passiflora* hybrid was *P. racemosa* Brot. (♀) × *P. caerulea* L. (♂), (Fig. 1), created two hundred years ago by Thomas Milne of Fulham in the United Kingdom (UK). Seven taxa from this cross produced flowering plants following pollination in the summer of 1819. Detailed accounts were subsequently reported by Sabine (1822; 1824). The male parent (*P. caerulea*) had been in cultivation in the UK since the 17th Century (Kugler and King 2004) but, at that time, *P. racemosa*, originating from Rio de Janeiro State in Brazil, had only recently been described by Brotero (1818).

The name *P. racemosa* refers to the fact that its flowers are mostly grouped in racemes. Of the seven taxa produced by Milne, just one formed racemes and was described by Sabine (1824) as "*Milne's racemose Hybrid Passion-flower*". Sabine noted that this had "*blossoms … appearing to grow in racemes*" and that these terminal racemes "*are without leaves*". However, few other hybrids of *P. racemosa* show this type of inflorescence; and the genetics of raceme formation in such hybrids will be described in a forthcoming publication (King 2021). The general morphology of what is now known as *P.* ×*violacea* is described by Vanderplank (1996) and Ulmer and MacDougal (2004).

NOMENCLATURE

As in so many plant families, names have changed over time to reflect our greater understanding of their phylogeny, to recognise prior publication and to adopt a systematic nomenclature. Thus *P. racemosa* is more correctly known as *P. princeps* Lodd. (sometimes shown as "*P. princeps* coccinea" or "*P. princeps* of gardens" in early literature), since the name *P. princeps* has priority (Royal Botanic Gardens, Kew 2020). However, the species is now almost universally known as *P. racemosa*; and that epithet will be used here.

The hybrids created by Milne were originally named *P. caeruleo-racemosa* but this is considered invalid.

Figure 1: *P. caeruleo-racemosa* as described by Sabine (1822). Drawing: Horticultural Society (now Royal Horticultural Society)

Loiseleur-Deslongchamps (1824) described a plant of unknown origin which clearly has the same parentage as Milne's hybrids. He named this *P. violacea*. According to Kugler and Wetschnig (1991) this is the earliest correct name, although they suggested it should be known as *P.* ×*violacea* Loisel. The name *P.* ×*violacea* should be distinguished from what later became *P. violacea* Vell: a now obsolete synonym for *P. amethystina* Mikan. This confusion is no doubt the reason that *P.* ×*violacea* Loisel. is considered to be an 'unresolved name' by The Plant List (2020). Despite this caveat, the name *P.* ×*violacea* is in widespread use to describe hybrids of *P. racemosa* and *P. caerulea*.

Before the advent of the *International Code of Nomenclature for Cultivated Plants*, the 9th edition of which was published in 2016 (Brickell et al. 2016), hybrids and other cultivars were named using the provisions of the *International Code of Botanical Nomenclature* (McNeill et al 2006), e.g. *P.* ×*violacea* (pronounced "Passiflora cross violacea"). These older names retain their validity and must be used as part of the name if the original cross is repeated, regardless of the crossing direction. So, for example, if a new hybrid is made of *P. racemosa* and *P. caerulea*, then

Table 1: Cultivar and other names associated with *P.* ×*violacea*
a) (Frank and Kugler, 2001)

'Amberg 96', 'Amethyst Beauty', 'Arc-en-ciel', atropurpurea, 'Atrorubens', ×caerulea racemosa rubra, ×caeruleo-racemosa quinquelobata, ×caeruleo-racemosa trilobata, ×caeruleo-racemosa, 'Celia Costen', 'Dedorina', 'EK 1', 'EK 2', 'Eynsford Gem', 'Frits', hybrida, 'Lilac Lady', 'Mariel', 'Mauvis Mastics', 'Milne's Hybrida', 'Nora', 'Pink Star', ×princeps caerulea, racemosa caerulea, 'Rosea', 'Sabine', selloi, 'Stella di Cremona', 'Tresederi', 'Victoria'.

b) Names subsequently registered or shown in supplementary notes

'Andromeda', 'Beaky', 'Chave', 'Ely', 'Marisa', 'Marloes', 'Pruny', 'Shelly', 'Telstar', 'Twin Star', 'Valerie Bishop', 'Velvet Beauty', 'Wippel', '12941'.

its full name will include that botanical name and the cultivar name. Thus, *P.* ×*violacea* 'Eynsford Gem' was described by Masters (1889) where the male parent was the well-known cultivar *P. caerulea* 'Constance Eliott'. It is still permissible to refer to this hybrid, in an abbreviated way, as *P.* 'Eynsford Gem'. The original Latinised name, which acts as a group description rather like the use of 'grex' (Latin for herd) in orchid hybridisation, is also retained for backcrosses, so if *P.* 'Eynsford Gem' were to be backcrossed with *P. caerulea* or *P. racemosa*, then the full name of the progeny would still be prefaced with *P.* ×*violacea*. But if *P.* 'Eynsford Gem' were to be backcrossed with a different species or some other hybrid then it would no longer be a form of *P.* ×*violacea*.

Not only have names changed, but in the long history of *P.* ×*violacea* confusion has inevitably arisen. A good example here is the cultivar *P. atropurpúrea* (also shown as *P.* ×*atropurpúrea*). A hybrid of this name was originally created in the nursery of Haage and Schmidt in Erfurt, Germany (Uhink 1883); it was *P.* ×*loudonii* (♀) × *P. racemosa* (♂) where *P.* ×*loudonii* (originally called *P. Loudoni*) was a hybrid of *P. kermesina* Link & Otto (originally called *P. Raddiana*) and *P. racemosa* (crossing direction unknown). However, as discussed by Frank and Kugler (2001) and Ulmer and MacDougal (2004), 'modern' *P. atropurpurea* is almost certainly not a hybrid of *P. kermesina* and twice *P. racemosa* but is simply a form of *P.* ×*violacea* and should be listed as *P.* ×*violacea* 'Atropurpurea'. Another curiosity is the cultivar *P.* ×*violacea* 'Sabine' (Table 1) where the German first name 'Sabine' appears to have been confused with the similar looking family name of the original author.

Figure 2: *P.* ×*violacea* 'Victoria.' Photo: L.A. King
Figure 3: An unnamed backcross of *P.* ×*violacea* [*P.* ×*violacea* 'Victoria' (♀) × *P. caerulea* 'Constance Eliott' (♂)]. Photo: L.A. King

OTHER CULTIVARS BASED ON *P.* ×*VIOLACEA*

Table 1 shows those cultivars based on the cross *P. racemosa* (♀) × *P. caerulea* (♂), including backcrosses to *P. caerulea* or *P. racemosa* , which were listed in the *Passiflorunde* checklist (Frank and Kugler 2001) or have been subsequently registered or were listed in supplementary notes (King 2010 and 2011, Mattison 2015). Not all are acceptable names by current standards, and some may simply be errors in the original literature. This list is unlikely to be comprehensive since there are probably others that have not been formally listed or even named. It is likely that many of those shown in Table 1 are now extinct. Vanderplank (1996) reported that four forms of *P.* ×*violacea* were in current cultivation, to which may be added *P.* ×*violacea* 'Atropurpurea'. By far the most common of these now offered by commercial growers in Europe is *P.* ×*violacea* 'Victoria', (Fig. 2), but the origin of that epithet is unknown.

A number of backcrosses have been produced, either to *P. racemosa* (♂) or to *P. caerulea* (♂) some of which are included in Table 1. As happens with many red-flowered species in *Passiflora*, sequential hybridisation with *P. caerulea* leads to rapid loss of colour in the petals and sepals. Fig 3 shows a typical example of such a hybrid where the influence of *P. racemosa* is largely hidden.

The flower and foliage of *P.* ×*violacea* 'Victoria', (Fig. 2) is similar to that shown in the drawing of *P. caeruleo-racemosa* (Fig. 1), and indeed to many other forms such as *P.* ×*violacea* 'Eynsford Gem' (Fig. 4), *P.* ×*violacea* 'Sabine' (Fig. 5) and *P.* ×*violacea* 'Atropurpurea' (Fig. 6). The origin of *P.* ×*violacea* 'Eynsford Gem' is well-documented (Masters 1889), but it is uncertain if any of the other forms of *P.* ×*violacea* grown today are derived directly from Milne's work of 200 years ago. As mentioned by Frank and Kugler (2001), there is a need for an evaluation to be made of those taxa still in cultivation to determine how many are distinct. Although a large number of cultivars based on the cross *P. racemosa* (♀) × *P. caerulea* (♂) have been created in the past 200 years, there do not appear to be any published accounts where the female parent is *P.* 'Buzios' rather than *P. racemosa*. It has been suggested (King 2016) that *P.* 'Buzios' is a natural hybrid of *P. racemosa* and not a form of the species.

Figure 4: *P.* ×*violacea* 'Eynsford Gem'. Photo: L.A. King

Figure 5: *P.* ×*violacea* 'Sabine'. Photo: R.J.R. Vanderplank

Figure 6: *P.* ×*violacea* 'Atropurpurea'. Photo: R.J.R. Vanderplank

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Above, from left to right: *Passiflora biflora*, *Passiflora serratifolia*, *Passiflora rugosissima*

Two Go to Mexico

By John R. Vanderplank

In spring 2015 Jorge Ochoa invited Rob McPhail and me on a plant hunting trip to southern Mexico and the border area near Guatemala. Unfortunately, Rob was unable to take the time off work so it was just the two of us. John MacDougal had very kindly supplied us with locations and maps of some endangered *Passiflora* species along the Guatemalan border and up the south western coast of Mexico.

On 8 July I flew from UK to Mexico via Paris on an Air France flight and arrived in Mexico City at 7pm local time, 40 minutes late. This was compounded by four Boeing 747 planes arriving at the same time and the queue through customs taking an additional one and half hours. My connecting flight was from terminal 2, just a short journey by land-train, but by now my time was getting short. At the customs gate in terminal 2 they hadn't seen an e-ticket before and insisted I go back to terminal 1 to get a proper ticket from the Air France desk. By the time I got there the Air France desk had closed and they had all gone home, so I was there for the night. In the morning, the airport "A" team was back in place and couldn't understand why I had had a problem and put me on the next flight to Tuxtla Gutierrez, but not my bags.

Luckily, Jorge was on the case, aware of the issues I was having, and was able to meet me at the airport. It was still before 9am so we had lost little time. We visited the University of Tuxtla Gutierrez's herbarium and managed to drive some mountain roads looking for passionflowers on our way to San Cristóbal de Las Casas, where we were staying at a guest house for a couple of nights.

Friday, 10 July we returned to Tuxtla Gutierrez and visited Tuxtla Botanical Gardens where we examined many herbarium specimens and took notes on the locations of some of the more interesting *Passiflora* species. We returned to our guest house and amazingly my bags were delivered from Tuxtla Gutierrez airport some 2 hours away.

Above: A Mayan lady with *Passiflora ambigua* fruit

Right: Jorge with *Passiflora ambigua* fruit

The following day we headed north to the Naha and visited La Selve Reserve on the way; although it is a most lovely reserve we only found a few common *Passiflora* like *P. biflora* with flower buds, *P. guatemalensis*, and a *P. sexflora*-like species that could well have been *P. complanata* or *P. rugosissma*, but at last we were in *Passiflora* country. En route to our billet in an ecolodge we stumbled across more *P. biflora* and a *P. serratifolia* with seemingly very large flowers. Close to where we were staying for the next couple of days we found a large ripe fruit some 9.5 x 11cm coming from a vine some 10 metres high, but unfortunately we couldn't see any flowers. A wonderful old Mayan lady said we were welcome to take the fruit and told us it was *P. laurifolia*, known by the local Maya people as Ahch'nak'. The seed in these fruit looked like the seed of *P. ambigua*, but its leaves looked more like *P. laurifolia*; we agreed it was *P. ambigua*.

Passiflora ambigua fruit

Passiflora hahnii

On 12 July we took several walks in the local area and were rewarded with *P. oerstedii*, *P. adenopoda*, *P. rovirosae*, *P. hahnii* and *P. cobanensis* (*P. brevipes*) some buds but still no flowers. We were amazed to see such a variety of *Passiflora* being cultivated in local gardens for fruit and perhaps for ornament: *P. ligularis*, *P. edulis*, *P. ciliata*, *P. vitifolia* and *P. caerulea*.

The next day we headed for Benemérito de las Americas stopping from time to time to reconnoitre some tracks and side roads. Although we found an abundance of *Passiflora* they were all species we had seen earlier in the week. This area close to the Guatemalan border is known as the "Bad-land" where illegal cross-border commerce with goods and people is an everyday event. The fact that perhaps foreigners may not be welcome was of little concern to us; I resembled an impoverished, mad Englishman and Jorge is Mexican by birth and did not look out of place. We walked up a small, winding, unpaved road to a well-designated border. There was no one about, so we just carried on. The forests here were in pristine condition on both sides. It was exciting; it felt as if we should find a new species of passionflower every few yards. We thought that Guatemalan forests must all be in this wonderful condition and would stretch for mile upon mile. In another quarter of a mile we came to a small market, comprised of semi-permanent stalls selling seemingly everything, which was quite busy considering the time of day. We assumed things must be cheaper in Guatemala and that it was worth the walk or motor bike ride to come here. I commented to Jorge, "You think you are in a poverty-stricken area, but

Left, going counter-clockwise: *Passiflora vitifolia*, a market in Guatemala, the Mexico-Guatemala border, Jorge in a pine forest full of *Bromeliaceae*

Passiflora insolita in cultivation

Passiflora ilamo in late afternoon

look, every girl over the age of ten has a mobile phone sticking out of her back pocket." We wandered further into the forest, and then, suddenly, we were in a clearing on top of a ridge. Looking over, as far as the eye could see, were oil-palm plantations; what a disappointment!

The next day we moved to a picturesque area near Montebello Lakes where we stayed for a couple of nights. Jorge suggested we take a walk in a nearby pine forest which had thickets of liquidambar and oak. We had seen specimens of a *Quercus* species at the herbarium with the most amazingly giant acorns; I hoped we might find a few of them in this forest. This pine forest was more like a *Bromeliales* forest; there were so many different species everywhere we looked, high and low, up trees or on the ground, plants of all sizes. Some had grown so heavy that they had caused the branch they were growing on to break and fall to the ground. I only wished I could take the odd thousand back home with me. We walked to the top of a ridge at 1600m altitude and within the hour we had found *P. sexflora* with fruit and what we thought was *P. lancearia* growing along a fence. This taxon looked identical to the plant we had seen with fruit in Costa Rica some years earlier. John MacDougal had mentioned in a letter to Jorge that it was in this area but only sterile specimens had ever been found. Our plant had a fruit, a small black berry about 1cm in diameter, so this was not *P. lancearia* ,which produces the most beautiful medium sized bright mauve fruit as we both vividly remembered. After 3 years in cultivation this taxon flowered and was indeed new to science. The taxonomy of the flowers was most unusual, even for a *Decaloba*, so we called it *P. insolita*, from the Latin *insolitus*, 'unusual.'

Next, we had a long drive through seemingly endless miles of oil-palm plantations. There was no point in stopping more than once; nothing grows inside these plantations apart from grass and there didn't seem to be any fauna either. After nine hours, it was getting late; we arrived near the base of the Volcano Tacaná. We chanced across the most rundown, derelict and filthy hotel you could ever wish to avoid, but it was 10 pm and the likelihood of finding somewhere else at this time of night was remote. It was very cheap; we checked-in and were asked to pay cash. We had dinner in a deserted restaurant, shared a bottle of wine and retired to our rooms. My room had walls and a floor decorated with images of livestock, a small window on the wall opposite the entrance, a bed that looked like it was already inhabited by small creatures, and a small table. Too tired to care, in minutes I was fast asleep. We emerged from our rooms at about the same time early next morning and headed for breakfast. No one was about, no one was in the dining room and strangely chairs were as though customers had just pushed them back and left the room. The tables were still un-cleared from dinner and no one was in the kitchen or the reception area, there were no guests of staff to be found! The hotel was deserted; it was the Marie Celeste of the hotel world. Bemused or spooked, I'm not quite sure, we picked up our bags and departed with haste.

Mount Tacaná is an extinct volcano 4,093m high on the border of Mexico and Guatemala. It boasts at least ten species of *Passiflora* over a wide range of elevations. On our first day we found large plants of *P. hahnii*, *P. ligularis*, *P. quetzal* and *P. rugosissima* in flower. We thought we had found *P. pendens*, which was exciting, but it turned out to be *P. adenopoda*. On our way down Jorge spotted *P. tacanensis* in bud with closed flowers and unripe fruit.

A young oil palm plantation

Passiflora ilamo in early morning

Passiflora tacanensis

The original description of *P. tacanensis* by Porter-Utley lacked any details of the flowers as unfortunately when she was there it was out of season. In 2020 Jorge and I published an article in Curtis's Botanical Magazine filling in the missing details. On the track quite close to where we were staying we found a lovely species with small bright yellow flowers that was historically known as *P. ornithoura v. chiapasensis*. This has now been elevated to species rank and renamed *P. ilamo* by John MacDougal.

The next day, Saturday, was Mexico's General Election day, which to our horror is an alcohol-free day. Jorge had found a guide to take us to the top of the volcano. We had explored several tracts during the previous day and got partway up the mountain, but the paths were not as obvious as they might be. I reconsidered my decision, and decided to let Jorge have the sole glory of getting to the summit; meanwhile, I would catch up on my notes and drawings. Jorge returned triumphant with stems, fruit and flowers of *P. membranacea* which he had collected close to the summit. We then sat in the café we had been frequenting for the last couple of nights and watched the election polling station in the square opposite recording the votes of the local population. We were drinking alcohol in coffee mugs (so as not to attract attention) with the complements of the management who must have valued the tipping culture of the Americans the night before. The cafe had windows on three sides. On one side we could see people lining up out of sight of the polling station and being given a slip or something, and as they came back they each received a cash reward. We assumed the candidate whose posters were everywhere got elected, but was a somewhat poorer man.

Passiflora membranacea fruit

Unfortunately, our short time on this fantastic mountain came to an end and on the Monday we drove 520Km back to Tuxla Gutierrez to catch our flights home. We had met lots of kind and generous local people who were willing to try and help if they could. We had shared more than a few laughs together. We had explored a few pristine habitats and seen more oil palm than we would have liked. We had found 25 *Passiflora* species and one that turned out to be new. In all, we couldn't have hoped for more.

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Photos by John R. Vanderplank

A History of *Passiflorunde* Magazine 1993 - 2013

Axel Frank[1]

Origins and the early years

In the summer of 1993, five Passionflower collectors - the nurses Jens Buddrich from Schleswig and Heidemarie Doyé from Kändler, the textile engineer Bea Lang from Neuss, Marco Müller from Schwann and the art historian Dr Barbara Post[2] from Stuttgart - met in Germany and founded the *Interessengemeinschaft Passionsblumen* (Passionflower Interest Group). Their aim was to collect and pass on information and cultivation instructions on the genus by launching a new magazine. It was above all the lack of German-language literature on *Passiflora* that gave them the idea.

From November 1993 to December 1994 five issues were published in A5 format, the first under the name *Passiflora-Rundbrief* (*Passiflora Circular*), the second under *IG Passionsblumen Rundbrief*. Finally it was the third issue which was called *Passiflorunde*, a pun on *Runde* (a small social circle). Bea Lang justified the name on the grounds that "a not too dry title might fit a layman's magazine rather well." Her assessment that it was an amateur magazine may have been correct at the beginning, but over the next few years the editorial team considerably improved the layout and content quality of the magazine, which thereafter appeared four times a year.

In 1995, two years after its launch, the team could boast 117 subscribers in all, with 99 from Germany, 8 from Austria, 5 from Switzerland, 2 each from Holland and the Czech Republic and 1 from Belgium. Barbara Post was responsible for the editorial work, Bea Lang for the design of the title page and distribution and Udo Zemella assisted as PC expert.

The Kugler era

In 1997, Barbara had to give up work for *Passiflorunde* for professional reasons, and was succeeded from issue 2/1997 by Emil Kugler (1930-2017) from Vienna. He had, said Barbara, already been "the most conscientious reader" and "the most diligent and knowledgeable author" of articles.

Passiflorunde issue 1/1997

She described his background as follows:

> Emil Kugler, born 1930 in Vienna... Retired federal railway official. Has been working with *Passifloraceae* for many years. Main focus: nomenclature and taxonomy, pre-Linnaean literature and old colour plates. Work on bibliography (7200 citations), list of names of taxa (300 names), collections: library (6000), stamps (90), colour slides (2000), seeds (200)... Further hobbies: mountain hiking, mineral hunting, photography, video films.

Emil initially thought he would only be needed as editor until the end of 1997, but in fact he continued in the post for more than 14 years. He wrote:

> At that time I was not quite aware of the many obligations that awaited me, which take up a lot of time. But I am a pensioner and so this is not particularly tragic, thanks also to the support of my wife Josefine. I may now honestly report that I enjoy it!

Emil's whole creative energy went into the production of the magazine. He was constantly trying to persuade people who had come into contact with *Passiflora* in

one way or another to write articles for *Passiflorunde*. However, articles from the circle of people interested in *Passiflora* were often in short supply, so that he himself constantly filled the magazines with his own articles.

The magazine

The magazine cost only €21 per year in Germany and Austria (€25 abroad) - good value for money for four 28-page issues per year, well printed by WLK Druck of Mödling near Vienna. The body was in black and white, with the title page and back cover in colour. From issue 1/2000 onwards, it moved from A5 to A4 format, which made for improved readability and more room for photos on the covers.

In terms of content, the magazine usually consisted of

- a foreword by the editor
- technical reports and articles
- miscellaneous material
- dates of meetings and exhibitions
- seed exchange, first introduced in issue 2/1999 by Martin Wettges, then just 15 years old and still a student, but now a musicologist and conductor

and most notably

- reviews of new technical literature on Passiflora, almost exclusively written by Emil Kugler.

Emil not only wrote most of the articles and almost all the reviews, he also helped his colleagues in their contributions by providing material, corrections and suggestions.

There was no lack of voices criticizing Kugler's strict orientation of the magazine towards scientific criteria as excessive. *Passiflorunde* was in competition with a German-speaking forum on the Internet, the majority of which the magazine ignored. Emil rejected the criticism and called on his critics to write articles based on their own ideas. With the magazine, actually every reader could be happy. The content of the magazine was wide ranging, with exciting travelogues by collectors, descriptions of new hybrids, articles on the history of the discovery of the Passionflower, its taxonomic description, its echo in religion, fine arts, on postcards and stamps, its use as a fruit and remedy and on care and pests. If it had not been scientifically oriented, I for one would never have known, for example, that there are also European species of *Passiflora* which, as fossil remains from past times in the history of the earth, have been described and named by botanists. *Passiflorunde* was a magazine aimed at a mostly academically educated audience; at the same time, however, it was also didactic, because it wanted to make even complicated relationships understandable.

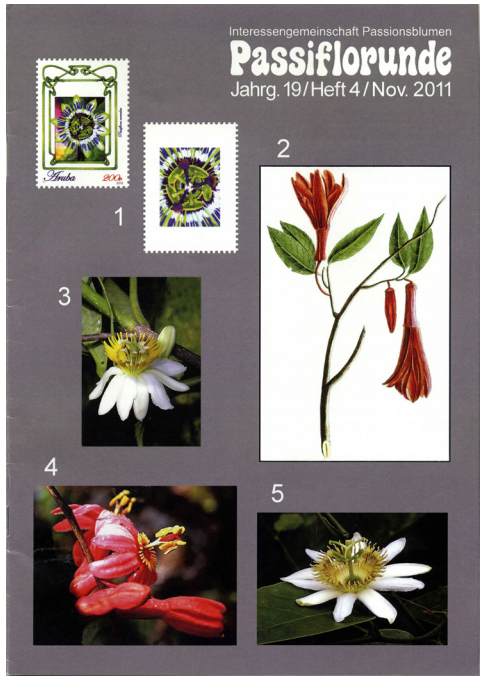
Special issues

In spring 1997 the first special issue of *Passiflorunde* was published: *(Edwards's) Botanical Register - 1815-1846. Passifloren - 36 coloured engravings. Compiled, translated and annotated by Emil Kugler.*

The second *Special issue of Hybrids and Cultivars of Passiflora* (authors Axel Frank and Emil Kugler) was published in March 2001 in German and in June 2001 translated into English by Les King.

Passiflorunde in Libraries and Databases

The magazine was assigned the ISSN (International



Left: *Passiflorunde* issue 4/2007, with *Passiflora* motif adapted from cover of 1909 Illustrated Catholic Bible
Right: *Passiflorunde* issue 4/2011

Passiflorunde issue 2/2001

Standard Serial Number for periodicals) 1605-4350 by the ISSN International Centre in Paris. At Emil's instigation, *Passiflorunde* as a magazine was kept in the Botanical Library of the University of Vienna (shelf mark 441/14) as well as in the Austrian National Library (from the Nov. 1999 issue under the shelf mark 1,571.269-CNeu-Per) and in the library of the Botanical Department of the Natural History Museum in Vienna (shelf mark 1728). It was also included in the Periodicals Database of Libraries of the German-speaking Countries and its data thus became internationally accessible. A first description of a newly discovered *Passiflora* species could therefore have been validly published in *Passiflorunde*.

Staff changes and the later years

From summer 2001 Heinz Opitz from Wuppertal was responsible for the distribution of the magazine in Germany and abroad (in Austria Emil Kugler did this job) and replaced Bea Lang. Thus, none of the former founding members was involved in the publication of *Passiflorunde* anymore. Christl Opitz took over the seed exchange from Martin Wettges in 2007. At this time, the magazine had about 120 subscribers.

In issue 4/November 2011, Emil announced that he would have to stand down as editor because of problems with his health, and that the neurologist Dr. Robert Stepansky from Kierling near Vienna would take over from the next issue. This came out as issue 1/April 2012. Thereafter only two issues instead of four were published each year; and not long after Robert became so busy with his professional work that it was no longer possible to continue the magazine. Issue 2/October 2013 was the final issue of *Passiflorunde*.

The impact of *Passiflorunde*

For more than 20 years *Passiflorunde* brought together lovers of *Passiflora* in the German-speaking countries, but also beyond them, and considerably increased the level of knowledge of all those involved. Sadly, what was a gain for the reader was at the same time a loss for science: since the publication of the magazine took up the whole of Emil Kugler's time, he was unable before his death in 2017 to complete projects of his own, such as the publication of the Bibliography of *Passiflora*.

I have only had space in this article to name the main members of the magazine staff; but there were many others who kept it alive for so long through their contributions; I am sorry that I have not been able to name them all.

INDEXES AND DIGITAL COPIES

Indexes to the magazine (not quite complete) were published in later issues, and are now being supplemented, as follows:

Contents of volumes	Index published in volume
1 (1993) to 13 (2005)	14 issue 3 (August 2006) pp. 9-16
14 (2006)	15 issue 1 (February 2007) p. 27
15 (2007)	16 issue 1 (February 2008) p. 27
16 (2008)	17 issue 1 (February 2009) p. 23
17 (2009)	18 issue 1 (February 2010) p. 12
18 (2010)	19 issue 1 (February 2011) p. 6
19 (2011)	20 issue 1 (February 2012) p. 9
20 (2012) to 21 (2013)	Specially compiled, now on PSI website

1 (1993) to 14 (2006) literature reviews	14 issue 4 (November 2006) pp. 7-14
15 (2007) to 21 (2013) literature reviews	Being compiled for PSI website

These indexes, and a complete run of *Passiflorunde* issues, are available at www.passiflorasociety.org/passiflorunde. You will need to log in first.

The "Succulent Passionflowers"

Matt Candeias
Founder of *In Defense of Plants Blog & Podcast*
www.indefenseofplants.com

Succulent *Passifloraceae*?! It took me a minute to get my head wrapped around the idea. It wasn't until I saw one in flower that I truly understood. The genus *Adenia* is found throughout east and west Africa, Southeast Asia, and hits its peak diversity in Madagascar. It comprises approximately 100 species and, as a whole, is poorly understood. Today I would like to introduce you to this bizarre genus within *Passifloraceae*.

Adenia sp. in the wild in Madagascar[2]

Adenia is, to date, the second largest genus within the Passionflower family and yet delineating species has been something of a nightmare for botanists over the years. At least some of this confusion lies within the diversity of this odd group. It has been said that few angiosperm lineages surpass *Adenia* in the diversity of growth forms they exhibit. Though all could be considered succulent to some degree, *Adenia* runs the gamut from trees to vines, and even tuberous herbs.

Even within individual species, the overall form of these plants can vary widely depending on the conditions under which they have been growing. Their succulent nature and the fact that many species can reach rather large proportions means that herbarium records for this group are scant at best. Many are only known from a single, incomplete collection of a few bits and pieces of

Adenia globosa male flowers at Kapi'olani Community College in Honolulu[1]

Female flower of *Adenia reticulata*[3]

Male flowers of *Adenia digitata*[4]

a plant. Also, juvenile plants often look very different from their adult forms, making timing of the collection crucial for proper analysis.

To complicate matters more, many *Adenia* are dioecious, meaning that individual plants are either male or female. Male and female flowers of individual species look pretty distinct and differ a bit from what we have come to expect out of *Passifloraceae*. Often collections were made on only a single sex. This is further complicated by the fact that these plants have a very short flowering

Flowers of *Adenia firingalavensis*[5]

Fruits of *Adenia hondala*[6]

seasons. Most come into bloom right before the onset of the rainy season and are entirely leafless at that point in time. Because of this, it has been extremely difficult to accurately match flowering collections to vegetative collections. As such, nearly 1/4 of all *Adenia* species are missing descriptions of either male or female flowers and their fruits.

Even genetic work has failed to clear up much of the mysteries that surround these plants. Some studies suggest that *Adenia* is sister to all other genera within *Passifloraceae* whereas others have even suggested it to be nestled neatly within the genus *Passiflora*. The most recent work hints at a placement among the tribe *Passifloreae*. If this confuses you, you are certainly not alone. Until a more complete sampling effort is done on *Adenia*, I think it is safe to say that this genus will be holding onto its taxonomic mysteries for the foreseeable future.

All *Adenia* are perennial plants but how they manage this differs from species to species. Some put all their energy into underground tubers, producing annual stems and leaves that die back each year. Others don't produce any tubers and instead store all their water and nutrients within thick stems. This has made at least a handful of species a hit with succulent growers around the world. It is always an interesting sight to see a giant caudiciform trunk or base with bunches of spindly stems spraying out from the top.

Adenia are also extremely toxic plants. The conditions under which these plants evolved are tough and it appears that this group doesn't want to take any chances on losing any biomass to herbivores. The main class of compounds they produce are called lectins. These proteins cause myriad issues within animal bodies including rapid cell death, blood clotting, inhibition of protein synthesis, and a disruption of ribosome and DNA function. Needless to say, it's in any critters' best interest to avoid nibbling on any species of *Adenia*. Even

Adenia globosa[7]

Top, going clockwise: Leaves and fruit of *Adenia cissampeloides*,[8] *Adenia globosa* at the Cactus Garden at Kapi'olani Community College in Honolulu,[9] *Adenia pechuelii* in the wild in Namibia[10]

handling and pruning of these plants merits caution.

Whether you're a botanist, taxonomist, gardener, or just curious about plant diversity, *Adenia* is a wonderful example of just how many unknowns are still out there. Regardless of their taxonomic status, these are fascinating species, each with a wonderful ecology and intriguing evolutionary history. These plants are hardy survivors and a great example of the lengths a genus can go to when presented with new opportunities. Undoubtedly many more species await description but the plants we currently know of are fascinating to say the least.

In Defense of Plants is an internationally recognized podcast and blog dedicated to celebrating the amazing ecological, evolutionary, and conservation-based stories of the botanical world. The In Defense of Plants Podcast is available on all podcast platforms. Find out more over at www.indefenseofplants.com.

PHOTO CREDITS

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Adenia: A Practical Guide

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INTRODUCTION

Adenia is the second largest genus in the *Passifloraceae* with some 100 described species. It surpasses its sister genus *Passiflora* in diversity of growth habit, ranging from lianas through stem succulents to pronounced caudiciforms; but despite this, it is far less well known. In this article, I try to redress the balance. After sketching the botanic background, I present some of the most common species in cultivation, grouping them by growth habit. For the enthusiast willing to try something new, I then provide some tips for their cultivation.

Additional information is presented in four Appendices, as follows:

I. Glossary
II. Checklist of *Adenia* in Cultivation
III. Sources of Plants
IV. Additional Sources of Information

BOTANIC BACKGROUND

Taxonomy

The *Passifloraceae* are a rapidly growing family of flowering plants. Taking into account the many recent additions, I estimate that it now contains almost 900 species classified in some 27 genera. It is divided into 3 subfamilies (*Malesherbioideae*, *Passifloraideae* and *Turneroideae*). The *Passifloraideae* are in turn divided into two tribes, *Paropsieae* and *Passifloreae*. It is within the latter that, among others, the genera *Adenia* and *Passiflora* are located. With perhaps as many as 650 species, if those awaiting publication are included, *Passiflora* is the largest genus within *Passifloraceae*, followed by *Adenia* with more than 100 species. (Wikipedia 2020, Ulmer & MacDougal 2004, Kuethe 2020).

Most species of *Passifloraceae* are found in the tropics and subtropics, with the majority taking the form of lianas with tendrils; it is only within the *Adenia* that succulence has developed (Eggli 2008).

History

The first *Adenia* to be described was *A. hondala*, by the Dutch colonial governor and botanist Hendrik van Rheede tot Drakenstein (abbreviated by botanists to Rheede) in 1688 in his *Hortus malabaricus* under the common names "modecca", "palmodecca", "motta-modecca" and "orela-modecca," all of which turned out to be *A. hondala*. (van Rheede 1688, Kugler 2001). The first valid description of this species was in 1791 by Joseph Gaertner (1791), under the name *Granadilla hondala*; it was only many years later that W.J.J.O. de Wilde (1967) placed this species in *Adenia*.

We owe the name of the genus to the Finnish botanist and explorer Pehr Forsskål who described *A. venenata* (Figure 1) for the first time in his posthumous *Flora ægyptiaco-arabica* (Forsskål 1775), basing the name of the genus on what he understood to be the Arabic name for the type species, *A. venenata* (عدن or 'aden), which he found in Yemen. (Kugler 2001)

Figure 1: *A. venenata*:
a) climbing shoots (Photo: Markus Varga)
b) rare branched specimen in cultivation (Photo: Markus Varga)
c) old specimen in habitat (Photo: R. Martin)

Distribution

Adenia is mainly found in tropical and southern Africa (about 65 species), Madagascar (about 20 species), south India, Sri Lanka, elsewhere in south-east Asia and northern Australia (together about 15 species). New species continue to be discovered and described (Hearn 2007, Ngumbau et al. 2017) or have yet to be named. Some of them already circulate in cultivation (as *spec. nov.*). No species is found in America. (Kugler 2001)

Morphology

The growth habit is very diverse and will be discussed in the next section. *Adenia* leaves have margins which are entire, without serration; they may be lobed or unlobed, and can vary widely even on the same plant: for example, *A. metamorpha* can exhibit different leaf shapes and patterns on a single specimen, as indeed its name suggests. Another example is *A. kirkii* - see Figure 11b. Petiole glands are usually present at the top of the petiole. About half of the species have developed succulence (Eggli 2002, 2008). Tendrils may be present or absent. Three species have developed spines homologous to tendrils (Kugler 2001).

The inflorescence is very diverse within the genus, and can be axillary, single- or multi-flowered or on tendrils. The flowers are mostly unisexual, but sometimes hermaphrodite. The plants are mostly dioecious, occasionally monoecious. Some species are polygamous, i.e. male, female, and hermaphrodite flowers are developed on the same plant. The typical dioecy makes *Adenia* almost unique within the *Passifloraceae*, since the other members of the family are almost entirely monoecious (*Passiflora* tetrandra is one exception).

The flowers are small, up to 3 cm, bell-shaped or tubular, mostly greenish or yellowish and have usually five sepals and five petals like passionflowers. Examples of flowers in cultivation are given in Figure 2. (Eggli 2002, de Wilde 1971).

Figure 2: Flowers of *Adenia*: a) female *A. eccirhosa*, b) female *A. kirkii* and c) male *A. glauca* (Photos: Markus Varga)

The fruits (as in Figure 3 and Figure 4a) are similar to the fruits of *Passiflora*, being fusiform (spindle-shaped) or globose (spherical), capsules or berries. The colour varies from greenish to yellowish, orange or red. The pulp and seeds are also very similar to *Passiflora*, as can be seen in the example in Figure 4b,c.

Toxicity

Adenia are notorious for their toxic contents. Most species are toxic throughout; just a few have edible fruits.

Figure 3: Fruits of *Adenia*: a) *A. glauca* unripe fruits on vine and b) ripe fruits (2 photos: S. Hariom), c) *A. ecirrhosa* (Photo: A. Reshetnyak)

Figure 4: *A. keramanthus* a) fruits, b) opened fruit, c) cleaned seeds (Photos: J. Jimenez)

Many *Adenia* species have cyanogenic glycosides, which are toxic to humans and most animals (Swart 1989). Tetraphyllin B, found in some *Adenia*, is also known from other *Passifloraceae* such as *Barteria fistulosa* and *Passiflora tetrandra*. *A. stenodactyla* contains the very potent toxin stenodactylin. Another class of toxins, toxalbumins, were found in *A. digitata*, namely modeccin, one of the strongest known phytotoxins. It hinders protein synthesis and is used in cancer therapy. (Kugler 2001)

THE DIFFERENT TYPES AND FORMS OF *ADENIA*

Taxonomic approaches to classification

De Wilde's 1971 monograph (de Wilde 1971) is the standard work on *Adenia*. He divided the genus into six sections (*Microblepharis*, *Adenia*, *Blepharanthes*, *Erythrocarpus*, Paschanthus and *Ophiocauluon*), based on the position of the petiole glands and the morphology of the flowers (Eggli 2002).

David J. Hearn (2006) presents a classification of *Adenia* based on the different growth habits of the species and uses this to arrive at a phylogeny for the genus as a whole. He shows that De Wilde's classification is not consistent with this phylogeny and provides 5 alternative sections. He finds that succulent stems evolved about 4 times and caudices as many as 8 times, so growth habits can be similar, even though they developed at different times. An overview of the species he examined and their growth habits is provided in Figure 5.

A Simplified Approach

Nick Gash (2018b) adopts a simpler approach based on the habit of the plants as they appear to the naked eye. For the enthusiast this is easier to grasp than the taxonomic maze, so I also have adopted it, with some further simplification, resulting in the following 7 types:

1. Round caudex with perennial stems
2. Tuber with short trailing stem
3. Tuber with climbing stem
4. Pachycaul climber
5. Stem succulent with or without tendrils
6. Sprawling shrub from thickened root
7. Vines and lianas

1) Round caudex with perennial stems

This includes the quite common *A. globosa*, with a fat, warty caudex (Figure 6a) which can become enormous. Plants imported from Africa can occasionally be purchased. Depending on the size of the caudex, and therefore their age, large plants can become very expensive. The perennial stems of *A. globosa* can easily be rooted but need a very long time to develop a caudex. Daniel Rhoads reports an *A. globosa* cutting which has developed a nice caudex - after 31 years! (Rhoads 2017). In habitat the caudex is completely covered with impenetrable stinging perennial branches (Figure 6b).

Other plants with this growth habit are *A. pseudoglobosa*,

Figure 6: *A. globosa*: a) specimen in cultivation after branch back cut and b) in habitat (Photos: R. Martin)

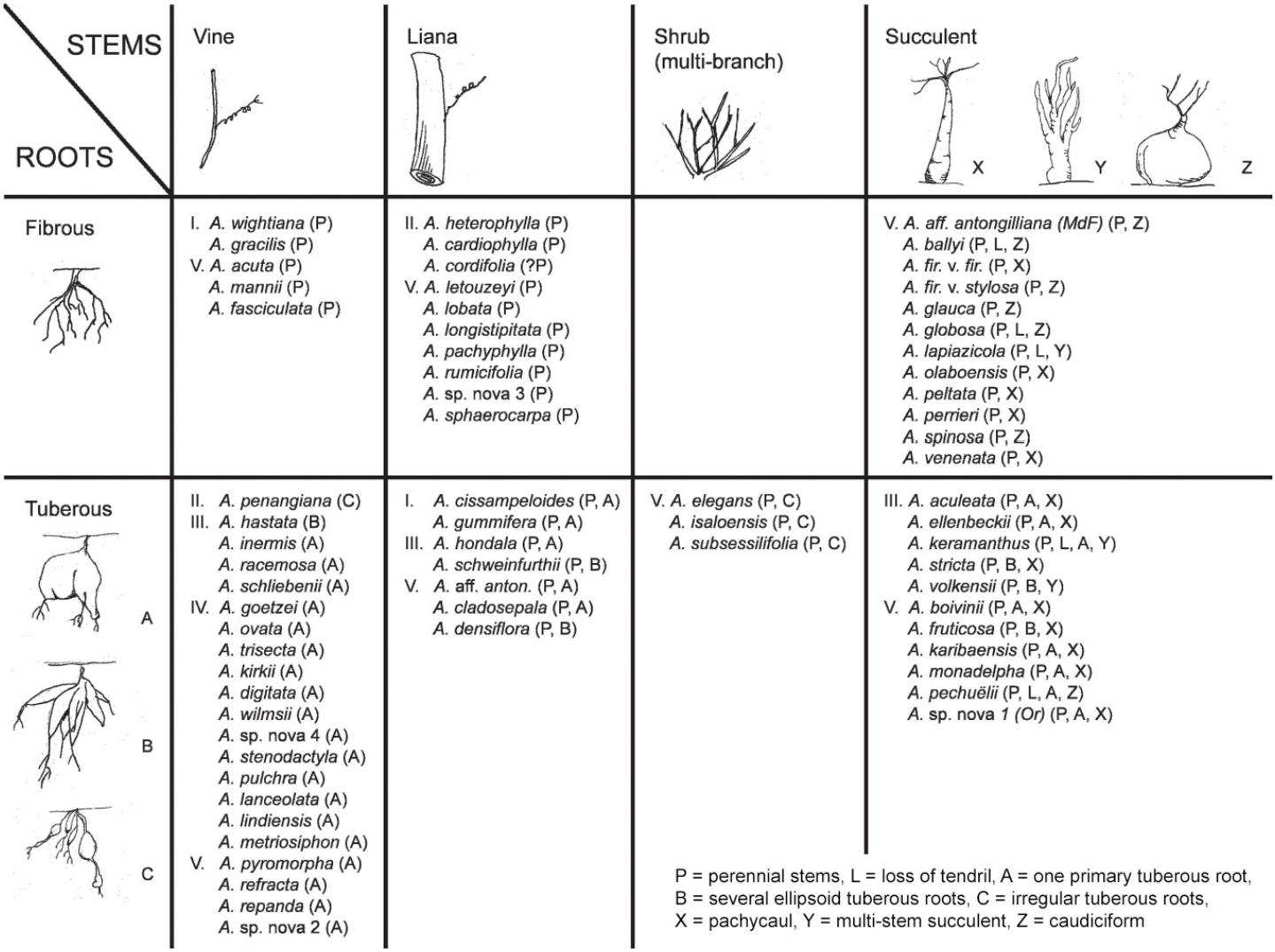


Figure 5: A variety of *Adenia* species classified by their form of growth [Hearn 2006].

A. spinosa and *A. pechuelii* which are also sometimes imported. An incredible photo of a still surviving *A. pseudoglobosa* eaten by animals was taken by R. Martin in Figure 7.

A. spinosa forms a nice caudex and is one of the few species that develop spines. When the stems are trimmed after the season, it can become a very attractive plant (Figure 8). Unfortunately, it seems prone to spider mites in cultivation.

A. pechuelii (Figure 9) is an iconic plant of Namibia

Figure 7: *A. pseudoglobosa* with caudex eaten by animals in Kenya (Photo: R. Martin)

Figure 8: *A. spinosa* in cultivation (Photo: H. Yabe)

and can live to a great age. Due to its slow growth, even small seedlings are very expensive, and cuttings can be difficult to root. Some years ago a very large specimen was auctioned for €5,200 (Gash 2018b).

2) Tuber with short trailing stem

These plants stay much smaller and can easily be kept on a sunny windowsill. The stems remain small (for me, less than 20 cm), are annual, and die back during dormancy. An example is given in Figure 10, just emerging from dormancy. If the plants are old enough, flowers can be expected. *A. goetzei* is a member of this group, diverging from the dioecious norm of the genus, forming plants which are occasionally monoecious and self-fertile.

3) Tuber with climbing stem

These are my favourites, as they have both a nice, compact caudex and vigorous climbing growth like passionflowers during season. *A. kirkii* is perhaps the most widely available of this group, with a wide, flat caudex and short stems (Figure 11). It has very variable leaves, which are mostly variegated (Figure 11b).

A. lanceolata and *A. stenodactyla* which can occasionally be found also belong to this group, as well as some species not yet described, such as the one presented in Figure 12.

4) Pachycaul climbers

These have a thick trunk, looking like a lengthened caudex, and an attractive climbing habit similar to passionflowers (Figure 1a). I place *A. glauca*, the *Adenia* most commonly encountered in collections, in this group. It has a very appealing growth habit (Figure 13), at least for passionflower-lovers, with seasonal climbing shoots with nice, mostly 5-lobed, silvery-grey leaves and tendrils. Unfortunately - as with all *Adenia* - the flowers cannot compete with "real" passionflowers (Figure 2c).

A. fruticosa, *A. venenata* and *A. firingalavensis* are sometimes available, and occasionally the beautiful red-leaved *A. stylosa*. In cultivation, *A. venenata* has mostly slim, pachycaul stems (Figure 1a,b), but they become thick when very old (Figure 1c).

Figure 9: *A. pechuelii* in Namibia (Photo: J. Beyenbach).

Figure 10: *A. spec.* "narrow leaf" from Malawi (Photo: Markus Varga)

Figure 11: *A. kirkii:* a) caudex b) variable leaves of the same plant (flower in Figure 2b) (Photos: Markus Varga)

Figure 12: *Adenia spec. nov.* from west of Mbinga, Tanzania: a) caudex with annual climbing shoots, b) growth tip (Photos: Markus Varga)

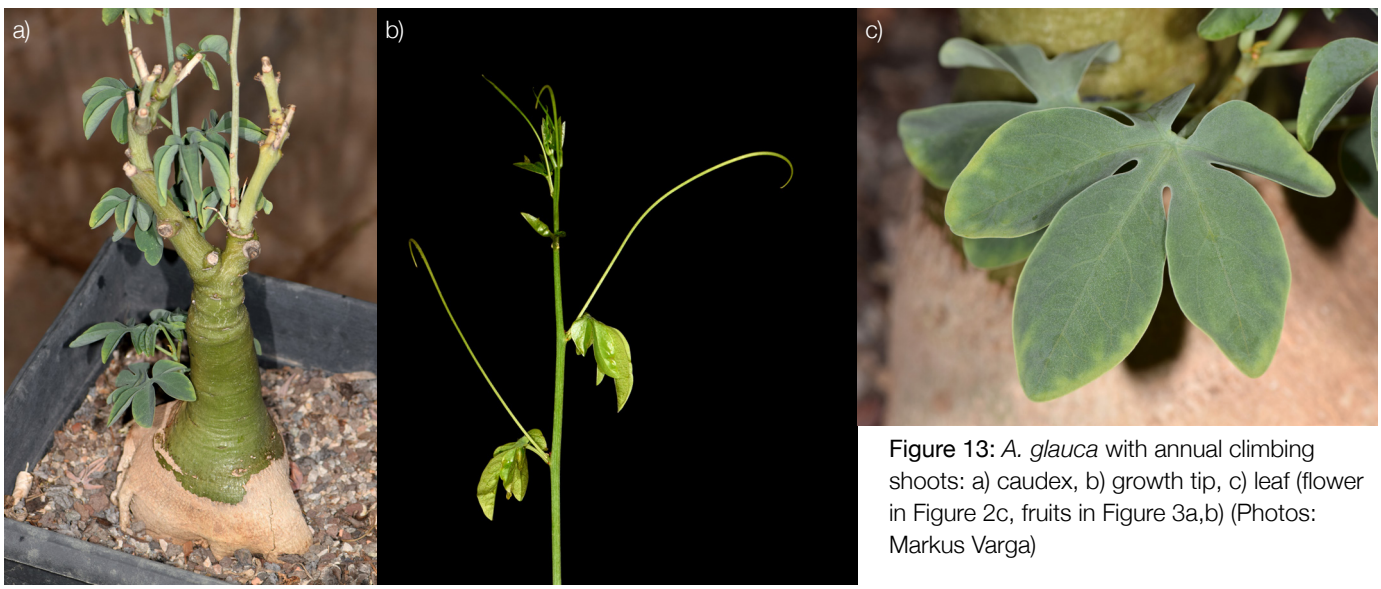


Figure 13: *A. glauca* with annual climbing shoots: a) caudex, b) growth tip, c) leaf (flower in Figure 2c, fruits in Figure 3a,b) (Photos: Markus Varga)

5) Stem succulent with or without tendrils

Although most *Adenia* are climbers to some degree, there are also some nice stem succulents. *A. keramanthus* (Figure 14a, fruits and seeds Figure 4) is the most readily available in this group, with both male and female plants sold regularly. The smell of the flowers is described by some as "pepperoni pizza" and by others as unbearably sickly (Gash 2018b), so you will need to try it for yourself! It is unusual in another way, too, as its stem and leaves are not glabrous like those of most species of *Adenia*, but pubescent. *A. ellenbeckii* (Figure 14b) and *A. volkensii* are two similar species in this group which are occasionally offered. High on experts' wish lists is *A. lapiazicola* (Figure 14c), growing in limestone cliffs in Madagascar, but not yet widely distributed in collections.

Figure 14: a) *A. keramanthus* in habitat (Photo: R. Martin, fruits and seeds in Figure 4), b) *A. ellenbeckii* in cultivation (Photo: Markus Varga), c) *A. lapiazicola* in limestone cliff in habitat (Photo: Madagascar Plants)

6) Sprawling shrub from thickened root

These plants are more shrub-like and neither climb nor form pronounced caudices; instead they send out ground-trailing shoots from tuberous roots. Sometimes one comes across seeds of *A. isaloensis* (Figure 15a) and *A. subsessilifolia* (Figure 15b) from Madagascar, which may germinate when fresh.

7) Vines and lianas

These very much resemble our beloved passionflowers in growth habit. They do not possess pronounced water storage organs (though lianas may have a thickened stem) and are found in the tropics. Almost none of them are in cultivation. One exception which is occasionally available is the only Asian *Adenia*, *A. heterophylla* (plants sold as *A. viridiflora* are usually also *A. heterophylla*) with a wide distribution in tropical south-east Asia and Oceania, as far as northern Australia (Kugler 2007). When young they have a thickened base, which grows out to produce lianas. One other member of this group that I know to be in cultivation is *A. lobata* (Figure 16), which is occasionally grown in the tropical greenhouses of botanical gardens. Its origin is tropical western Africa (Fern 2020).

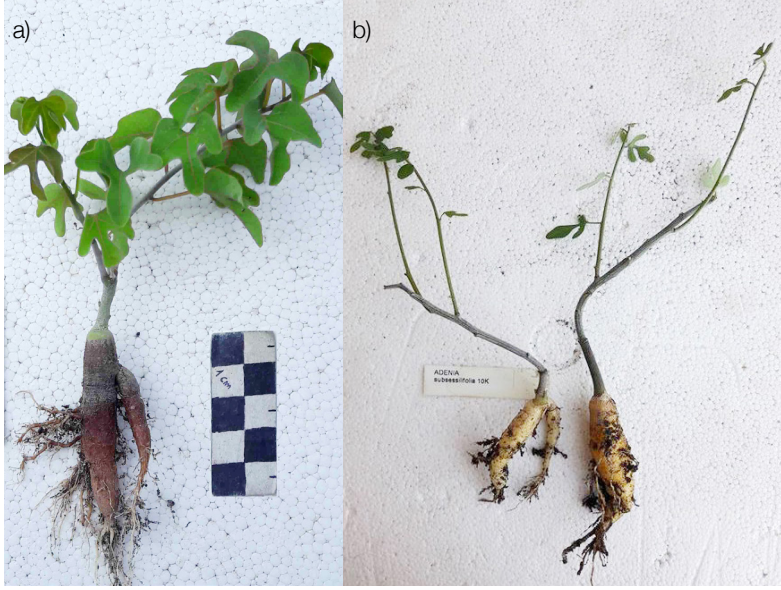


Figure 15: Bare-rooted a) two-year old seedling of *A. isaloensis* and b) one-year old *A. subsessilifolia* seedling in cultivation (Photos: G. Simone)

CULTIVATION

Cultivation of succulent *Adenia* is quite easy compared to that of some sensitive passionflowers. I care for them in a similar way to cacti, with a well-drained soil, a lot of heat, and a dormancy season.

Toxicity

Sensitive persons should take care: as mentioned above, all parts of most *Adenia* are poisonous and can lead to erythema when the plants are handled.

Substrate

Given the wide variation in the habitats in which *Adenia* grow in the wild, no single soil mixture will suit all species. Nevertheless, they are generally quite tolerant, which is just as well, as usually little information is available about their natural habitat. I mix sharp sand (2mm grains), coarser grit (5mm), lava granulate (5mm), and organic soil in equal quantities. If you take care not to overwater them, additional soil is recommended. Succulent growers tend to make "Bonsais" out of their plants, by planting them in tiny pots (e.g. Figure 8), thereby hindering their normally strong growth; passionflower-growers who try their hand at these plants, I would hope, are less likely to do so.

Watering

With this soil mixture I water the plants once or twice a week in the growing season if the weather is hot. Caudiciforms are sensitive to wet soil, so ensure that it dries out before watering again. Most of the succulent *Adenia* have well-defined growing seasons, but others are more variable (Gash 2018a). If they are dormant and have no leaves showing, watering can be fatal and should be avoided at all costs. They leaf out when temperatures and humidity increase, and it is then that watering can start. During winter, dormancy is usual, although some plants do not lose their leaves and try to grow all year round. For these, some watering, maybe once a month during winter, is possible. Sometimes they skip a season but come back a year later. They should be fed with a nitrogen-rich fertiliser about once a month during the growing season, so more often than for most succulents. Alternatively, you can use a slow release fertiliser such as Osmocote, which takes care of the plant as you water it.

Temperature and light

Expose the plants to as much sunlight as possible, but keep the caudex in the shade to avoid sunburn. Unlike cacti, at least those from north America, *Adenia* need much more heat during dormancy. When I started growing *Adenia*, I overwintered them between my cacti at 5-10°C, a temperature which many did not survive. In most parts of Africa the temperatures do not fall as low as this, so I would recommend giving them at least 15°C in winter. Some species from southern Africa may survive lower temperatures, if you want to experiment (Gash 2018a).

Propagation

Propagation can be done both vegetatively and from seeds. Cuttings from plants with fleshy stems are mostly easy, but they usually do not work when taken from thin seasonal climbing shoots such as those shown in Figure

Figure 16: *A. lobata* in the Princess of Wales conservatory in Kew Gardens, UK, 2018 (Photo: Markus Varga)

12b. Cuttings of succulent shoots should be allowed to heal, taking care that the cut dries out completely, several days before being planted out and treated as adults; no plastic bag is required to retain moisture. Like most succulents, they usually root easily. The drawback of vegetative propagation of caudiciforms is that they often do not form a nice caudex again, or it might take years. For harder to root species, successful grafting has been reported (*A. pechuelii* on *A. glauca*) (Kaminer 2017).

Seeds are difficult to produce from cultivated plants, as for most species you need a male and a female flowering at the same time to produce fruits. Propagation from bought seed is unfortunately as difficult as for passionflowers: seeds are difficult to find and only a few species are available. Prices of €3 or more a seed are common. The seeds must be fresh and harvested from ripe fruits, which mostly cannot be assured as sources are somewhere inaccessible, so germination is a lottery. If you want to try, it should work in a similar way as for passionflowers: I soak the seeds for 24 hours in water and then plant them in moist soil at a temperature of 25°C. Temperature peaks, like those that occur in the greenhouse when the sun shines, are thought to benefit germination.

Gash (2018a) says that you can also sprout the seed in a sealed microwave container placed in the propagator, with the seed between two sheets of moist kitchen towel, carefully potting the seeds up as soon as the radicle emerges. This works well, he says, if you are very careful not to damage the young root and have a steady hand. The kitchen towel will need replacing once a week or so. Instead of the kitchen towel, I have also had good results from placing the seeds on wet sponges (no need to exchange them). Either way, keep the seeds dark as, like *Passiflora*, *Adenia* species are dark germinators.

Tropical species

About the cultivation of tropical species not much is known, as almost none are in cultivation. An exception is *A. lobata* which, as already mentioned, is occasionally grown in botanical gardens (Figure 16). Given their origins in tropical rainforests, one would expect that they could be grown in a similar way to tropical passionflowers, providing plenty of warmth all year round.

ACKNOWLEDGEMENTS

I thank PSI for giving me the opportunity to present these rare plants to the community of passionflower lovers. In addition, I thank Arjen Lommen for encouragement, Adam Patrick and Robert Rice for review and comments, and Martin Wettges for help in sorting through the references in the Passiflorunde archive regarding *Adenia*. Finally, I must express my gratitude to Rainer Martin, Juan Jimenez, Gabriele Simone, David Hearn, Hiroshi Yabe, Singh Hariom, Alexey Reshetnyak, Joachim Beyenbach, and Madagascar Plants for sharing their images and granting permission for them to be used here.

APPENDIX I: GLOSSARY

Selected definitions from Beentje 2010 and others:

TERMS RELATING TO REPRODUCTIVE ORGANS OF PLANTS

bisexual, hermaphrodite	having flowers each of which has BOTH male AND female structures; of such flowers
unisexual	having flowers each of which has EITHER male OR female structures; of such flowers
dioecious	having unisexual flowers with the male and female flowers on DIFFERENT plants
monoecious	having unisexual flowers with the male and female flowers on the SAME plant (also applied to plants with bisexual flowers, so having male and female structures on the SAME plant)
polygamous	having bisexual flowers as well as unisexual male and/or female flowers on the same plant

OTHER TERMS

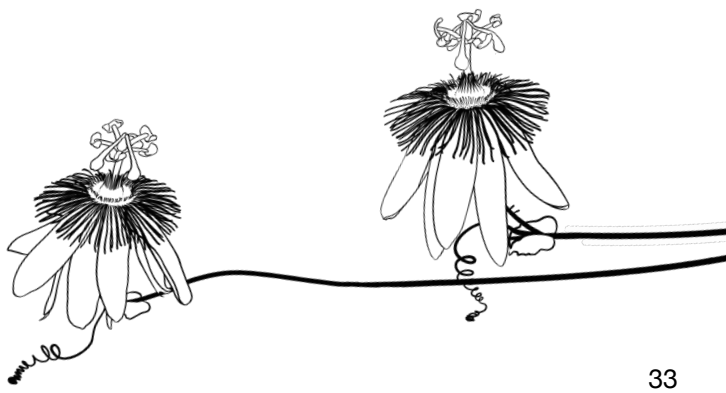
caudex	an enlarged storage organ at soil level, composed of the swollen stem or root, or both
caudiciform	formed like a caudex, enlarged or swollen
glabrous	smooth and without hairs, scales or other trichomes
gland	a secretory area or mass on the surface, either embedded or ending a hair
inflorescence	the part of the plant that bears the flowers, including all its bracts, branches and flowers, but excluding unmodified leaves
liana	woody climber, supported by other vegetation
pachycaul	thick-stemmed and sparsely branched (e.g. *Cycas* or *Encephalartos*), often used of bottle-shaped trunks
phylogeny	classification based on evolutionary relationships, as deduced, for example, from morphological, chemical and DNA characters
phytotoxin	toxic chemicals produced by plants themselves
spine	a sharp-pointed, hardened structure derived from a leaf, stipule, root or branch, but always originating from the vascular or woody part
sprawling	(of habit) spreading loosely, not erect, at ± right angles to the axis
succulent	a plant with thick, fleshy and swollen stems and/or leaves, adapted to dry environments (e.g. *Aloe*, *Cactaceae* or *Stapelia*)
tuber	a swollen root or branch of a root acting as a reserve store of nourishment or water (root-tuber)
type species	(in plant taxonomy) species on which a genus is based
vine	climbing herbaceous or woody plant with small stem diameter

APPENDIX II: CHECKLIST OF *ADENIA* SPECIES IN CULTIVATION

Of the 100 or so species that have been described, about 40 are in cultivation. Additionally, new species are discovered regularly, which often come directly into cultivation. Martin Wettges made a list of succulent *Adenia* in European botanical gardens and available at distributors in 2000 (Wettges 2001). Based on this and on internet searches, mostly postings on Facebook, I provide an updated list of *Adenia* species in cultivation:

Adenia species	Botanical gardens	Online shops	Private collections
aculeata	✓		✓
aculeata ssp. manganiana			✓
ballyi	✓	✓	✓
cladosepala	✓	✓	✓
densiflora			✓
digitata	✓		
spec. aff. digitata	✓	✓	✓
ecirrhosa	✓		✓
elegans	✓	✓	✓
ellenbeckii	✓	✓	✓
epigea	✓	✓	✓
epigea, red leaves		✓	✓
epigea var. stylosa			✓
firingalavensis	✓	✓	✓
fruticosa	✓	✓	✓
glauca	✓	✓	✓
globosa	✓	✓	✓
goetzei	✓	✓	✓
gummifera	✓		✓
hastata	✓		
heterophylla	✓	✓	✓
isaloenisis		✓	✓
karibaensis	✓		✓
keramanthus	✓	✓	✓
kirkii		✓	✓
lanceolata		✓	✓
lanceolata ssp. scheffleri		✓	✓
lapiazicola			✓
lobata	✓	✓	✓
lindenii		✓	✓
macrophylla			✓

Adenia species	Botanical gardens	Online shops	Private collections
metamorpha			✓
monodelpha			✓
olaboensis	✓	✓	✓
ovata		✓	✓
pechuelii	✓	✓	✓
penengiana			✓
perrieri	✓	✓	✓
perrieri, variegated			✓
spec. aff. perrieri		✓	✓
pseudoglobosa		✓	✓
racemosa		✓	✓
repanda	✓		✓
saxicola			✓
spec. nov. Crystal Epidermis			✓
spec. nov. Ghazi			✓
spec. nov. Kenya		✓	✓
spec. nov. Mbinga			✓
spec. nov. Malawi			✓
spinosa	✓	✓	✓
stenodactyla	✓	✓	✓
stricta	✓		
subsessilifolia	✓		✓
venenata	✓	✓	✓
volkensii	✓	✓	✓



APPENDIX III: SOURCES OF PLANTS

Plants: *Adenia* are less well understood, even among succulent enthusiasts, and are often confused with the more common species of *Adenium* or desert-rose. Nevertheless, the best chance to get hold of an *Adenia* plant is in specialised succulent nurseries. They usually have *A. glauca* in their stock. All plants are imports of a few specimens from their origin, so mostly they are available just for a limited time after the import. This also makes the plants quite expensive and may give rise to conservation concerns. Depending on the size (and therefore the age) of the plant, prices of fifty to several hundred euros are not unusual. Rare species are often offered by auction and sell for ridiculous amounts to succulent lovers. For a wide choice, I can recommend the following nurseries:

Plants for European customers:

- www.blumen-passiflora.de by Martin Drews, Germany: recently added the tropical vine *A. lobata* to his inventory of passionflowers, no succulent *Adenia*.
- www.kakteen.cz by Pavel Heřtus, Czech Republic: usually imports from Africa once a year.
- www.kakteen-haage.de by Ulrich Haage, Germany: usually large selection in stock.
- www.mbuyu.de by Rainer Martin, Germany: specialises in Kenyan plants, usually a few different *Adenia* species in different sizes in stock.
- www.plantemania.fr by Christophe Alain, France: usually some *Adenia* in stock, rare species offered by auction.
- www.uhlig-kakteen.de by Matthias Uhlig, Germany: usually some *Adenia* in stock.
- www.williamscactus.co.uk by Craig Barber, UK: usually some *Adenia* in stock.

Plants for US customers:

- www.raresucculents.com in California has several species listed.
- www.out-of-africa-plants.com in Florida occasionally provide *Adenia*.
- Otherwise you will have to rely on imports from abroad or on eBay.

Seeds: As stated above, seeds are difficult to germinate and seldom offered. Usually very few are available and these sell out quickly. The seed lists are usually updated in December or January, and it is then that you have the best chance. You may find some on offer here:

- www.kaktus-koehres.de (Germany)
- www.mesagarden.com (New Mexico, USA)
- www.plantemania.fr (France)
- www.rarepalmseeds.com (Germany)

APPENDIX IV: ADDITIONAL SOURCES OF INFORMATION

Pictures and more information

In addition to the references cited below, I can recommend this web page:

- www.bihrmann.com/caudiciforms/: the largest collection of *Adenia* photos I know of. Some information on species description and care is given, if known.

Facebook groups

Many pictures can be found in these groups, sometimes gorgeous and unknown specimens:

- Planet *Adenia*: www.facebook.com/groups/143237922398176, a small specialised group, at present the only one solely dedicated to *Adenia*.
- Planet Caudiciform: https://www.facebook.com/groups/planetcaudiciform, a large group for all caudiciforms, I recommend the search-function to locate the *Adenia*.
- Planet Caudex: https://www.facebook.com/groups/planetcaudex, slightly smaller than the group above.

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Top-left: *P. cinnabarina* growing at the National Collection
Top-right: *P. maliformis* growing at the National Collection
Bottom: *P. subpeltata* growing at the National Collection

Passiflora Seed & Pollen Part 2

R. J. R. Vanderplank

Following the successful germination of my *P. cuprea* L. and *P. morifolia* Mast. seed last year the next step was to see if I could raise the seedlings into flowering plants. *P. morifolia* grew rapidly during the spring and started flowering in midsummer producing masses of deep purple fruit by autumn. *P. cuprea* grew rapidly and then more rapidly becoming a large and invasive vine but didn't produce any flowers which was somewhat of a surprise. The plant is still growing well so perhaps next year it will grace me with flowers.

I sowed seed of a few other species this year including *P. subpeltata* Ortega. and *P. maliformis* L. both stored at 15-20°C for over 15 years. Before sowing I dissected a few seed; the embryos were still firm and filling the seed-case cavity. There seemed to be no physical reason why the seed should not germinate, but after several attempts no seed showed any signs of germination and after 20 weeks when dissected the embryo had rotted away. I still have 20 year old seed stored at between 4°C and -18°C of several other species which I will attempt to germinate next year. It is possible that old seed may need imbibing very, very slowly, perhaps just in humid air to start with.

To my surprise in early spring a seedling appeared in a large 50 litre flower-pot in a greenhouse 10 metres away from my passionflower house. The leaves were most distinctive and my first impression that it was *P. cinnabarina* Lindl. was correct. But I haven't grown *P. cinnabarina* for 7 to 10 years; the pot with the seedling had been used for growing garden vegetables for three years and been emptied and refilled several times, so how this plant came to be growing here was a mystery. *P. cinnabarina* seed are notoriously difficult to germinate; like *P. subpeltata* they have seed-coat imposed dormancy. With *P. cinnabarina* this can be overcome by washing for up to 90 days or, as proposed by the late Don Ellison the use of "liquid smoke". This is processed smoke from Australian bush fires. It is well established that the seed of many plants endemic to South Africa and Australia will only germinate after a forest fire. It was believed for many years that it was the heat that broke the seed dormancy but research has showed that the chemicals in the smoke are the major contributing factor.

My plant grew wonderfully and flowered through the summer producing lots of fruit and seed. I have donated seed to the PSI Seed Bank for sale. I think seed of *P. cinnabarina* could take years to germinate, mine must have done and did not need specialist conditions, just a pot of well drained compost in an unheated greenhouse. Or, try liquid smoke which I think can still be purchased online, otherwise washing the seed to try to remove the chemical inhibitor. It is well worth the effort.

Remembering François Thuys

Christian Houël[1]

François Thuys preparing Caipirinhas at Mauro Peixoto's home

All who knew him will have been shocked and saddened to hear of the sudden death on 17th August 2019 of François Thuys, from a wasp sting. To members of PSI, he will be remembered as a loyal attender of its meetings, who always had some expert information to share and plants or seeds to exchange.[2]

For me, he was one of my best friends and, in my passion for *Passiflora*, an essential part of my life. We decided to have a joint collection: he concerned himself with obtaining seeds and, for exchanges, had contact with collectors unknown to me. We would see each other 2-3 times a year: in all we met twice in French Guiana, and eleven times in Brazil.

Family life

What can I tell you about François? He married Nicole very young and they soon had two boys, so that he had three grandchildren while he was still quite young.

He worked in the building industry and then public works. He got to know employees of a variety of nationalities, and in the process learned several languages. Later on, he became a maintenance worker for a school. He knew how to do everything: he built his own house and helped his sons to build theirs.

He was keen on sport, especially cycling, and climbed a number of Alpine passes, including Mont Ventoux twice with his sons, who prior to the onslaught of Covid-19 had planned to return there in the summer of 2020 in memory of their father.

His personality was reserved and respectful. He was devoted to his *Passiflora* and *Aristolochia*, and had a magnificent garden to look after. He created an incredible number of hybrids, which I'll leave to someone better qualified than me to detail.

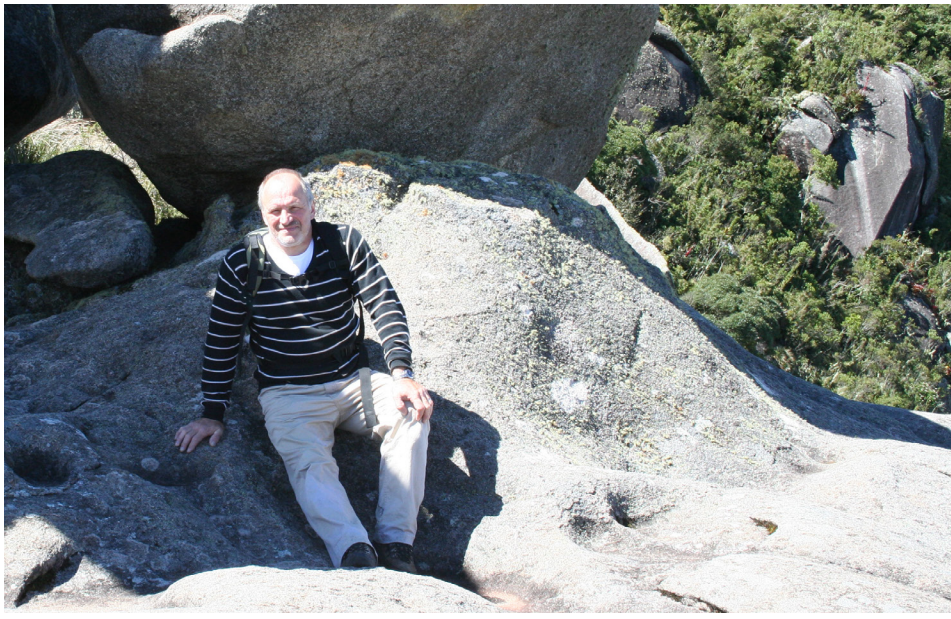
Our trips to Brazil

During our eleven trips to Brazil, we saw many species and varieties of *Passiflora*. We enjoyed visiting Mauro Peixoto's property as well as the Harri Lorenzi's Plantarum Botanical Garden in Nova Odessa; but most of our time was spent searching for plants in the wild.

We were not always successful: *P. filamentosa*, *P. clathrata*, *P. hypoglauca* and others eluded us, and some were on private property - *P. cacao*, *P. rupestris* and *P. boticarioana*, for example. But here are some we did find together:

From left to right:
P. mucugeana, *P. ischnoclada*, *P. mansoi*, *P. speciosa*, *P. porophylla (organensis)*

Top, from left to right:
P. lutzelburgii, *P. glaucecens*, *P. trintae*



François Thuys at Pico das Prateleiras, Brazil

- *P. itatiaiensis* with Mauro Peixoto on the Itatiaia massif.
- *P.* sp. (Utinga) at Utinga by the side of the road. Quite similar to *P. silvestris* (= *P. galbana*) but with distinctive bracts.
- *P. mucugeana* was a challenge: we looked for it for three years, following countless difficult tracks, before we were able to find it.
- *P. speciosa* we found in great numbers - after looking hard - but for several years were unable to find either flowers or fruit. We finally found a fruit in 2017 and flowers in 2018, but we never did find a plant with large flowers at Saint Teresa and Domingos Martins, even at Senhor Kautsky's: he could only show us photographs.
- *P. imbeana*: The path up Pico do Frade was blocked by a landowner, but after looking for three years we found a route across difficult terrain which enabled us to see it.This was the only spot where we found it.
- *P. luetzelburghii* we found first at Araci before finding a great number at Ourolândia.
- *P. trintae* we also found on the roadside in Vitória da Conquista but it was in greater abundance at Cândido Sales. However, it disappeared following construction works, though we found it again at Salinas.

François Thuys (left) and friends searching for passionflowers in French Guyana in 2003

All of these will be found in *Les Passiflores de la Mata Atlântica au Brésil*, the book I published in 2019, for which, as I said in the introduction, François deserves as much credit as I do.

Thank you, François, for your friendship.

1 Translated by Robert Rice

2 Some of the seeds he left have been kindly passed by his family to Christian for PSI, and they have been included in the PSI November 2020 European sale.

Photos by Christian Houël

Plant Profile: *Passiflora edmundoi* (Sacco 1996)

John R. Vanderplank

BOTANIC BACKGROUND

History
P. edmundoi was collected by E.P. Heringer in 1964 and by Edmundo Pereira in 1965, and described by José da Costa Sacco in 1966. It seems that it may have been collected several times earlier in the century but the herbarium specimens were misidentified as *P. kermesina* Link & Otto. Looking at the living plants this seems almost impossible but sometimes poorly preserved herbarium specimens look very similar to each other.

Etymology
Named after Edmundo Pereira who collected the type specimen.

Habitat
At elevations of 900 to 1,000 m.

Distribution
Eastern Brazil: Bahia and Minas Gerais states.

Conservation Status
DD (Data Deficient).

Taxonomy
In his paper Sacco placed *P. edmundoi* in sub-genus Granadilla series *Kermesinae* with *P. watsoniana* Mast., *P. miersii* Mast. and *P. kermesina* and provided a key. Feuillet and MacDougal (2003) promoted series *Kermesinae* to Section *Kermesinae* and moved it from sub-genus *Granadilla* into Supersection *Stipulata*. Unfortunately *P. edmundoi* does not fit well with the other three species in this section. Although they all have folious stipules and the same distinct operculum, *P. edmundoi* has a long calyx tube and usually only two series of corona filaments, whereas the others have a campanulate calyx and four or five series of corona filaments. Visually *P. edmundoi* looks more like *P. tarapotina* Harms, *P. reflexiflora* Cav., *P. mendonacaei* Harms and *P. umbilicata* (Griseb) Harms in Section *Tacsonioides* but here, apart from *P. tarapotina* there are still major differences in the shape and position of the operculum. Perhaps *P. edmundoi* and *P. tarapotina* should be placed in a Section of their own.

Top: *Passiflora edmundoi* red form
Bottom: *Passiflora edmundoi* pink form

CULTIVATION

Cultivation History
P. edmundoi appeared in cultivation in Europe around 2005. There is no record of how it came into cultivation. There are now two quite distinct clones. The first clone in cultivation had deep pink flowers and the latter, with slightly larger and deeper red flowers, appeared much later.

Passiflora edmundoi fruit

Passiflora edmundoi leaves

Flowering and pollination

In general *P. edmundoi* is an easy subject to grow and will grow extremely rapidly under glasshouse conditions or outdoors during the hottest months of the year. Providing it has good light, flowering will start in March and continue well into October or November. Flowers do not self-pollinate but crossing the two varietal forms has not been tried to my knowledge.

Hardiness

Overwintering is more problematic; plants need a minimum temperature of 15ºC (59ºF), although lower temperatures are tolerated for short periods overnight. As with most tropical plants the soil temperature becomes critical in the winter. A drop in air temperature for a short period rarely causes much damage to the top of plants. It is the sudden cooling of the soil, especially if it is wet, that does the damage by killing some of the capillary roots. This stops normal water uptake, usually followed by over watering and finally root death due to fungal disease. In general, plants with under-soil heating do better and will withstand much lower temperatures to their vegetative parts. In northern Europe and America supplemental lighting and keeping the day length at 12 hours is of great benefit and can be the difference between success and failure. Lighting can prove expensive but using LED lights is a more affordable solution.

Soil

As with virtually all passionflowers a well-drained, open compost with a pH of 6.5 to 7.5 is preferred. For *P. edmundoi*, I would use a loam-based compost, but a peat-based compost would also do well, especially in pots; but in either case you should add up to 50% sharp sand to ensure good drainage.

Pests and Diseases

There are no unusual pests or pathogens to watch out for, but red spider mite and Western flower thrips can take hold and devastate plants very quickly.

CULTIVARS

In spite of being in cultivation for 15 years there are only a few cultivars with *P. edmundoi* as the male or female parent recorded:

- *P.* 'La Venexiana' (*P. edmundoi* × *P. caerulea* 'Pierre Pomié') by Maurizio Vecchia. Reg.108, 2007
- *P.* 'Dafne' (*P. edmundoi* × *P. kermesina*) also by Maurizio Vecchia. Reg. 164, 2010
- *P.* 'Star of Berlin' (*P. racemosa* × *P. edmundoi*) by Andreas Bäurle. A lovely hybrid and the only one I can find with *P. edmundoi* as the male parent. Reg.225, 2015
- *P.* 'Penny Ann' (*P. edmundoi* × *P. caerulea* [wild]) by John Vanderplank. New, unreg. It has retained some of *P. caerulea*'s hardiness tolerating temperatures down to freezing for short periods.

Considering that *P. edmundoi* has been successfully crossed with species from three sections within Supersection *Stipulata* there must be lots and lots of new crosses that could be made.

DESCRIPTION

Vine	glabrous, slender
Stems	slender, terete
Stipules	folious, 4.5 × 2.5cm
Petioles	slender up to 5cm long with one pair of filiform glands midway and one pair close to the leaf blade
Leaves	deeply three lobed, 6–9 × 7–11cm, membranous, margin entire, lobes ovate with four small glands at their base between the lobes
Peduncles	solitary, terete, up to 17cm long
Bracts	ovate, stalked, 15 × 9mm, scattered, bright pink
Flowers	large up to 11cm in diameter, showy, bright pink or red
Calyx	cylindrical, 1.5 – 2.1cm long, green and deep purple inside
Sepals	lanceolate, pink or red, deeply keeled with 4mm awn, 5 × 1cm
Petals	as sepals but more slender and slightly shorter
Operculum	membranous in lower half, free filaments above, 5–7mm high, pale mauve, attached near base of calyx tube
Corona Filaments	in two or three series, apex towards the androgynophore, pale or deep violet, outer series fleshy, free to base, inner series membranous
Limen	tubular at base of androgynophore, 2–3mm high
Androgynophore	slender, up to 5cm high
Ovary	fusiform, glabrous, hexagonal in cross-section
Fruit	fusiform, ripening pale green, hexagonal in cross-section, 6–7 × 1.5cm
Seeds	symmetrical, obovate, tridentate at apex with chalazal beak, margin dentate, reticulate with sharp ridges, light brown

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Recent Publications

Boender, Ronald. 2019. *Passionflowers: a Pictorial Guide*: 70. Amazon

Houël, Christian 2019. *Les Passiflores de la Mata Atlantica au Brésil*: 1, 28-30 Photobox

Photos by John R. Vanderplank

Butterfly Corner
A Passion for Passionflower Butterflies

Martin Wills

INTRODUCTION

Imagine most readers of the PSI Journal have passionflower collections of their own but, with notable exceptions such as our founder, Ron Boender, not so many have tried keeping butterflies. I have been doing so for almost twenty-five years, and thought it was high time I shared my passion and encouraged more of you to have a go.

In this issue I'll tell you how I got started, and talk about some of my favourite butterflies. In future issues I'll tell you more about how to set up a greenhouse specifically for butterflies, which butterflies to go for and how to breed and tend them, and most importantly, which passionflowers they like to feed on and how to grow them.

I am based in the United Kingdom, just south of London, where butterfly rearing is mainly a summer activity, as it's hard to keep them going through the winter months. Those living in warmer climes may be lucky enough to enjoy them all year round.

HOW I GOT STARTED

It was in 1996 that I first set up a greenhouse for tropical butterflies. These included *Heliconid* species, which need passionflowers for their lifecycle. A visit to the former Eastbourne Butterfly House provided me with a couple of Decaloba species, *Passiflora biflora* [EB] and *Passiflora capsularis* to go with the usual *Passiflora caerulea*. The *biflora* was donated to Kew Gardens as *biflora* and is still in our collection here today.

My first greenhouse was a 10ft x 8ft (3m x 2.4m), which I set up in my garden in 1998. It has produced many a butterfly and many a hybrid passionflower, the latter often as caterpillar food plants to take the pressure off of the species. *Xerogona* hybrids can make great foodplants for *Heliconius erato*, giving the other *Decalobas* a chance to survive.

One of my first butterfly species was one that can destroy a passionflower collection very quickly - *Dryas iulia*. We found that the Australian *Passiflora* species (and the glass around them) were plastered with *Dryas iulia* eggs: these plants don't seem to have the defences that South American species do.

In 1999, I worked at Kew Gardens helping set up their *Passiflora* collection while keeping a few butterflies as well. At the time, they only had 15 different *Passiflora*, but through donations their list has now grown to around 200 (though some of these may be duplicates). One important task was to design and set up breeding cages for their *Heliconids*.

In 2001, I moved to the Butterfly House at Syon

The *Heliconid* breeding cages I designed at Kew, now being used as hatching cages

Park, the beautiful London home of the Duke of Northumberland, just over the river from Kew Gardens. Once again, I worked with passionflowers and butterflies. One very special species was the lovely *Philaethria dido*, which we got to breed on *Passiflora platyloba* and *Passiflora edulis*. I noticed the adults digesting pollen a couple of times: did they copy other *Heliconids* in the greenhouse, I wonder, or is this natural behavior that they do high up in the canopy in the wild?

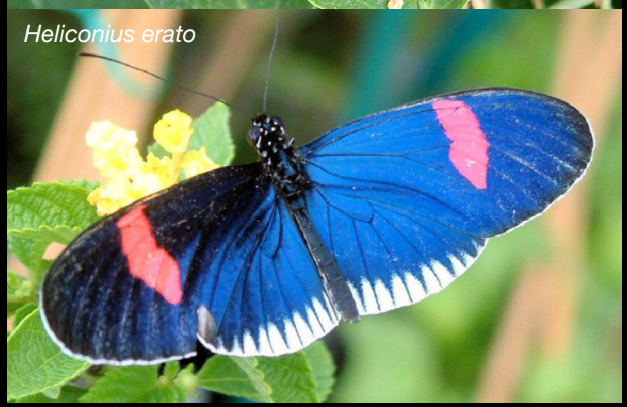
Heliconius numata

Hybrid pairings within the two groups are common as shown by this picture of *Dryas iulia* crossing with *Dryadula phaetusa*

Heliconius atthis

Heliconius atthis

Heliconius erato



Heliconius erato

SOME OF MY FAVOURITE BUTTERFLIES

Now for some of the butterfly species. *Heliconids* are divided into two main groups: the primitive species and the advanced, although this simple division has been complicated by the addition of the European fritillary butterflies to the *Heliconid* grouping.

I will start with some of the lovely highlight species that are a pleasure to have flying around in the greenhouse. They will be covered in more detail in future issues with caterpillar, pupae and egg laying habits.

Heliconius numata

A lovely species and large too. it has many colour forms but the black and orange one is always nice to get out of a batch of pupae. It will feed on a wide range of passionflower species mainly in the *Passiflora* section, but unlike other species it is not a heavy eater. The larva has orange on its front segments and at the rear in its early stages so is not too difficult to separate from other larvae on the vines. It can live up to 9 months as a butterfly.

Heliconius atthis

Another favourite species but very hard to tell the pupae from those of *Heliconius melpomene*, so if you are unlucky a batch of 10 pupae may produce only 8 *atthis*.

Heliconius numata

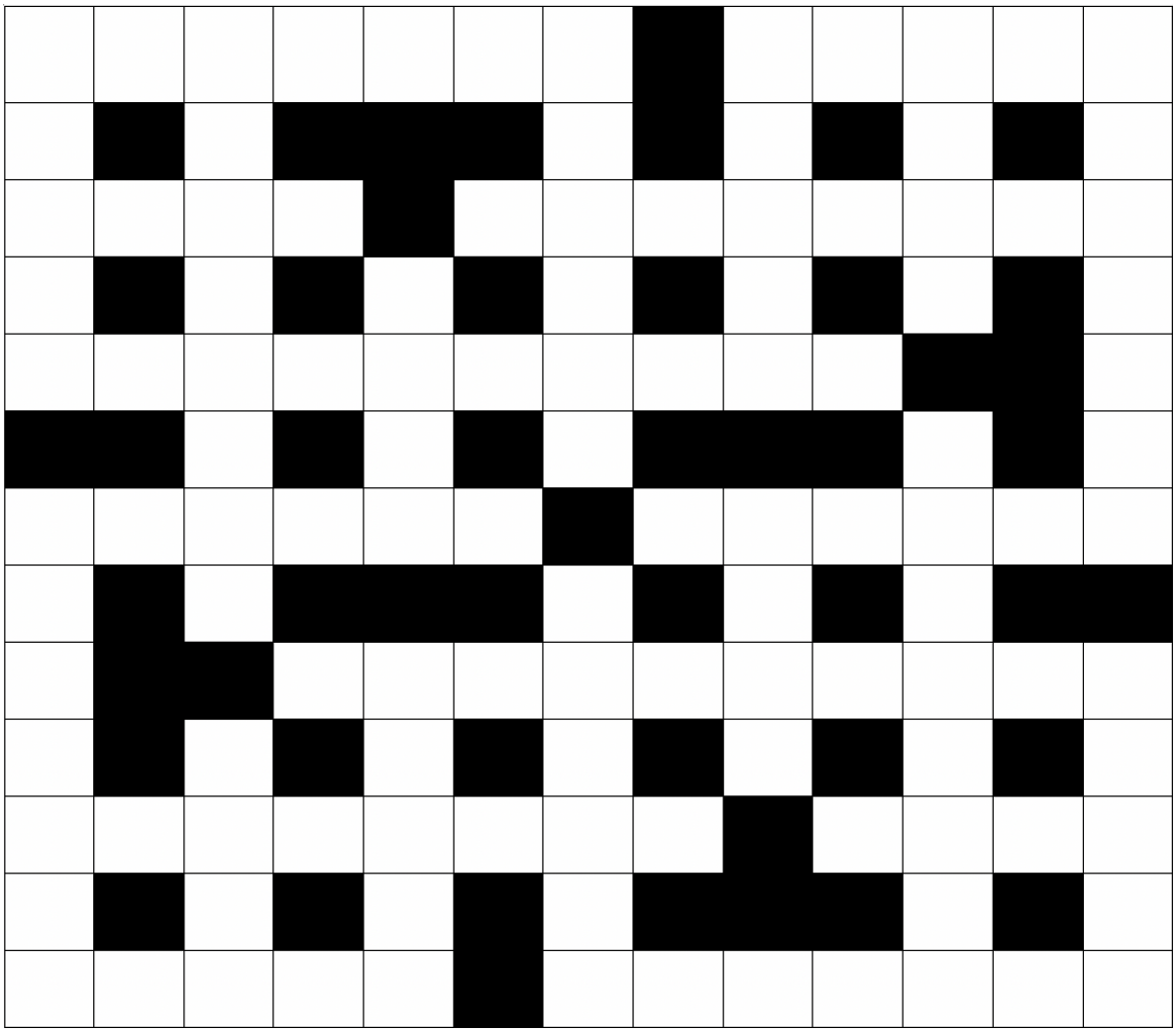
This species will cross with *melpomene* and I have a photo of the resulting hybrid.

Again these will fly around all summer and feed on the *Passiflora* section species and hybrids. There is very little variation in this species.

Heliconius erato

A *Decaloba* feeder and mimic partner to *melpomene*, with lots of colour forms that match; found in South and Central America. The adult female can be persuaded to lay on a *Xerogona* hybrid by moving the larvae on to it just out of the last skin change, so when they hatch they taste the leaves of the plant and lay their eggs, protecting the other *Decaloba* passionflowers in the greenhouse.

Passiflora Crossword



Enter the words below into the grid. Two words, both *Passiflora* species, are missing. Can you find them?

ABANDONING, ABERDEEN, ALATA, ALBANIA, ALPHA, ALTHEA,
AMOENA, APODA, ARBOREA, ARCH, AXIL, BACON,
BALBIS, BEING, BRIGADES, GRANDIS, HEMP, IDLE, INTO, IONS,
MANIA, OENANTHE, PEEKED, PLUMOSA

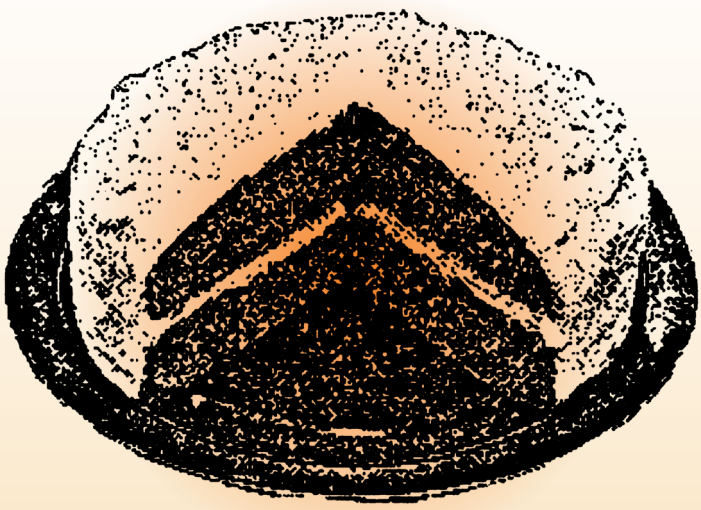
Patrick's Internationally Famous

Passionfruit Carrot Cake

By Patrick Worley

This recipe is so easy because it is done in one large bowl. I make a two layer cake or 1 large sheet cake.

Preheat your oven to 350° F/176° C



Ingredients

- 1 orange
- The juice from 4 passionfruits
- 2 cups flour
- 2 cups sugar
- 2 tsp baking powder
- 2 tsp baking soda
- 1 tsp nutmeg
- 2 tsp cinammon
- 1 tsp salt
- 4 eggs
- 1 1/4 cups vegetable oil
- 2 cups finely grated carrots
- 1/2 - 3/4 cups chopped toasted walnuts or toasted sunflower seeds (or a mixture)

Frosting

- 8 oz cream cheese
- 1 lb powdered sugar, sifted
- 1/4 cup of butter
- 1 tsp orange puree
- 2 tsp passionfruit juice, using more if frosting is too thick

Trim thin slices from both ends of the orange. Cut in half length wise. With a shallow "v" cut, remove the center core. Cut into wedges and remove any seeds. Leave the skin on. Cut into chunks and puree in the blender or food processor. Reserve 1 tablespoon for the frosting.

Sift together all of the dry ingredients in a large bowl. Add the orange puree, passionfruit juice, and oil. Mix well. Stir in the carrots and nuts. Line the bottom of two round, 9-inch cake pans or one 9x13-inch sheet cake pan with waxed paper. Pour the batter evenly into the two pans and bake in a 350° F/176° C preheated oven for one hour or until a toothpick comes out clean. Let the cake cool and remove it from the pans. Allow to completely cool before frosting.

Frosting: Beat the cream cheese and butter together until just blended. Add the powdered sugar, orange puree and passionfruit juice until thoroughly combined.

If you make a sheet cake there will be extra frosting, which can be frozen or used on muffins or pound cake.

Seedbank News

Have you got seeds to donate?
Then the seedbank managers would love to hear from you - just drop a line to one of the contacts below!

North and South American Seedbank News
We expect to announce the re-opening of the (North) American Seedbank shortly. We apologise for the delay and thank you for your patience. Please watch www.passiflorasociety.org/#news for updates. In the meantime all queries and offers of donations should be addressed to AmericanSeedbank@passiflorasociety.org. Please drop a line to the same address if you have any interest in a South American Seedbank, an idea which Sergio Lloreda is currently exploring.

European Seedbank News
Sal LaDelfa, our European Seedbank Manager, has topped his previous record! In the European Seedbank Sale 2020 (which at the time of writing has another fortnight to run) he has already sold some 400 bags - 60% more than last time. But feedback is always welcome - so do drop an email to him at EuropeanSeedbank@passiflorasociety.org if there are any seeds you'd particularly like that weren't on offer, or have other suggestions. A fresh supply of seeds has just arrived, so he may hold a further sale in the spring - watch www.passiflorasociety.org/#news for updates.

Quality Control and Germination Research
To help us maintain the quality of our seed, and assist research on germination, seedbank users may be asked to fill out a simple feedback form.

2021 Provisional Outline Programme

Friday 1st and/or Sunday 3rd: Visit Days

- Option 1: Morning — Jardins des Martels
  Afternoon — Chocolate Museum followed by Vineyard visit and tasting
- Option 2: Morning — Toulouse Botanical Garden
  Afternoon — Amazonian rainforest exhibition at Toulouse museum; Explore Toulouse

Saturday 2nd October: Main *Passiflora* Day

- 9:00–12:00 — Visit to Christian's National Collection. Plant and seed exchange and purchases.
- 12:00–12:30 — Drinks courtesy of St Jory Town Council at the greenhouses, followed by a light lunch.
- 14:00–15:30 — Annual General Meeting of PSI (in council meeting room, tbc)
- 15:30–19:00 — Presentations and discussions in the same room
  Suggestions please to vicepresident@passiflorasociety.org
- 19:30 — Dinner at restaurant

With travel and other restrictions due to Covid19, it is not certain at the time of going to press (15th December, 2020) that the conference can go ahead. If you'd like to come if it does, then:

- **if you've already registered, email vicepresident@passiflorasociety.org before 31st July 2021 to confirm or cancel.**
- **if you haven't, please register before 30th June 2021 at www.passiflorasociety.org/psi-st-jory-2021.**

Support Our Work: Join PSI

Following feedback from our members you can now choose between these new membership options, which replace all previous options:

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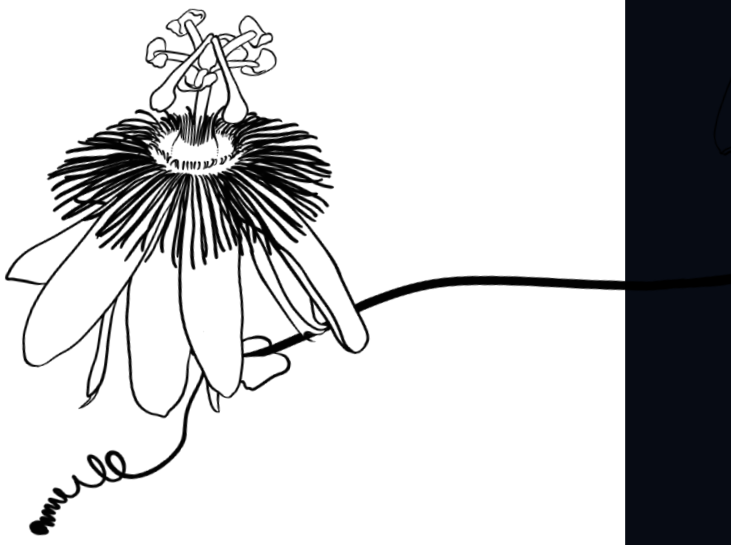
- hard copy of each current newsletter
- digital back numbers, and other publications
- attend PSI conferences and meetings
- vote and stand for committee membership
  - US$30* per year by PayPal subscription, or
  - US$135* per 5 years by Bank Transfer

Digital
- as Full, but digital newsletter only
  - US$20* per year by PayPal subscription
  - US$90* per 5 years by Bank Transfer

Basic
- ordinary access to seedbanks
- updates and periodic special offers
- attend meetings (but not conferences)
- Free



*or equivalent in Euros or British Pounds

Just go to www.passiflorasociety.org/join-psi to find out more and become a member.

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Passiflora (this newsletter)
- issues from 1991 to date, including special issues

Passiflorunde
- issues from 1993 to 2013 including special issues and indexes

Passiflora Online Journal
- issues from 2011 to 2017

Curtis's Botanical Magazine
- *Passiflora* illustrations and descriptions 1787 onwards (forthcoming)

Other useful sources and information, such as
- Killip - The American Species of *Passifloraceae* - Volumes 1 and 2, plus Supplemental Notes (forthcoming)
- *Adenia* articles and references (forthcoming)

www.passifloracultivars.org
- Cultivar registers and lists
- Application form to register new cultivars

Additional material and suggestions welcome!