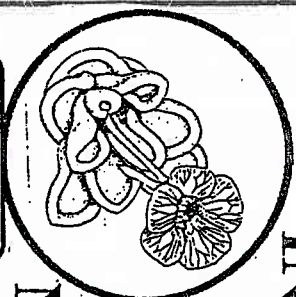


THE INTERNATIONAL PINGUICULA STUDY GROUP



P. reticulata

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Pinguicula colimensis. The distinctive flower of the 'true' species makes it instantly recognisable from all others. Unfortunately, it is not the easiest species to grow or keep, let alone flower! Photographed in the collection of S.E. Lampard.

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EDITORIAL

The 1993 season has certainly begun with a storm!

Alfred Lau's series of lectures, given at the Mexican Plant Convention in March, left over 120 participants drenched with fantastic images of many types of plant growing in full splendour in their natural habitats. The most stunning of all were of course the *Pinguiculas*! Alfred took us to see them through his slides, from the mossy slopes beneath sparse oak and pine forest to harshly exposed rock outcrops and then on to limestone mountains and barren, eroding gypsum hillsides, habitats where you would least expect to find *Pinguiculas*. Yet we were exposed to the shock of one new species after another: *P. laeana* in all its splendid forms, followed by the exquisite purple veined *P. reticulata*, then *P. heterophylla*, and the variety *P. 'Alfredae'*, both with thread-like leaves resembling certain *Droseras*. Finally, without pause, Alfred let loose with an almost endless torrent of unnamed plants, images flashed like lightning before us on the screen, including many remarkable new species such as the enormous plant from Ayautla! I was left dazed like many others; how could so many plants have escaped scientific discovery until now?

As we enter our second year I hear the loud rumblings of an avalanche! Begun as something small amongst a few friends, our numbers have apparently doubled since the last issue, with over 140 people now registered with Ron. Of course this means that we now all have a much wider circle of friends with whom to correspond, not only exchanging news and views but also of course plants. To help you to reach the greatest number of people, we have a 'Letters Page' and a 'Plant Exchange Register' though please take note of the article in this issue regarding import/export legislation. In addition, we have articles on 'Home Tissue Culture', more advances in Cultivation Methods, the identification of *P. colimensis*, and a report on the discovery of another new species from Mexico. In answer to Joe Mazrimas' plea in his letter I hope he is pleased by our steadily expanding ranks of our authors and hope that more of you will join in.

Finally, the small team of volunteers that help with the production of this newsletter have had to put together 200 copies using glue and stapler, in anticipation of continued growth in membership. If trends continue we may have to change our methods, not only to reduce the workload, but also to further improve the quality of the end product. This will inevitably result in an increase in costs, so please let us have your ideas - would you want to pay more for a glossier product or are you happy with what you get?

Please write! Stan Lampard.

Letters

Alfred Lau writes from Germany while still on tour:

Weeks have passed since my memorable visit to Birmingham, yet it seems that I addressed the Pinguicula friends only yesterday, but I do not want to delay my heartfelt thanks for the invitation any longer! Never in my dreams had I expected such a sacrifice on behalf of those who attended..... Please tell all of the people that co-operated that I am deeply moved as I consider what they did to make that weekend a success..!

Memo Saker from Holland writes:

A month after the Mexican Convention I'm still enjoying it..!

M.C. Eiland from Oxford writes:

Many thanks for the most enjoyable Conference - surprisingly everything ran on schedule and according to plan; quite a change from other Conferences..!

Kjetil Abercrombie from St Albans writes:

..What a great event that you organised, I am still thinking about the fascinating talks by Alfred Lau..

Ian Fraser from Bridgend writes:

Thanks for the convention with Alfred Lau, it was most enjoyable. A fascinating man..!

Editors note: There were many other such letters which, more than anything else, made me feel the event was well worth the effort to organise! Thank you all for coming and for giving so generously toward the sum of £500 raised for Alfred! This will enable him to continue his work caring for the Mexican Indian boys at his home.

Joe Mazrimas Co Editor CPN, QLSA writes:

Issue No. 2 of IPSG was good but not long enough! I want more stuff to read in it rather than note paper! Seems like Casper is getting fat hard with all the new discoveries lately... it would be nice to hear from him maybe through your newsletter.....?

Shan says -

Following a letter I wrote enquiring about the type locality of *P. rotundifolia*, published by M. Studnicka as *Minas de Asbestos* in the state of Oaxaca, Mexico: Alfred Lau told me that he only knew of such a place in the state of Tamaulipas. I raised this with the author who replied:

Miloslav Studnicka from Liberia writes:

Thankyou for your letter and the locality "Minas de Asbestos" which, as you say, is in Tamaulipas. Yes, it was my mistake to publish this locality for *P. rotundifolia* as being in the state of Oaxaca. This was due to bad information from the collectors. The 'holotype' is in the Herbarium of Charles University in Prague at the present time and there is given the state of Tamaulipas.

On the same issue:

Jan Rifa from Austria, whom Studnicka cites as the collector, has written the following to Johan Van Marum from Brummenhal, also in Austria:

The true locality for *P. rotundifolia* is: "between Rayones and Galeana, on gypsum hills, Nuevo Leon". Later I collected several similar *Pinguiculas* in closely allied areas. One *P. rayonensis* (Lux), certainly is related to *P. rotundifolia* and possibly may be identical! I think a detailed study is necessary here, suppose there are some other *Pinguiculas* in that area that are not yet in cultivation? In my estimation, there are dispersed some subordinated taxa, possibly varieties or forms, growing in that area on isolated small "islands" of gypsum rock.

Editors note:

Yet another taxonomic debate rages!

Islands of evolution, fascinating stuff!

Maybe Darwin's theories regarding the origin of Galapagos Finches will be illustrated through Mexican *Pinguiculas*: who will take up Rifa's challenge to investigate the *P. rotundifolia* / *P. rayonensis* complex further?

L.

Pinguiculas in tissue culture

Gareth Davies

Many *Pinguiculas* are extremely easy to propagate by conventional leaf cuttings, but when I managed to acquire one or two of the rarer species (*oblongiloba* and *zecheri*) this method seemed to have certain limitations, such as that removal of a large number of leaves from the parent plant left it fighting for life, and that I couldn't propagate the plants fast enough to meet the demand for exchanges with other growers. This was when I started messing around with plant tissue culture.

For the uninitiated, tissue culture (otherwise known as micropropagation) is the process by which plant parts are removed, sterilised, placed on a special nutrient medium, and induced to grow by means of manipulating plant hormones.

My first experience with the method was using Tobacco, a species widely used for research because it is easy to culture. Typically, here, sterile pieces of tissue (called explants, though not in the same sense as ex-parrots) are placed on one type of medium to encourage cell multiplication (called callus formation), moved to a second medium with different hormones to cause shoot growth, then a third stage with a different medium to stimulate root growth. This process was said to be "easy", so I held little hope for the unexplored world of *Pinguicula* micropropagation.

As it turns out, *Pinguiculas* are unbelievably simple to tissue culture. Forget all the different culture media used for tobacco; *Pinguiculas* can do all the stages at once. The basic method for the species that I have tried seems to be the same: taking a leaf, sterilising it, placing it on a medium containing no hormones, watching it grow lots of new plantlets for about 6 weeks, by which time the nutrients have run short in the medium, and roots are stimulated to grow. After this stage, plants are put in the greenhouse and cherished as usual.

There have been several articles in recent Carnivorous Plant Society journals dealing with various aspects of tissue culture (see references), and here I hope to summarise most of the current information.

The first thing you need for tissue culture is a sterile environment. The media used are not only ideal for plant growth, but also for fungi and bacteria, which grow far faster than your plants, and kill them. In science labs, like the one I use, sterility is provided by a laminar airflow cabinet (current cost: over £800). For home use, a cardboard box with armholes, with a see-through cover and lining of clear polythene is quite adequate. Alternatively, you might like to try a more complicated design involving perspex and a hairdryer (see Ref 2). To give some idea of the relative merits of the two systems, I have carried out transfers of cultures on a kitchen worktop with no sterile box, and have seen no contamination; whereas a class of MPhil students trying to culture tobacco, managed to grow a remarkable collection of contaminating fungi, even using an airflow cabinet. The moral is that technique is all important; imagine you are working in a rain of bug spores, and keep all culture vessels closed or covered as much as possible, and tilt open vessels at 45° to prevent contamination.

Start by swabbing out your sterile cabinet with methylated spirit, to kill any lurking infections, and you're ready to go.

You'll need sterile vessels (jam jars and lids that have been submerged and boiled for half an hour, preferably in a pressure cooker) and a sterile medium. The dry powder for this can be ordered (although only in huge quantities) from commercial suppliers. You need one-third strength Murashige and Skoog medium (follow instructions on the pack), with 8g agar per litre, and 15g sucrose (sugar) per litre. For the "kitchen tissue culture lab", a rough guide is that a level teaspoon is 5 grammes, and the exact quantities of ingredients are not too important (if in doubt, it's better to err on the side of too little, rather than too much). Heat the medium up using a pressure cooker, or, better still, pop your litre of non-sterile medium in a jar in a microwave, together with a second vessel containing a pint of water, and cook on high for 20 mins. (The extra pint of water is to prevent your medium for boiling for too long; meanwhile the microwaves kill the bugs, and the heat dissolves the media ingredients.) You can add plant hormones to fine-tune the method, but I feel that this makes life needlessly complicated. Now dispense your sterile liquid medium into your sterile jars, to give a 1-2cm layer, using your sterile environment, and wait for it to set.

Meanwhile, you can sterilise your explant. There are two strategies here: leaves and seeds. Leaves are better, if you can get the right ones. The right leaves are the thick winter leaves of the Mexican butterwort type. I haven't yet succeeded with summer leaves of these, as the amount of time needed to sterilise the leaf also kills it. I have a feeling that using leaves from plants grown in peatite / vermiculite would work, as this compost supports fewer bugs than does peat; the fewer bugs there are to kill, the less sterilising time is needed, and the better the tissue survives, but I haven't tried this yet. Another option is to lower the bleach concentration, but I haven't tried that either. I've never had any success in

sterilising the thinner leaves from other groups of *Pinguicula*s, although I once came very close with *P. lutea*. My guess is that it is possible, if not easy. Well, they've done it at Oxford. (Boooooo!) Sterilising seeds, if you can get them, is a better bet for the less robust species.

Whether you try seeds or leaves, the method is the same. You soak the material in 10% bleach, with a drop of washing-up liquid, for 5-15 minutes. (10 mins for thick *P. moranensis* leaves, experimentation for other leaves), then wash the material in 3 changes of sterilised (boiled, covered and cooled) water before placing it on the surface of the solid medium. (boiled tweezers are a useful instrument for this,) all operations being carried out in your sterile environment.

With the hard work over, you now place your culture jar in a bright place (not in sunshine), with about 20°C and 16 hours light a day as the optimum conditions. New plantlets will grow in a few weeks, and will eventually root, and they can then be taken out of the culture vessel, and placed in your usual *Pinguicula* medium, in a warm, humid place until established. The resulting plants reach maturity in a few months, as opposed to over a year for leaf cuttings. And, of course, once you have your culture growing, it is a simple matter to detach sterile leaves to initiate new cultures.

To give you some idea of the potential of this method, I generated over 100 *P. esseriana* from two leaves, within 3 months. (Extrapolating this, it would be possible to grow at least 6 million *P. esseriana* in one year, from one leaf!)

I'd like to finish by saying that this isn't as complicated as it looks! Once you've had one go, it gets easier, and if you've tried home wine-making, then you've already got two-thirds of the skills you need for plant tissue culture.

Acknowledgements

I'd like to thank all the people who have made this article possible: from Fred Green for providing me with my star plants all those years ago, to Brian Johnson, Steve Woodward and Stan Lampard for starting me on tissue culture, and to Dr Ian Furrer for use of lab facilities.

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2. Achieving the sterile state for home tissue culture, Part II. Brian Johnson. *CPS Journal* 16, 9-10
3. Tissue culture of carnivorous plants at Oxford. Steve Woodward et al *CPS Journal* 15, 16-19
4. Tissue culture of carnivorous plants. Gareth Davies et al *CPS Journal* 12, 17-20
5. In Vitro propagation of the Butterwort *Pinguicula moranensis* Richard Adams et al *HortScience* 14(6), 701-702

PLANT EXCHANGE

We have had many letters asking about plant export restrictions. Please note that the following apply :

1. From 1st. June 1993, there is no restriction on the movement of plants, leaves and seeds within all twelve countries of the E.E.C.
2. Non E.E.C. countries will still require Phytosanitary certificates for all but seed.

If you know the restrictions that apply for your country - please let us know so that we can print them to assist others.

RESPONSIBILITY IS STILL THAT OF THE SENDER

Pinguicula x 'haulti'

by Laurent LEGENDRE & Serge LAVAYSSIÈRE

Is there a typographic error in the title? Is this a joke?, or, perhaps, the latest product from a bored toy store : a plastic butterwort? No, this is a real butterwort, with sap and glands. So, is there a butterwort indigenous to one of the most beautiful confluences of the Seine? No, neither! At least not until about four years ago. At that time, Serge and I, both friends and members of Dione³, joined efforts to generate the above hybrid and raise it to adult size. Our collaboration on this project explains the double authorship of this article, both of us describing his side of the story.

History

It all started when I read in my high school biology textbooks, that some hybrid plants can actually grow stronger, taller, and more beautiful than their parents (maize, called corn in the U.S., is an excellent example). Highly excited by such a finding, I initiated a hybridisation programme with carnivorous plants which yielded viable seeds out of the following crosses:

- *Drosera capensis* x *D. binata*
- *D. burkeana* x *D. capensis*
- *Pinguicula esseriana* x *P. caudata*
- *P. X Sethos* x *P. esseriana*
- *P. X Sethos* x *P. moranensis* Huahuapan.

Due to frequent education related moves, I was unable to keep most seedlings alive. I, therefore, turned to Serge for

help. Thanks to his cultivation skills, he was able to rescue two specimens of the last hybrid (P.X Sethos X P.moranensis Huahuapan). We decided to name them P.X l'hautil⁴ after their place of birth.

Imagine my joy, two years later, when Serge sent me some pictures of these two specimens in full bloom. Even though they both differ significantly in size, their flowers share several common features : the lower petals are "just like their fathers" and the upper ones "just like their mothers". We, therefore, most likely deal with two different forms of the same hybrid. Their simple growing requirements should facilitate, we hope, their quick spread through our association.

Description

The leaf rosettes of both forms are relatively similar, except in size. It is therefore very natural to call one "grande forme" (large form) and the other one, wouldn't you have guessed? "petite forme" (small form). The heritage from both parents is straightforward. While the summer rosettes are the exact copy of those of P.X Sethos, the winter rosettes are very compact like P.moranensis Huahuapan. The plants bloom without any surprise at the end of winter. In early blooming stages they have a striking resemblance to the picture by Adrian Slack in his book "Insect Eating Plants", page 110. Any similarity disappears when the blooms open. Though the flowers of P. X l'hautil 'Petite Forme' resemble the ones of P.X Sethos, the flowers of 'Grande Forme' consist of very large petals, partially overlapping. In both cases, the petals are slightly undulating, a heritage of Huahuapan.

The flowers of both forms display identical sets of

colours. Their central core is light green. It gives rise to a white spot of 5 by 2 mm. on the lower central petal. The central region of the base of both lateral lower petals is marked by two central white lines, 3-4 mm. long, which are framed by dark violet lines. The rest of the petals are of a lighter, but still profound, violet colouration. The upper petals are characterised by the same violet tint, though they lack the white spots. The spur, 3 cm. long, is almost 'straight', bending only slightly towards the floor. In the case of 'Grand Forme', the flower is 3 cm. high as well as wide. In 'Petite Forme' it is only 2 cm. high and slightly less in width. Both forms bloom generously so that one can expect 2-4 consecutive flowers each year.

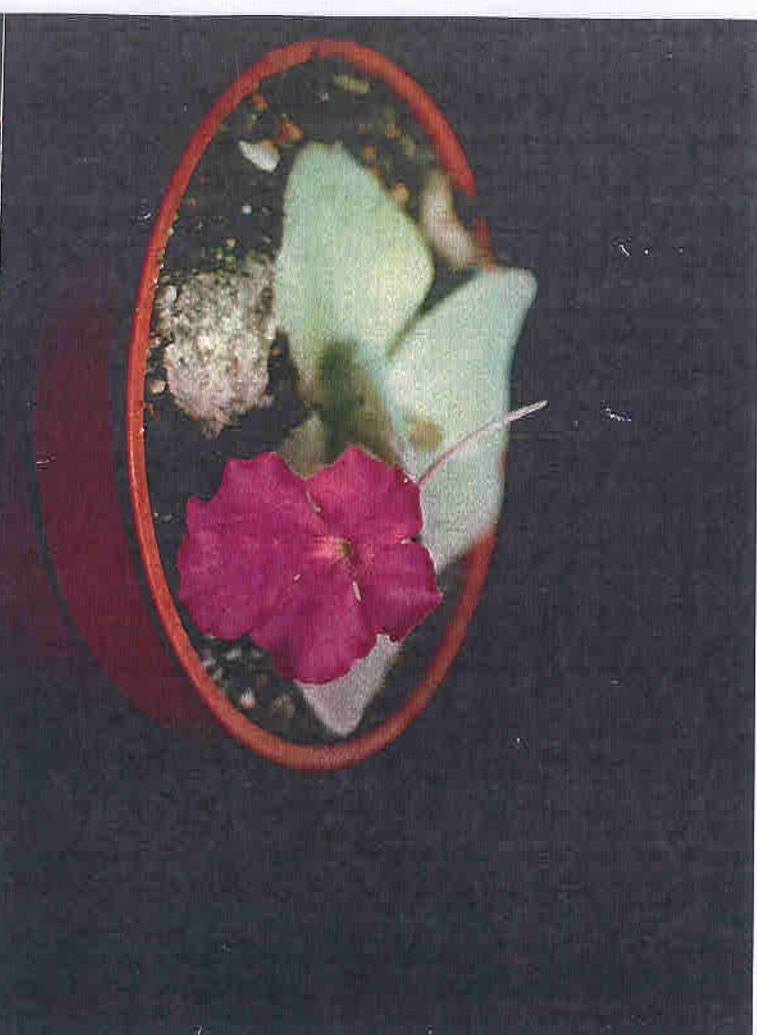
Since both hybrids divide vegetatively while blooming, beautiful specimens having large floral displays can easily be obtained within a few years.

Cultivation

There are few cultivation difficulties with these two hybrid forms. Just like their parents, they require a mountain type tropical climate. Under our northern climates they are faced with contrasting seasons, a situation which does not occur in their native countries. During the summer, one can keep them outside in the shade, but they would thrive just as well inside under sufficient artificial light. During the winter, a lowering of the temperature is advisable to induce blooming. Though night temperatures of 10°C are sufficient, it has to be noted that both of my plants have survived, without any damage, two to three nights at record winter temperatures of 0°C.

As for many butterworts the growing media is a mixture of peat and sand, made less acidic and richer by the addition of a little





bit of compost (about 1/10). Even though acidic peat is virtually exempt from spores, mould or fungi, the same is not true for most composts which will require at least 20 minutes cooking in the water vapours of a pressure cooker to be properly sterilised.

As for any hybrid, the only valid multiplication mode is by vegetative means. Mature plants spontaneously divide while blooming, but if one is in a hurry, one can achieve extremely successful leaf cuttings from spring or summer leaves, obtaining up to six to seven plantlets per leaf, especially with 'Grande Forme'. Seed germination, if it were to succeed, would not yield plants with characteristics identical to the ones of their parents (see "Vegetative and sexual multiplication of Pinguicula hybrids" - in Dionee 16).

Concerning hybridisations

A small trick that can help difficult, if not impossible, cross-pollinations involves mixing, at different ratios (1/10, 2/10, or 4/10), the pollen we want to see bear fruit (auto pollination pollen). A far U.V. irradiation of the auto-pollination pollen prior to mixing would destroy its viability, and eliminate the need for hybrid selection among the seedlings. The underlying principle is that upon recognition of the "right kind" of pollen (auto-pollination pollen) at the stigma surface, the stigma cells will trigger the germination of pollen tubes from these pollen grains for subsequent ovary fertilisation. The presence of "good looking" pollen grains in our pollen mixture will, therefore, initiate a process from which "bad looking" grains can benefit. Of course, additional elements also aimed at identifying the genetic patrimony of the incoming pollen tube exist at the level of the style and of the ovary, but

none of these seem to have played any role during the creation of P.X I'hautil.

Conclusion

This novel hybrid expands the horizon of the hybridisation field of carnivorous plants one step further. Yet, numerous areas still remain unexplored, especially with epiphytic Utricularia, so pretty and so easy to cultivate.

Footnotes

1. translation of : Lavayssiere, S., and Legendre, L., (1991), Dionee 22 : 2-5.
2. river crossing Paris, France
3. French carnivorous plant society.
4. a small hill about 50 km. northwest of Paris, France, where this hybrid was conceived.

Original writing :

Laurent LEGENDRE - (Introduction, History, Concerning hybridisation, Conclusion)

Serge LAVAYSSIERE - (Description, Cultivation)

Translation :

Laurent LEGENDRE.

P. oblongiloba D.C., Prodr. Syst. Nat. 8:27 (1844) Mexico
P. parvifolia ROBINSON, Proc. Amer. Acad. 29:320 (1894) Mexico
P. planifolia CHAPM., Fl. South. US. ed. 3:303 (1897) S USA
P. potostensis SPETA & FUCHS, Phytol. (Aust.) 29(1):100 (1989) Mexico
P. primulifolia WOOD & GODFREY, Rhodora 59:219 (1957) S USA
P. pumila MICHX., Fl. Bor. Amer. 1:11 (1803) SE USA
P. ramosa MIYOSHI ex YATABE, Bot. Mag. Tokyo 4:1 (1890) Japan
P. rayonesensis ZAMUDIO & LUX, Acta Bot. Mex. (1992) Mexico
P. rectifolia SPETA & FUCHS, Phytol. (Aust.) 29(1):97 (1989) Mexico
P. reticulata SCHLAUDER, Der Palmengarten 55(3):28 (1991) Mexico
P. rotundifolia STUNICKA, Folia Geobot. Phytotax. 20:201 (1985) Mexico
P. X scullii DRUCE, Rep. Bot. Cl. Brit. Isles 6:301 (1922)-
 = *grandiflora* LAM. X *vulgaris* L. Ireland, France
P. sharrpii CASPER & KONDO, Brittonia 29:112 (1977) Mexico
P. takaki ZAMUDIO & RZEDOWSKI, Phytologia 60(4):260 (1986) Mexico
P. utricularioides ZAMUDIO & RZEDOWSKI, Acta Bot. Mex. 14:28 (1991) Mexico
P. vallisneriifolia WEBB, Oria Hispanica 48 (1853) Spain
P. vallisneriifolia WEBB lus. *brevifolia* CASPER, Feddes Rept. 66(1/2):65 (1962) Spain -?
P. variegata TURCZ., Bull. Soc. Imp. Nat. Mosc. 77 (1840) Siberia
P. villosa L., Spec. Pl. ed. 1:17 (1753) Alaska, Canada, Scandinavia, Russia
P. villosa L. f. *albiflora* FRODIN, Bot. Not. 129 (1915) N boreal
P. villosa L. lus. *ramosa* CASPER, Feddes Rept. 66(1/2):44 (1962) N boreal
P. vulgaris L., Spec. Pl. ed. 1:17 (1753) Europe, Russia, N America boreal
P. vulgaris L. f. *albida* (BENH) NEUMANN, Sverig. Fl. 119 (1901) N-C Europe
P. vulgaris L. f. *bicolor* (NORDST. ex FRIES) NEUMANN, Sverig. Fl. 118 (1901) N-C Europe, Russia, N America boreal
P. zecheri SPETA & FUCHS, Stapfia 10:111 (1982) Mexico

* * *

Those synonyms who are still wrongly being used, are listed below:

P. caudata SCHLEGEL. = *P. moranensis* KUNTH
P. filios mulionis MORREN = *P. moranensis* KUNTH
P. kewensis LAVENDER (originally a cultural hybrid), could at most be named as *P. moranensis* cv. 'Kewensis'
P. mexicana BONPL. = *P. moranensis* KUNTH
P. orchidioides D.C. = *P. moranensis* KUNTH
P. rosei WATSON = *P. moranensis* KUNTH

Varieties of *P. moranensis* are never be described taxonomically, and therefore rejected to 'nomen nudum'. See p.1 (synonyms etc.)

According to the International Code of botanical Nomenclature.

THE DISCOVERY OF A NEW COLONY OF *Pinguicula vulgaris* EXTENDING THE SOUTHERN LIMIT OF ITS DISTRIBUTION

IN JAPAN

by Muneyuki Shibata

A new colony of *P. vulgaris* has been confirmed at Idaka town in the Kii Peninsula. Prior to this report the southern limit of distribution in Japan proper was regarded as the southern alps in Nagano prefecture, whilst the western limit was considered to be Mount Ishizuchi within Ehime prefecture on Shikoku Island.

The new location is within the Murou-Akame-Aoyama National Park on a wooded mountainside at an altitude between 600-800 metres, at the border of Mie prefecture and Nara prefecture. Mr. Akimasa Takeda, (professor of Biological Resource at Mie University), and Mrs. Chikura Nakama, (teacher at the Kogakukan High School), have confirmed this find. The colony grows almost perpendicularly, covering an area of 50 metres, at densities up to 100 or more per square metre!

Mr. Sadashi Komiya, (professor at Nippon Dental University, and President of the Insectivorous Plant Society), says that until now, Shikoku Island and central mountainous regions would have been more usual. The new location suggests that the species was previously more widely distributed, but has subsequently been forced to retreat northwards.

The Education Board of Idaka have wasted no time in appointing Cultural Assets and have said that I may patrol regularly with the Mountain Association and Cultural Assets Research Association, in order that these plants may be protected.

P.colimensis or P.hemilepiphytica?

by Ron Mudd

Which do you grow? True, many people have plants labelled as P.colimensis - but are they? From recent communications and receipt of photographs it is my opinion that most people are actually growing P.hemilepiphytica or one of the P.moranensis 'complex'.

It is my intention here, to discuss these two species, and hopefully to assist you to determine which you grow.

P.colimensis McVaugh and Mickel -

Casper (1966) lists P.colimensis as belonging to Section Orcheosanthus, subsection Orchidopsis, series Cyclosectae. He describes the plant as having the following characteristics:

- Two rosette forms. The smaller winter rosette consists of numerous spatulate shaped leaves, 10-20 mm. long. The larger summer rosette consists of 6-10 large ovate - rounded oblong shaped leaves with slightly rolled edges, densely gland hairy. The leaves at flowering time are 15-40 mm. long and 11-24 mm. wide, but after flowering become 60-120 mm. long and 30-65 mm. wide. Usually 1-3 flowerstalks, 60-140 mm. long with a single flower. The flowers are large, 35-50 mm. long (inc. spur). The corolla is of two distinct lips. Short tube without palate. Long (25-35 mm.) spur, curved downward and pointed.

The type was discovered in 1957, in flower and fruit, on mountain summits near the pass 10-11 miles south - southwest of Colima. It was found on sunny slopes, on gypsum, at an elevation of approx. 500 m. McVaugh and Mickel (1963) reported that "Except for the thousands of plants at the type-locality, we have not seen any undoubted specimens of P.colimensis."

From my own experience, (both in my own collection and in that of others), I feel that this is a most interesting plant to grow, and I find it difficult to understand how any other plant could have originally been confused with it. The winter rosette provides the first point of interest. When the rosette is fully formed, it can be buried up to 4 cm. below the surface of the compost. When it is dug up it resembles a small 'bulb', with a living green centre which is wrapped in pale, dried, dead leaves. At this point, in cultivation, it should be kept very dry to avoid any rotting. When growth is seen to be underway, watering can CAREFULLY commence. My plants seem to appreciate a cool humid environment.

The leaves provide the next point of interest. Appearing thin and paper-like, they have some of the largest glands that I have seen on a pinguicula leaf blade. It is possible to count them with the naked eye. The colour of the leaf, in cultivation, is a very bright green, (yellowing if light levels are high).

When flowering, P.colimensis is a magnificent sight. The large flower is rounded in the lobes and the curved spur is most unusual.

P.hemilepiphytica Zamudio and Rzedowski -

Zamudio and Rzedowski (1991) describe this species as coming from the state of Oaxaca in Mexico. They identified that this plant did not fit into Section Orcheosanthus because of its long funnel-form corolla tube. They therefore created a new Section (longitubus) and subsection (infundibulares).

Recognising that this plant had long been placed in herbariums under the name of P.moranensis, a comparison between the two was undertaken. This comparison of both plants and growing habitats confirmed P.hemilepiphytica as a new species, which was then

described. I have taken some of the key points from the original description :

FLOWER SIZE -	35-80 mm.
COROLLA TUBE:	
LENGTH -	10-26 mm.
FORM -	long funnel-form
SPUR -	12-30 mm. long, straight to very slightly curved.

The type was found in Oaxaca amongst colonies of moss on a wooded mountainside at 2200 m. altitude in 1987.

Although frequently recorded as epiphytic by collectors, this species is also found in abundance upon rocks, along with colonies of moss.

This species is relatively simple in cultivation, given a humid environment, (in summer), and an open compost, (some daring growers have even grown this species on almost bare rock - HI CHRIS).

The leaves of this species can take on a superb burgundy-green colour in cultivation if exposed to good light, and can show a very deep red colour at the base of the petiole.

Hopefully the above descriptions, along with the photos in this issue (thanks Chris and Sean), will enable you to identify if you are growing either of these plants. If your plant does not fit either description, write and let us know - we MIGHT be able to help.

The mite identification guide, mentioned in the last Newsletter is not yet available. We hope to be able to review this in the next

issue.

- RON

The discovery of a new *Pinguicula* from Ayautla, Oaxaca, Mexico. by Alfred B. Lau.

In early 1987 I tried to get through the new road from Jalapa de Diaz to Huautla de Jimenez where I looked for new plant material. I wanted to photograph one particular Cycad in habitat by the name of *Dioon rzedowskii*. There were also rare species of Palms from the genus *Chamaedorea* close to the Rio Uruapan. I followed the river with several children from Jalapa de Diaz who, in the process, got lost. There is no trail to this area as the people believe the river is bewitched! When we found them again at around 2a.m. they were sound asleep in the crevices of eroded rocks close to the waterfalls. At the entrance to the cave where the Rio Uruapan begins, we collected a new *Peperomia*, and beautiful specimens of *Tetranema mexicanum*, (*Allophyllum*) which were in full bloom in the huge hollow from which the water proceeds. It is surprising that this plant can thrive with such little light! Around the large cave, but out of reach, I saw big, yellow blotches, leaf rosettes which were undoubtedly those of a *Pinguicula* with flowers resembling those of *P. agnata*. Unfortunately, we could not explore in more detail because of the oncoming darkness.

A few months later, the dirt road was dry enough to travel to Ayautla. I scanned the almost vertical wall of Cerro Rabon on the approaches and was surprised at the large populations of a form of *Agave attenuata*, a succulent in an area with an annual rainfall of 3000mm. Approaching the Mazateco Indian village of Ayautla, one of the most picturesque in the state of Oaxaca, I noticed big blotches of yellow and asked the Indian boys who accompanied me for my binoculars. There were the large *Pinguiculas* again, on fully exposed rock in the heat of the tropical sun!

We climbed the steep hill until we reached the wall. Together with this fabulous *Pinguicula* we also admired marvellous specimens of *Tillandsia streptophylla*. Some of the best climbers amongst the boys reached the plants to take photographs, these turned out to be spectacular! What was unexpected was that the semi-erect leaves catch insects on both upper and lower sides as the mucilage to which the insects stick covers the whole leaf. This is quite unique as in other species in the genus it is only found on the upper surface.

It is to be assumed that the species grows on the south side of the steep walls from Rio Uruapan and its source until above Ayautla where the walls peter out. The plant can be propagated by leaf cuttings and seed. The plants are robust (It appears to be the largest species so far discovered! - Ed.) and withstand the hardest rains, being well attached to the walls.

Editorial note: Whilst there are obvious similarities with *P. agnata* this description reveals a number of quite unique features which, along with differences in floral details, are likely to justify specific status. We can attribute the discovery of yet another Mexican endemic species to Alfred Lau and are most grateful to him and Joe Mazrims for preparing this article for our Newsletter.

BOOK REVIEW

by Chris Heath

LETT'S GUIDE TO CARNIVOROUS PLANTS OF THE WORLD

CHARLES LETTS & CO.

R.R.P. £19.95 (U.K.)

A new book for carnivorous plant enthusiasts is welcome, and this well produced volume contains some superb photographs, many in habitat. Several field trips are described, providing useful and interesting information. There is a section on possible evolutionary paths, though this suggests a close relationship between *Pinguicula* and *Drosera*, and not *Utricularia* as might have been expected. My main criticism, and why I feel this book is reduced in value as reference, is the frequent inaccurate or inadequate information. To illustrate this, I refer to the sections on *Pinguicula* species.

No details on propagation techniques, and summer temperature guides for both Mexican and European species in cultivation are the same at 10 - 30°C. *P. vulgaris* is described in the upper temperature range, with the suggestion of cultivation in full sunshine (= early dormancy and few flowers). *P. agnata* is used as an example of a tropical species, where it is said to be found amongst tall grasses and *Sarracenia*!! *P. colimensis* is erroneously described, the illustration almost certainly being of *P. hemisphaerica* - rather generously referred to as being considered the most beautiful of all species. An illustration of *P. zecheri* in habitat is almost certainly *P. vulgaris*, and there is doubt as to a photograph of *P. moranensis* (possibly *P. rectifolia*). *P. rotundifolia* is listed, but often referred to as *P. rotundifolia*. Known species are listed up to 1985 at 54.

VERDICT

A good "coffee table" book of excellent photographs, but with rather too many errors.

SEED BANK

<i>P. grandiflora</i>	<i>P. emarginata</i>	<i>P. corsica</i>
<i>P. alpina</i>	<i>P. leptoceras</i>	<i>P. planifolia</i>
<i>P. primuliflora</i>	<i>P. ehlersae</i>	<i>P. antarica</i>
<i>P. rotundiflora</i>	<i>P. vulgaris</i>	<i>P. agnata</i>
<i>P. macroceras</i>	<i>P. moranensis</i>	
	<i>P. moranensis</i> 'Mexicana'	
	<i>P. moranensis</i> 'Caudata'	
	<i>P. ehlersae</i> x (<i>P. x Sethos</i>)	
	<i>P. moranensis</i> 'Morelia'	
	<i>P. x Sethos selfed</i>	
	<i>P. longifolia</i> ssp. <i>causensis</i>	

Many thanks to all who have donated and especially to Tom Hall (U.S.A.) for his generous donation. Please remember to only pay when you have received the seed vegetable. We receive very many requests and some seed was cut quickly. If alternatives are acceptable please indicate and these will be sent. - RON

INSERTS

1. "FAMILY TREE"

This shows the relationships between the species. I have composed this from the literature in my possession. I am sure that as more research is carried out on the genus, things will change. Indeed I have recently been informed that P. laueana is more likely to represent Section Longitubus than Section Orchosanthus. Any confirmed movements will be reported in future Newsletters.

2. Climate chart

We have included this chart for you to have the opportunity to assess the possible requirements of the Mexican species. Some location data can be found in Newsletter No.1. If you do not have access to a copy of No.1, you can write to me for a photocopy of the location list, (please include a S.A.E. and 2 reply coupons).

* Please note that there are NO back issues available.*

3. Photographs

The photograph inserts are as follows :

- | | | |
|--------------|---|--|
| TOP LEFT | - | <u>P. colimensis</u> showing long thin spur, |
| TOP RIGHT | - | <u>P. hemiepiphytica</u> showing long corolla tube, |
| BOTTOM LEFT | - | <u>P. 'Ayautla'</u> growing on a rock face in Mexico |
| BOTTOM RIGHT | - | <u>P. hemiepiphytica</u> , winter rosette, showing |
- that it is NOT formed underground and is NOT
'bulb' like.

- RON