

Islaya grandiflora
var. *levispinia*

Carl J. Lazzari

THE CHILEANS

YEARBOOK 1968

GENUS ISLAYA

THE GENUS ISLAYA BACKEBERG

By Wolf Kinzel

(Translated by E.W. Bentley and based upon the German Round Robin devoted to this genus).

In recent years the so-called 'Chileans' have become very fashionable; he who does not boast at least some *Neochilenia*, *Neoporteria* or *Copiapoa* can scarcely venture amongst cactophiles. Surprisingly, therefore, one single genus remains almost unnoticed that belongs certainly, not in a geographical - but rather in an ecological (and perhaps also taxonomic) sense to the 'Chileans'; the genus 'Islaya' Backeberg which, with only its most southern species in Chile, terminates the range of the cacti genera of the Chilean-Peruvian coastal desert to the north. The object of the following notes is to make this genus better known to the cactophile and at the same time draw the attention of the botanist to certain problems.

Conditions of the habitat

The climate in which the plants of this genus must literally starve is unique; a desert hard on the shore of the Pacific Ocean, in which it almost never rains; the cold Humboldt current running along the coast, especially in the winter half-year causes thick mist with biting wind to drift landwards which however falls as rain only high up against the slope of the Andes. In the summer the tropical sun scorches up all living things that are not specially protected. Buxbaum says of the temperature there; 'Temperature low in relation to the geographical position; in spite of the nearness of the equator the yearly average is under 20°C'. However if one breaks down this average as with the aid of data from the Moquegua meteorological station quoted by W. Hoffman (4) another picture is seen. In the year 1947 the monthly maximum lay between 35°C. (April) and 29.5°C. (June), the monthly minimum between 9°C. (January) and 2.5°C. (May and July). This means daily temperature changes of about 20°C. with only quite small temperature differences between different times of year !

In such murderous conditions only the mostly globular - short cylindrical however when older - plants of this genus live on completely humus-free sandy or pebbly soil which in many places is strongly calcareous. From habit I said they live 'on' - better would have been 'in' the soil. Often only half the blown away woolly felted crown is showing and it is not easy to find the plants. Often the Islayas are the only dwellers in this otherwise dead waste; sometimes they are associated with blue algae, *Tillandsias* and in certain spots also with some other cacti e.g. low lying *Haageocerei* (*H. repens* etc.). Perhaps here is the reason why this genus is still so little known. It needed in the first place a thorough search of this desert region by collectors such as Ritter, Rauh and more recently Hoffman, in order to really find them. W. Hoffmann said to me, still influenced by his last collecting trip; one really can't quite understand how plant life can be sustained in this disconsolate desert.

The Genus

In the Buxbaum system *Islaya* is put in the second series of the tribe *Notocactaeae*, together with the recognised 'Chileans'. For a description I had best quote, before I get down to details, the author of this genus from his 'Kakteenlexikon' (2) -

"Globular to longish plants, perhaps usually growing singly if undamaged; with a various sized, thick felt crown and yellow - only in one case partly reddish - flowers. The red fruit is fluffy haired with persistent flower remnants together with the upper tube bristles on top; when ripe it becomes elongated into a basally opening hollow fruit with seeds inside at the top, with or

without carpel sacs; the seeds are dull black. A very uniform group of species".

If the inclusion of the genera *Horridocactus*, *Nichelia*, *Thelocephala*, *Reicheocactus*, *Pyrrhocactus* and *Islaya* in *Neoporteria* as Donald and Rowley (10) recommend on the basis of R.R. Sokal's 'Numerical Taxonomy' (9) from a computer comparison of their characteristics if favourably received, this 'uniform species group' should perhaps at least stay as a sub-genus.

The smallest species become scarcely bigger than 10-12 cm., the largest species - *I. grandis* - up to 50 cm. high and 20 cm. thick; the longest - *I. krainziana* - some 12 cm. diameter and up to 75 cm. long.

The round felt crown, yellow, whitish or grey allows one to recognise the beginning of the growing period; its colour becomes fresher, brighter, and it grows at the periphery. But later, after the flowers, more and more young spines break through it: in some species it is finally completely overgrown with spines. The young areoles appear at the edge of the crown, at first still strongly wool-felted, later becoming more and more naked.

The roots are adapted completely to the rainless mist climate in which the ground only gets wetted on the surface. They mostly do not go deep, but exhibit a widely ramifying dense system below ground, often in a meter-wide circle round the plant.

The areoles, on 10 to more than 20 distinct ribs, bear numerous outer and mostly also some middle spines, which in my opinion have a clear protective function; the outer spines we often find parted, that is, they do not lie ray-wise round the areole but on both sides, roofing over the furrows between the ribs. In the middle spines, bending downwards is not to be overlooked; often the lowest (or several) are sharply bent off downwards, overlapping the neighbouring outer spines and even partly the next areole so that the crest of the ribs is covered by a continuous line of spines. This tendency to parting of the outer spines and the downward directing of the middle spines seems to be more or less clear cut in all species; almost I might designate it as a characteristic of the whole genus.

The buds spring from the felted crown - not exactly from the middle, but more to the edge. First one sees a growing tuft of wool that sometimes in its different colouration already presages the later flower colour. From this the bud then emerges. (Occasionally such wool tufts show themselves without buds, however; they are sterile and after some time become carried off by the wind).

The flower (Fig. 1) is radially symmetrical, the perianth leaves lanceolate, in most species yellow to yellowish green, in some species however inclined to pink to red. The stamens are numerous, the style ends in 5-7-9 stigma lobes spread out like a star. At least one species is self-fertile.

The fruit - this is a small marvel. Red and globular, it grows with progressive ripening, while the seeds are found in the upper part, in a small balloon, hollow below, that bears it like a sail, the dried flower remains. The strong wind, always blowing landwards, finally breaks off the dried fruit and carries it away. Then a small opening is torn in the bottom of the balloon through which the seeds become distributed little by little in the rolling about. One speaks of a 'wind wafted fruit'.

The germination of the seeds seems to set in soon after the ripening, but to last for some years; seeds from an *Islaya divaricatiflora*, collected in 1964 and purchased on importation, germinated quite well for me in 1966.

Historical

In 1861 Forster found on a volcano in South Peru - his notes gave 'in the province of Islay' - a small globular cactus which he described as '*Echinocactus islayensis*'; body solitary, 5-7cm. diameter, almost completely spine bedecked, woolly-felted in the crown; 19-25 ribs, 8-22 outer - and 4-7 middle - spines, grey to horn coloured, flowers small, yellow', but Schumann (8) could only list this species under 'disappeared'. According to Backeberg (1), Forster's original literature about it 'got lost during the war'.

In 1913 Vaupel found near the coast at Mollendo a second species which he described as '*Echinocactus mollendis*'. Britton and Rose regard this as identical with the Forster species - a view that Rauh (6) also reached later - and listed it in their 1922 cactus book as '*Malacocarpus islayensis*'. Conversely Backeberg (1) points out - perhaps correctly - that since Forster's and Vaupel's descriptions do not tally throughout, the identicalness of *I. islayensis* and *mollendensis* is perhaps then scarcely established.

In 1931 Backeberg finds a further species above Mollendo that he first describes as *Malacocarpus minor* and later in 1934 choses it as the type of a new genus *Islaya* separated from *Malacocarpus* on the basis of the structure of the flowers and fruit.

Since 1950 further species have been found, and in 1951 Akers described *Islaya bicolor*.

If one peruses the list of Friedrich Ritter's field numbers one encounters again and again the genus *Islaya*; beside the familiar species new ones crop up; FR 128, 186, 200, 307, 588 - 591, 683 and 684. Some he described himself, others were also found and described by other collectors (as e.g. his F.R.590 *maritima*, which Rauh described as *grandiflorens*), whilst some still await description.

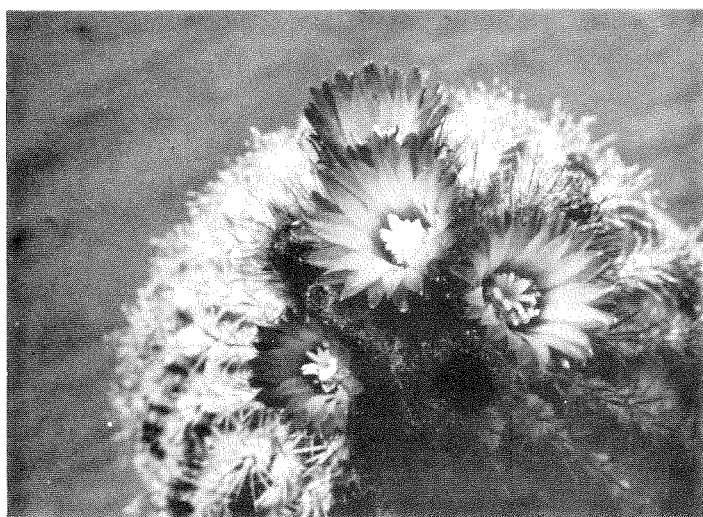
In 1954 and 1956 Rauh travelled over the Peruvian cactus region. In his report on this journey (6) he described six new species.

In 1963-64 Werner Hoffmann travelled the *Islaya* region. Besides known species he collected near Puerto Chala an as yet unknown species of which, without wishing by it to anticipate, in any way, I give a passing short description; body solitary, ca. 7cm. diameter, almost covered with spines, about 20 ribs, numerous outer - and more or less 5 middle - spines, reddish in new growth, blackgrey in age. Compare this with Forster's '*Echinocactus islayensis*' at the beginning of this section and we seem to have come full circle. Has Hoffmann finally found the original *Islaya* again?

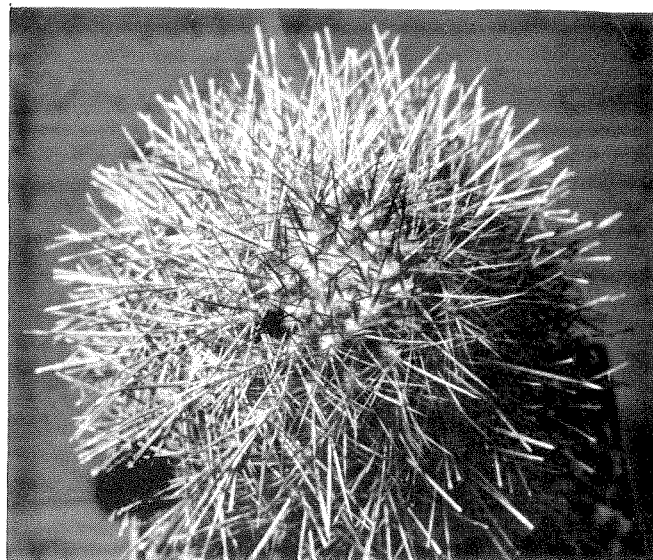
The Species and their varieties

Before I turn to the species in detail, may I venture an observation about varieties. Always in the naming of these varieties - *tenuispina*, *brevispina*, *curvispina*, etc., the suffix 'spina' occurs, which means spiny. It is therefore a matter of substantial differences in spination.

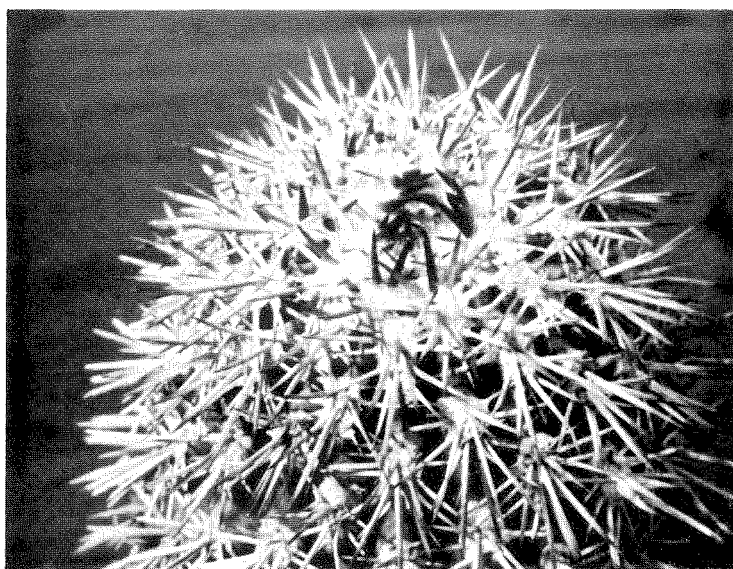
In contrast, examine Ritter's description of *Islaya divaricatiflora*: outer spines 3 to 7 mm, middle spines 4 to 10 mm long - even: flower colour green-yellow or red'. Here is quoted a range of variation that in a less experienced author would certainly have led to the setting up of two to three varieties. Not so Ritter, with perhaps the most experience of site localities; he encompasses the whole variation range in one species description: an example worthy of imitation.



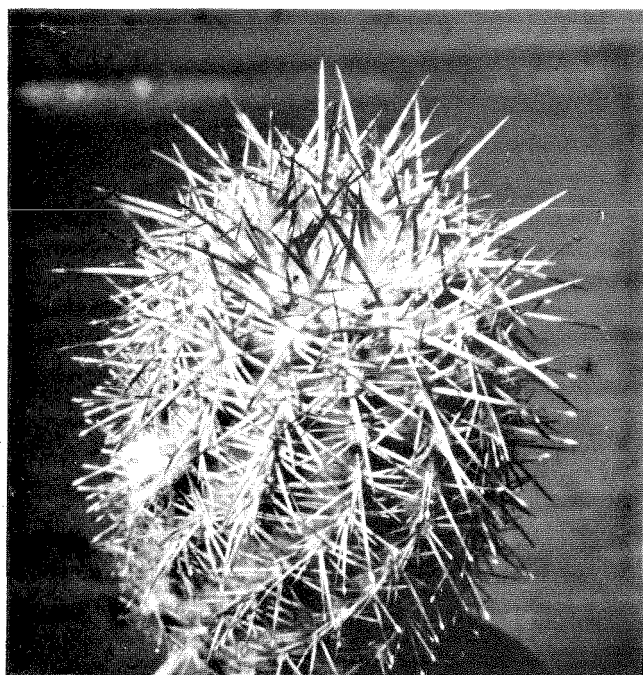
1. *Islaya* flowers (*divaricatiflora*).



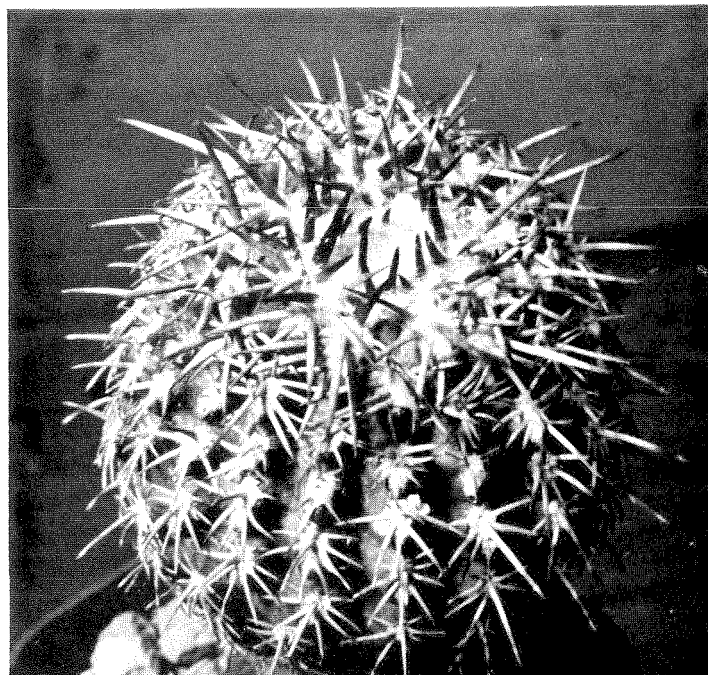
2. *Islaya* species found by W. Hoffmann.
—The lost *Islaya islayensis* refound?



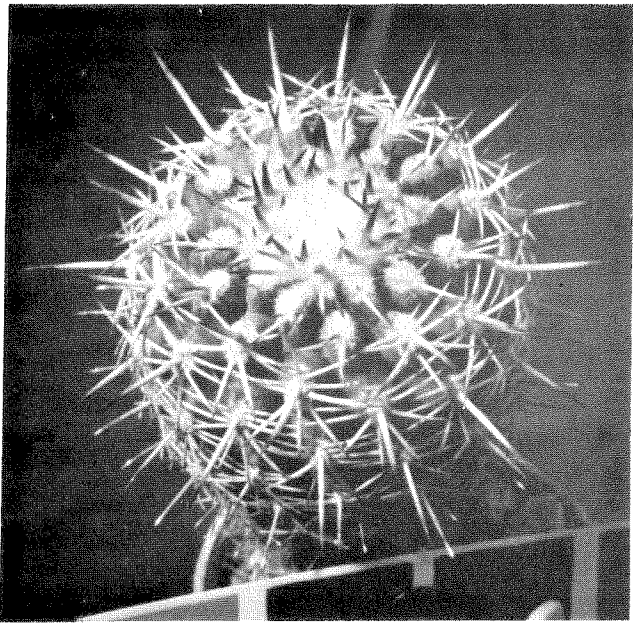
3. *Islaya bicolor*, an imported plant.



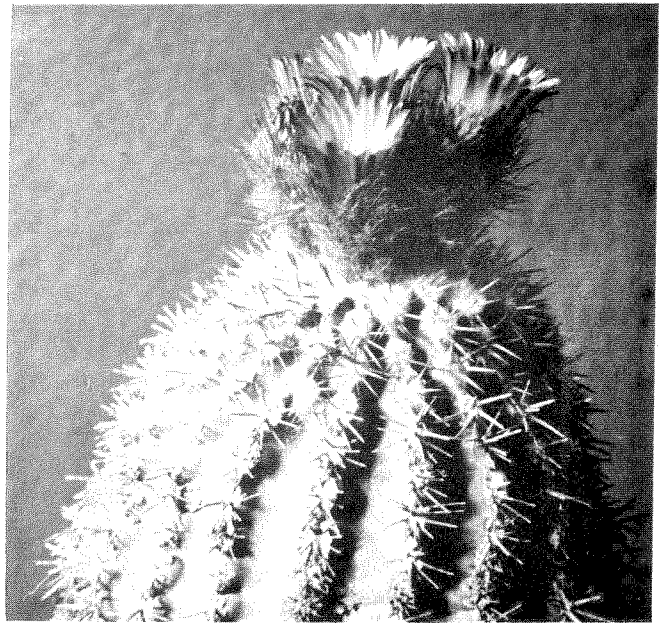
4. *Islaya grandiflorens*
Ritter's *I. "maritima"*, FR 590.



5. *Islaya paucispina* v. *curvispina*
Not all spines are curved.

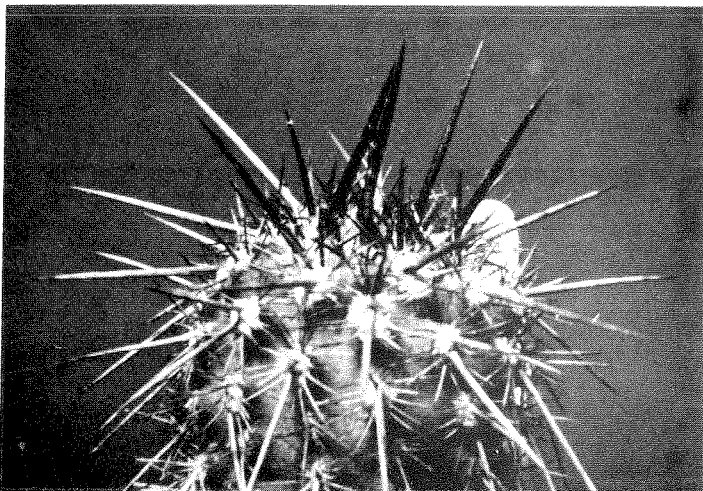
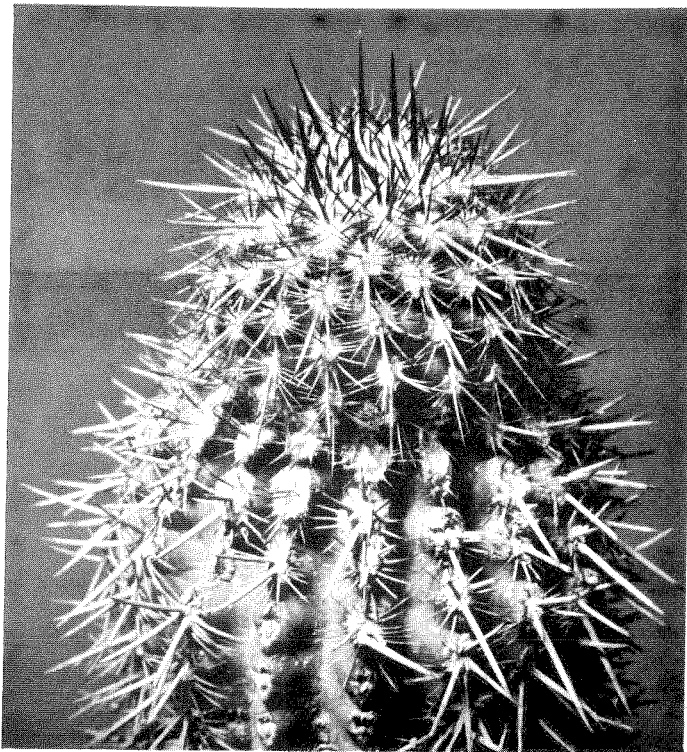


6. *Islaya brevicylindrica* (young plant).

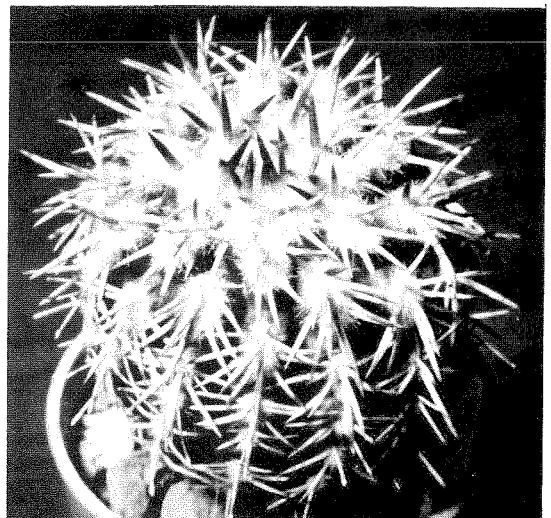


7. *Islaya divaricatiflora*.

8. *Islaya minor*.
Imported plant.



9. *Islaya minor*
Seedling - note long black spines.



10. *Islaya krainziana*

This brings up the question; does a difference in spination alone - with the same flowers and fruit - generally justify the setting up of a variety? Have we not a form at most?

This question cannot be answered by means of a single example, even if here already, as for example in *Islaya paucispina*, occasional transitions to the bent-spined form (var. *curvispina*), but rather only through precise habitat observations or sowing trials by which one may observe how widely the progeny of one and the same plant varies.

If in what follows I now name the species in the geographical sequence from north to south, I assume that the reader can find their description in another place, e.g. in Backeberg's *Kakteen Lexicon*; so I will confine myself to incidental observations.

The most northerly *Islaya* is:-

1. *Islaya bicolor* Akers et Buining (Fig. 3) found on the high plain between Nazca and Lomas, called two-coloured on account of its yellow-red flowers. The species is self-fertile.
2. *Islaya grandiflorens* (Fig. 4) Rauh et Backeberg with perhaps the largest *Islaya* flowers, grows near Chala on the coast, but also farther south near Atico on the Pan American Highway. Rauh (6) describes a thinner and more sparsely spined form as var. *tenuispina*; owing to a misunderstanding between the two authors Backeberg lists this as the type and the more strongly spined form as var. *spinosior*. Ritter, who found the species earlier, but did not publish, listed it as FR 590 as *Islaya maritima*. Also north and south of Chala one finds:
3. *Islaya paucispina* Rauh et Backeberg with its bent spined form var. *curvispina* (Fig. 5), also reaching south to Atico - here may also belong *I. paucispinosa* described separately by Backeberg. Further on Hoffmann's new discovery:
4. *Islaya* sp. nova de Puerta Chala, which may be identical with Forster's missing *I. islayensis* (Fig. 2).

Inland, eastwards from Chala, Ritter found his yet undescribed:

5. *Islaya flavida* n.n. FR 186, yellow-brown spined; description awaited shortly.

Pushing further inland one finds the largest species:

6. *Islaya grandis* Rauh et Backberg, found up to 50 cm. high, on the detritus terraces above the Rio Majes near the Hacienda Ongoro at 900 m. altitude. Here also a sparsely spined form, var. *brevispina*.
7. *Islaya copiapoides* Rauh et Backeberg, regarded by Ritter as a variety of *I. islayensis*, it grows in the coastal desert north and south of Ocona.
8. *Islaya brevicylindrica* Rauh et Backeberg (Fig. 6) was found somewhat further south, above Camana.

Further inland, but more to the south, almost as far down as Moquegua, Ritter found:

9. *Islaya divaricatiflora* Ritter FR 588 (Fig.7) of which there are a reddish and a greenish flowering type. Also in its spination this species is a good example of the range of variation of many *Islaya* species.

The type of the genus:

10. *Islaya minor* Backeberg (Figs. 8 & 9) listed by Ritter elsewhere under FR 307a also as a variety of *I. islayensis*, found by Backeberg above Matarani, somewhat north of Mollendo; it extends along the coast southwards down to Ilo.
11. *Islaya mollendensis* (Vpl) Backeberg was found in 1914 by Vaupel between Matarani and Mollendo and taken by Dr. Rose as well as Rauh and Ritter to be identical with *I. islayensis*, but was called in question by others (in this case Buxbaum and Krainz appear to be in agreement with Backeberg!).

Far in the south of Peru Ritter found his FR 591 which he called:

12. *Islaya unguispina* n.n. Ritter; he wrote me briefly about it; '.... grows on the Peruvian coast near the border with Chile; but I have neither living material nor a photo, and also the flowers and seeds are not known to me, so that I cannot publish it validly'.

The most southerly known species is:

13. *Islaya krainziana* Ritter FR 200 (Fig.10) which grows in the extreme north of Chile near Poconchile in a completely rainless desert and can become 12 cm. in diameter and up to 75 cm. long. Its flower is yellow inside, red or with a reddish middle stripe outside. Of interest is the resemblance of this southernmost species to the northernmost, *I. bicolor*, as much in the spination as also in the flower colour; according to Ritter it is a pure convergence phenomenon.
14. *Islaya islayensis* Forster I have not included here; it has disappeared and is possibly identical with one of the species listed above.

After all it seems that southern Peru, especially the coastal strip between Ilo and Arica, is a rewarding field for the collector and investigator; possibly there exists there, besides Ritter's *I. unguispina*, many other new species for the finding.

So comprises the genus, which stretches some 650 km. from north to south on the West Pacific coast, up to now 13 (or 14) species, of which three are still undescribed. In number but also in growth, a small genus that should tempt many an amateur to possess in full and make the centre piece of his collection. Now in truth the only thing that prevents this is that many species are still quite rare in cultivation and therefore are not easy to secure.

Finally, a few words about cultivation. It is rumoured - I do not really know why! - that is a difficult genus. Although I cannot exactly recommend them to the beginner I cannot confirm this; at the most some species e.g. *Islaya grandis*, may be somewhat sensitive. Seen as a whole, *Islaya* is a rewarding, free-flowering, although slow growing genus. Grown on its own roots from sowing to first flowering one must be patient for some years. However, those who lack patience may graft; an *I. bicolor* grafted as a seedling ca. 10 cm. high brought me plenty of flowers and fruits by the fourth year.

Yet *Islaya* does well on its own roots. The substrate should be mineral and humus free; perlite (a volcanic tuff - H.M.) can be recommended. Be sparing with water. Two to three full waterings in the year - especially in spring and autumn - suffices; at other times be content after hot sunny days with a thorough spraying. In summer several week's dryness will not hurt; the *Islaya* lover can safely go on holiday and leave his darlings to the sun. In autumn the spraying can continue as long as the days are sunny; in the spring begin this as soon as the sun is reasonably warm. As the sun's heat intensifies it is advisable to keep *Islayas* close to the glass. The winter conditions should be cool and fairly or completely dry, but as light as possible.

Light is most important; one should be careful not to compare the Garua fog with our dull November days! Werner Hoffmann once told me that the light there even on misty days is so bright that photos taken by guessing the exposure will be over-exposed for certain. In our latitudes *Islaya* then needs the lightest situation, even in winter.

Plants on their own roots grown in this way in pots seldom develop a thick ball of roots since most of the moisture comes from above; planted out, however, their roots soon become spread out on all sides.

Grafted *Islaya* must naturally be treated more according to the requirements of the stock. This brings about a culture problem, if one grows *Islaya* grafted and on their own roots side by side. In such cases one must choose stocks that also do not dry up when grown with a poor water supply.

Rooting an *Islaya* is no problem, at most one of patience. Some 2 cm. sized offsets detached from a grafted *I. mollendensis* needed 2-3 years with me till the first root-tips showed; in spite of this, in the spring obvious new growth was to be seen. If one reflects that the plants in their homeland must meet a large part of their water requirements through their spines and epidermis, it follows that plants that are to be rooted must be frequently mist-sprayed; an occasional luke-warm immersion does no harm. This applies especially to imports. It is self-evident nevertheless that freshly cut surfaces should be protected from moisture.

Also when growing from seed, water sparingly is the rule. A complete drying out of the substrate just a few weeks after germination harms the algae and fungi at the most; healthy seedlings withstand it.

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The majority of the place names referred to above can be found on the map forming the front cover of 'The Chileans' No.8. A translation of a description of a collecting trip in Islaya habitat, by W. Hoffman, also appears on p.4 of that issue and on p.7 are some relevant comments from F. Ritter on the fruit and seed of this genus.

Comments from Subscribers

..... from J.D. Donald.

I find this article by Wolf Kinzel excellent and am in agreement with him almost all the way along.

The only comment I have to make is that Islaya is not really a number of separated species, but a collection of a locally variable single species, each isolated area having its own peculiar form. There is no overlapping of any specific distributions. Hence I favour very few species indeed and the reduction of most to at best local forms or varieties of the original species, Islaya islayensis, despite the obscurity or identity of the original plant.

Certainly in the re-united Neoporteria, Islaya is clearly a distinct entity, and as such could logically be classified as a sub-genus, as Gordon Rowley and myself pointed out. The fruit and seed disposal methods are identical with Thelocephala (Chileorebutia) - the seed is close to that of Pyrrhocactus (another sub-genus of Neoporteria) - and the flower is a reduced form of Nichelia (Neochilenia and Thelocephala). Clearly it is related to the Chilean genera and not to any Peruvian genera.

..... from F.J. Warne, Newcastle, England.

I obtained an Islaya grandiflorens from K. Uhlig in the late summer of 1965, the body being about 6" high and some 3" in diameter. It had some short dry roots and appeared to have been grown in a fairly peaty medium. Consequently, when potted up, the compost had a good proportion of peat in it, together with a generous amount of sand and grit, to give an open, porous soil.

The plant received constant overhead sprayings until the arrival of cold weather - I did not water the soil at all. The winter temperature in the greenhouse went down to about 38°F. During the spring and summer of 1966 I gave the plant my normal watering and spraying. It put on about ½" to 1" of growth during the season, with an abundance of wool in the crown, but no flowers.

It was given similar treatment in 1967 and exhibited similar growth, but in addition it also produced four flowers which were quite long lasting. These were followed by most striking pink coloured fruits, more colourful even than the flowers. (This plant is shown on our front cover - H.M).

.....from Miss E.M.Colley.

(Eire, west coast, Lat. 53°N , influenced by Gulf stream).

I have four small *Islayas*, three being grafted, which all flowered for me in 1967 - *I.bicolor*, which had small orangey-yellow flowers; *I.mollendensis*, and *I.minor*. There were brought back from our 1965 Cactus Tour to Belgium. The fourth is on its own roots and I think it could also be *I.bicolor* - this was acquired in Austria on our 1964 Tour.

The *I.islayensis minor* did form some fruits which were a distinctive pink colour. These contained a small quantity of seed which I passed on to a fellow member of our Branch.

I am able to get away with no heat in my greenhouses over the winter as our climate is mild enough to grow climbing geraniums up the house all the year round and the hardier type of palm grows quite luxuriantly out-of-doors here. We do get a few frosts but we are sheltered from the N., N.E., and West. Being by the sea, any snow goes pretty quickly.

..... from R.E.Martin, Gloucester, England.

I am particularly interested in this genus and at the moment I have six species of this genus, four being imported collected plants and two being seedlings which I have grown from seed. All my imports flower every year - this I do not attribute to my skill as I fully believe that the species I have are very free flowering in themselves.

My imported species of *Islaya* are:- *I.brevicylindrica*, *I.grandiflorens*, *I.islayensis*, and *I.mollendensis*. My two home grown seedlings are *I.maritima* and *I.krainziana*. My *I.grandiflorens* is 3" tall by $2\frac{1}{2}$ " diameter - this flowers best of all and for a period of some four to five weeks in all, each individual flower being out for a week or just over. *Islaya brevicylindrica* is $2\frac{1}{2}$ " tall by 2" dia. - this one seems to have one mad fling as regards flowering and puts forth anything from 10 - 15 flowers all at once covering the whole crown of the plant and lasts about 8 to 10 days, but then that's it for the season. My *I.islayensis* is 2" high by 2" dia. and also flowers over a period of about one month, putting forth a few flowers at a time.

All these flowers are pretty much the same as far as I can tell, all approximately $\frac{1}{4}$ " dia. and on short tubes. The colours do not vary a great deal, being predominantly the same - yellow, with orange shades towards the centre. Only on *I.islayensis* do the fruit berries appear after the flowers, with a yield of about four seeds to a berry. On looking through my lens at some seed of *I.islayensis* I see that it is black in colour, rather like a kidney bean in shape, in size 2 mm in length and 1 mm in width.

All my *Islaya* are on their own roots and whilst they look happy enough and flower quite well, they never seem to make much growth. In spring - about March - they begin to look more colourful about the body and the wool on the crown begins to look more white as if it were new growth - and then from this wool in due course the flower suddenly appears almost without warning. My two seedlings are in their fifth year from seed and are both about the same size - about $1\frac{1}{4}$ " tall by 2" dia. - but I do not know at what age they might flower.

My soil mix is John Innes No.2 plus much sand, flint grit and limestone chips. This gives a nice open and porous mixture, to which I add just a pinch of gypsum. I spray these plants now and again during the winter months.

..... from Fr.P.Schwatlo, Germany, Schliersee. (Alpine foothills).

"We live in the mountains at a height of 825 m. (approx. 2,750 ft.) The winters here are extremely long. There were over six feet of snow outside in the middle of February. The slopes surrounding the house still have large patches of snow at the end of April. In mid-April we had a heavy fall of snow (a thing which can occur here quite easily in June!) which put us back again so that my last cacti were only moved in to their summer quarters in mid-April. Last year we experienced an alpine thunderstorm when we had hail-stones as large as pigeons' eggs. The green-houses belonging to a nursery nearby were smashed to pieces within a few minutes. Thank goodness my greenhouse is of plastic. There was not even a scratch to be seen after the storm.

I have only three *Islaya*s: *grandiflorens*, *copiapoides*, and *minor*, the latter being but a few millimetres in height and a few weeks old. No flowers there for a while. The two first-named plants have flowered regularly. They have the usual yellow flowers, which have a strong scent. Unfortunately *grandiflorens* has some kind of vermin under the wool of the crown which might have done some damage, as nearly all the wool has become loose".

..... from H. Middleditch.

In his opening paragraph the author refers to the genus *Islaya* terminating the cacti genera of the Chilean-Peruvian coastal desert, to the north.

The coastal desert of Ecuador, Peru and northern Chile is relieved by a narrow strip of vegetation running the full length of the desert from north to south, in broken patches. (See *The Chileans* No.2). The onshore winds bring moisture in the form of mist - or *garua* in the local tongue, so this highly localised climate is often called the *garua* climate. This is the only source of moisture for vegetation in this *garua* zone, so that where the *garua* mist is weak in extent and limited in duration conditions will be far more arid.

From the southern part of Peru - covering the habitat of *Islaya* - to the latitude of the River Copiapo in Chile, the *garua* mist is weaker and more patchy than to the north or south, so that this length of *garua* zone is more desert-like, even during the winter season of mist, than the remaining *garua* zone to the north and south. Doubtless it is this central section of desert to which the author refers when he describes the *Islaya* as terminating the northern end of the coastal desert.

From about the latitude of Nasca northwards (see map, *Chileans* No. 8) the season of the *garua* is much damper, so much so that it will support a wide range of non-succulent vegetation, in addition to *Haageocereus*, *Loxanthocereus* and *Trichocereus*.

I have a few *Islaya*, one of which - *I. brevicylindrica* - became detached from its grafting stock. To my surprise it has produced some sign of root during the last five months, although it is not quite one inch across. During 1967 my *Islaya islayensis minor* (or at least the plant carrying that label) produced a single flower which subsequently turned into a bright pink fruit. This gradually elongated until it was over $\frac{1}{2}$ " tall. This is shown in the photograph (Fig.11).

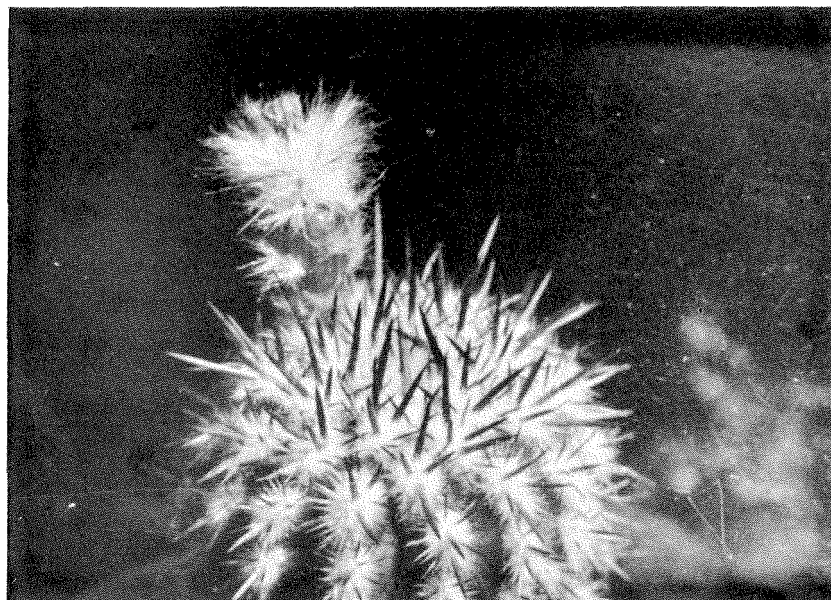


Fig.11 *Islaya islayensis minor*, in fruit.
Collection and photograph - H. Middleditch

STUDY GROUPS / ROUND ROBINS

English	Copiapoa	Contact the Chileans.
	Epiphytes	A.J.S.McMillan, 5 Oakfield Road, Bristol 8.
	Frailea	J.Forrest, Beechfield House, Meikle Earnock Road, Hamilton, Scotland
	Hydroponic Culture	P.R.Hallett, Llaregyb, 20 The Garth, Bull Bay, Amlwch, Anglesey.
	Lobivia	R.E.Hollingsbee, 46 Markland Road, Dover, Kent.
	Miniature Opuntia	D.E.Watling, 52 Frances Road, Windsor, Berks.
	Neoporteriae	H.Middleditch, 5 Lyons Avenue, Hetton le Hole, Co.Durham.
	Notocactinae	K.H.Halstead, Little Firtrees, Wellington Close, Dibden Purlieu, Southampton.
	Parodia	A.Johnston, 11 Malvern Road, Scunthorpe, Lincs.
	Photographing Cacti	A.W.Craig, 16 Skeeby Close, Hartburn, Stockton on Tees.
	Sulcorebutia	Contact the Chileans.
	Trichocereus	N.T.Hann, 30 Copse Avenue, West Wickham, Kent.
	W.Kinzel, 53 Duisdorf / Bonn, Bonhoefferstrasse 16, West Germany.	
	German	
	Parodia. Rebutia & Lobivia. Chileans. Gymnocalycium. Echinopsis. Epiphytes. Islaya.	

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