

CHILEAN CACTUS COUNTRY

The cacti from the west coast of South America grow in the relatively narrow strip of land which lies between the Andes and the Pacific Ocean. Natural climatic controls in this region produce a barren landscape from the northern border of Peru to central Chile, where cacti are the predominant natural vegetation.

The arid nature of this coastland is a result of the combined effects of the high, unbroken, backbone of the Andes; the cold Humboldt current which runs northwards off the full length of the coast of Chile and Peru; and the very stable high-pressure anti-cyclone centred over the south-eastern Pacific. These natural controls combine to produce an arid land stretching along almost 2,000 miles of coast. Nowhere else in the world do we find a coastal desert of such aridity spanning so many degrees of latitude.

In Europe, we have a weather pattern of frequent cyclonic disturbances bringing continual changes of cloud and temperature, with varying amounts of rainfall. In contrast, the anti-cyclone off the Pacific coast of South America is undisturbed throughout the year, bringing a monotonous succession of bright, sunny, cloudless days to the western slopes of the Andes in Peru and northern Chile.

The natural air flow round the Pacific anti-cyclone produces northerly warm, dry winds which are more or less parallel to the coast and so bring no rain to the lands over which they pass. This general northward air flow is modified by the effects of the rapid rise in the surface temperature of the earth each day due to the combination of tropical sun, clear skies and absence of vegetation. By day, the air immediately above the hot rocks or sand also becomes very warm and tries to rise. On the other hand, the constant motion of the ocean waters swallows up the sun's heat so that the air over the sea shows little change in temperature between day and night.

During the day the air over the sea will be relatively cool compared with that over the land, so that it flows inshore whilst the heated overland air rises uphill. This produces a typical daytime onshore breeze which can be quite strong at high noon.

The cool Humboldt current, which flows northwards opposite the full length of the coast of Chile and Peru, also strongly influences the climate of the arid zone. Because of the Coriolis force, the water tends to flow at a small angle to the left of the air flow. The surface sea current thus sets slightly away from the coast, being replaced by upwelling water from even colder depths of the ocean. The coldest water is thus often found nearest to the coast and will be 10°F or more cooler than the average for the latitude.

The vast quantities of marine organisms brought up from the depth by the ocean currents support great shoals of fish: these in turn are harvested both by hordes of sea birds nesting on the cliffs and by the occupants of the isolated fishing villages scattered along the coast.

This cool offshore water exaggerates the typical difference between land and sea daytime air temperature, so strengthening the typical onshore day breeze. This effect can become so pronounced, especially in summer, that the onshore wind or "virazon" reaches gale force in the afternoon, preventing the handling of cargoes at the unsheltered coastal ports. During the hours of darkness, the reverse effect is depressed by the cool sea current and offshore night winds are mild or non-existent.

Flowing north with the Humboldt current is a stream of cool, moist air. The warm air typical of the latitude is chilled where it meets this cooler air current and where the two air masses mix, stratus cloud is formed. Where this cloud comes into contact with land or sea, it appears as mist or fog. This fog bank generally occupies an altitude between 1,000 and 2,000 feet above sea level, but varies in both depth and extent with locality and season.

The upwelling of the coldest water near the coast is more marked in certain places. The strongest upwellings are at about latitude $7^{\circ}/8^{\circ}\text{S}$ (North of Trujillo) and at $15^{\circ}/16^{\circ}\text{S}$ (around Lomas) with less strong upwellings at $22^{\circ}/23^{\circ}\text{S}$ (Tocopilla) and 30°S (Coquimbo).

Water from the open ocean, at a temperature more typical of the latitude, overflows the cold Humboldt current and approaches the coast at $9\frac{1}{2}^{\circ}\text{S}$ (Huarney), $13^{\circ}/14^{\circ}\text{S}$ (Pisco) and a very marked one at $17^{\circ}/19^{\circ}\text{S}$ (between Mollendo and Arica).

Where the water immediately adjacent to the coast is rather cooler, the coastal fog is generally more marked and persistent.

The height and density of the fog also varies with the seasons. In summer the cloud base will gradually rise until it reaches about 2,000 ft (extending therefrom up towards 4,000 ft), lowering again with the approach of winter until the base drops to about 1,000 feet. The fog is also most strongly developed in winter when the re-evaporative effect of the sun on the cloud top is least.

At Lima, the clear skies of March and April begin to be clouded in May, the cloudiness grows until, from late June until September, the sun is invisible for weeks at a time. At Mollendo, the months of February, March and April are least cloudy, whilst July, August and September are completely overcast for many days in the month.

Owing to the regular daytime onshore breeze, the fog bank drifts landwards on to the coastal hills. In Peru, the foothills rise more or less gradually from the shore; in places, sandy plains of varying width and extent separate the foothills from the shore. The fogbank thus lies on the hills and up the valleys at a very variable distance from the shore.

For most of the coast of northern Chile the foothills rise steeply from the shore to upwards of 3,000 feet: consequently, the fog only penetrates inland through the lower passes and the infrequent river valleys. For almost 500 miles of coast in northern Chile there is but one river - the Loa - breaching the cliff-like coastal barrier. When Charles Darwin, the famous naturalist, visited Iquique in 1832, he noted how the fog bank seldom rose above the cliffs of the coast range which rose almost abruptly from the sea.

In central Chile, the coastal range gradually reduces in elevation and changes slowly to a series of peaks and ridges. It is breached by an increasing number of rivers as the less arid climate of the Santiago region is approached. As a result, arms of fog penetrate into more inland country. Additionally, the effect of night-time radiation of heat to clear skies and the consequent formation of early morning mists - especially where cold air drains into valleys and basins - extends these foggy fingers inland at dawn. As far inland as Santiago, low lying areas are occasionally covered by fog banks.

In other parts of the world, onshore breezes bring mists to barren coastlands (lower California, Kalahari, Somalia) but nowhere can they compare in extent and persistence with the fog bank - the "Garua" - running from Ecuador to Central Chile.

This fog bank is the source of moisture for a band of vegetation on the coastal hills - a band perhaps a few miles wide in places, barely a mile wide in others - in an otherwise rainless, barren desert which is roughly between 50 and 100 miles wide. At its thickest and wettest and most persistent, this fog will support lush, semi-tropical vegetation. In the transition zone seaward and landward of this band and in the region of thinner or less persistent fog, only cacti, lichens, and Tillandsia grow. Inland or shoreward of these plants, there is only bare rock or shifting sand.

The central part of Chile is also visited by the northward shift of the Westerlies in winter (July), bringing an annual rainfall to Santiago which averages about 16": this rainfall decreases northwards so that at Coquimbo there is commonly only one rain shower each year - in some good years, two. This additional moisture allows the Neoporteria and Tephrocactus to spread from the coast, inland to the main Andean chain.

From Los Villos we find Eulychnia growing both on the coast and for about fifteen miles inland along quebradas and basins. Near Coquimbo the Copiapoa appear and with various allies of Neoporteria continue nearly to the northern borders of Chile. From northernmost Chile to Punta Chala in Peru we find the genus Islaya.

The continuity of the climatic characteristics of this zone are exemplified by comparing John Akers' description of "Peruvocereus" clavatus found near Lima, which had spines and bristles grey and shaggy as a plant became covered with lichens and Tillandsia (Jnl. Cactus & Succulent Society of America XX, 4, April 1948) with Hans Lembcke's description and illustration of Eulychnia observed near La Serena, overgrown with great cushions of moss (Kakteen 9, 3, March 1958), although these two observations were made about 1,500 miles apart.

H. Middleditch.

(We hope to give more detailed information about habitat of the various cacti genera and associated flora in a later article. Editor).

NEOPORTERIA

(Translated by E.W. Putnam from the original in "Dodonaeus", 111, 2, 27-30 and reproduced by kind permission of the Belgian Cactus Society)

When trying to unravel the Chilean group of cacti one has to start by saying that two of the genera, Neoporteria and Copiapoa, are quite unconnected with each other. The genus Copiapoa is readily recognised since all its representatives are easily distinguished from all other genera as much by their form as by their flowers.

But one cannot say as much of the Neoporterias, whose form and general appearance are easily confused with Neochilenias and Horridocactus. The flowers, however, are characteristic. A similarity can be seen in them to the flowers of certain Cerei, such as Cleistocactus among others, in which the exterior petals are strongly recurved.

I fail to understand why, in spite of these differences, the American specialists, particularly P. Hutchison, wish to re-group the four genera under the name Neoporteria. The tendency to place Pyrrhocactus, Neochilenia, Horridocactus and Neoporteria into a single genus is general in the U.S.A. This point of view could be better understood if it was limited to the amalgamation of the first three, but the Neoporterias, as we understand them, are so characteristic and typical that one must group them as a distinct genus.

The actual genera show sufficiently noteworthy differences. With Neoporterias the first signs of flowering appear in the autumn and flowering often takes place in the middle of winter. The other three genera flower more traditionally, in spring or summer. The buds of Neoporteria are bare or glabrous, where in the other genera they resemble woolly knobs. Neoporterias have cylindrical flowers with erect, vertical petals which surround and protect the stamens, in contrast to the other genera whose flowers are shaped like small urns or funnels with half-open or oblique petals which completely expose the stamens.

The scales of the flower-tube of Neoporteria are slightly woolly or wholly glabrous. On the other hand all the other species have abundant wool, hair or bristles. The fact that the flowers of Neoporteria remain open day and night is also a remarkable characteristic which distinguishes them completely from Horridocactus, Pyrrhocactus and Neochilenia, which only flower in the daytime.

If we make a systematic comparison of seeds we find notable internal and external differences. Seeds of Neoporteria are brown and matte but shine when observed laterally in reflected light, while the seeds of the other three genera are all brown-black, completely matte and show no reflection.

But let us leave this discussion of the difference between these Chilean genera and turn to the history of the genus Neoporteria, which is of relatively recent institution. When Britton and Rose erected it in 1922 their diagnosis was practically the same as that we now apply to Neochilenia, since they gave the genus yellow or cream-coloured flowers and a rapiform structure. Their type-species was Echinocactus subgibbosus. As this species has flowers which distinguish it completely from the other species, the diagnosis become void, since it would have led to two types of inflorescence being included in one genus.

Backeberg, who did not fail to notice this anomaly, then erected the genus Chilenia, but should have quoted a type-species for it to be valid. With the accepted rules of nomenclature the type-species could not have a different generic name to other plants with the subgibbosa type inflorescence which were still included in Neoporteria.

Later the other species were incorporated in the genus Neochilenia when it was realised that Chilenia could not be retained as it had never been given a latin diagnosis.

Then Backeberg discovered that certain Neoporterias could have several flowers at the same areole, so he erected another new genus: Bridgesia. He learn subsequently that this generic name already existed, so he re-christened his creation Chileniopsis. But his difficulties were not over yet, and it became clear that other species in other genera could also carry several flowers per areole, so he finally capitulated.

The general appearance of old plants is often semi-columnar and some species may even attain a height of three feet, e.g. grafted specimens of N. villosa, cephalophora and nidus. The other species rarely exceed 18 inches in height and may attain diameters of about 12 inches.

These are very attractive plants to cultivate as they may often flower after two or three years and can be wintered in very cold conditions, corresponding with their habitat conditions and confirmed by experience. Old specimens remain quite free from blemishes.

Their spiny armour is always admired. I am thinking especially of Ritter's recent discoveries, among which I might mention the beautiful plants of the multicolor group, whose spines range from white to black. Also worth mentioning are N. rapifera with its distinctive tubercles and N. nigrihorrida and N. castaneoides, so widely sought and admired.

For cultivation I recommend the grafting of these slow-growing plants onto sturdy stocks, with the exception however of N. cephalophora and N. villosa which literally cover themselves with offsets. I recommend for stocks Trichocereus spachianus and Trichocereus lamprochlorus, with a strong preference for the latter which I find most successful. It should also be noted that grafting on Trichocereus pachanoi encourages the production of outstanding spines on several species.

Once grafted there is no further need to worry about cultivation, as they will flourish with the traditional methods used for our grafting stocks.

A. GOVAERT, Wommelgem, Belgium.

Extracts from Correspondence

G.D. Rowley writes: "When I first heard of something called "The Chilly-uns" I naturally concluded it was a magazines for nudists !. However, having overcome my disappointment on actually receiving a copy, I extend congratulations and a welcome". He also says: "You could hardly have picked a more controversial genus than Neochilenia since even the generic name is wrong !. Nichelia has priority by four years and under International Rules must be taken up instead."

L.E. Newton comments on the Observation Records - "One set of data which can be supplied by those in possession of imported plants, is the change in phenotype which may occur in cultivation, e.g. differences in lengths of spines. After a few years in cultivation plants may not agree with published descriptions, especially those raised from seed. At present there is no available information on the plasticity of taxonomic characters, though everyone is aware that they are very plastic".

D.W. Whiteley, re genus Chileorebutia (Frič): "Yoshito Ito of Japan produced the valid genus Thelocephala which was the same as the invalid genus Chileorebutia of Frič, being based on the same type species, Echinocactus reichei (K.Sch.). This is why Ritter was later unable to validate the genus Chileorebutia since Thelocephala (Ito) takes precedence."

Mrs. P. Pens of South Australia - "I've got an old plant of Neoporteria Chilensis growing out in my garden about 18 ins. high . . ."

Dodonaeus tell us, regarding some plants distributed under sp. nova names or type numbers: "Pyrrhocactus sp. nov. Santiago No. 12 is seed of Mr. Lembcke. Neochilenia woutersiana would be B.A.W. 3 and comes from Mhr. Wouters of Lent (Holland), the description should have been published in Backeburg's Lexikon (seed coming from behind the Iron Curtain). Pyrrhocactus Salto de Agua is wild seed of Uhlig (German). Neoporteria sp. nov. 102 comes from an import plant belonging to Mhr. Jansens, La Hague."

We should appreciate factual reports on the quality of plants and service from overseas nurseries and exporters. We have one comment: "I recently received some plants from Max Schleipfer of Neusass bei Augsburg, Germany. These included a number of Neopteris identified by field number only, which I suspect are seed collected by Hans Lembcke. All plants were clean, free from damage and reasonable value for the price. The plants were well packed but had been sent by land and not air mail as requested; the charge for postage and packing was 5 DM (about 9/6d) and there was a charge of 2 DM for the health certificate. This was sent inside the package and not taped to the outside where it is readily accessible for passing through U.K. Customs. The price list comprises 63 pages, and is unusually informative."

NEWS & NOTES

Most readers will have seen the first of a series of articles in the June issue of the National Cactus and Succulent Journal - "South American Echinocactanae (Part 1)" by Hans Bonefaas and Cyril A.E. Parr.

We understand that an extensive article on Neopteris and allies by J.D. Donald and G.D. Rowley will appear in the next two issues of the Journal of the Cactus Society of Great Britain.

Revision of Observation Record. It is proposed to revise the layout of the draft Observation Record sent out with "The Chileans" No. 1 before re-printing in its final form. Mr. Middleditch has circulated comments to those who have already made suggestions, any further comments will be welcomed by him if sent promptly.

The yearly subscription for "The Chileans" is 10/6d, please send this to the group organiser, Mr. H. Middleditch, 5 Lyons Avenue, Hetton le Hole, Co. Durham.

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