Bromeliaceae

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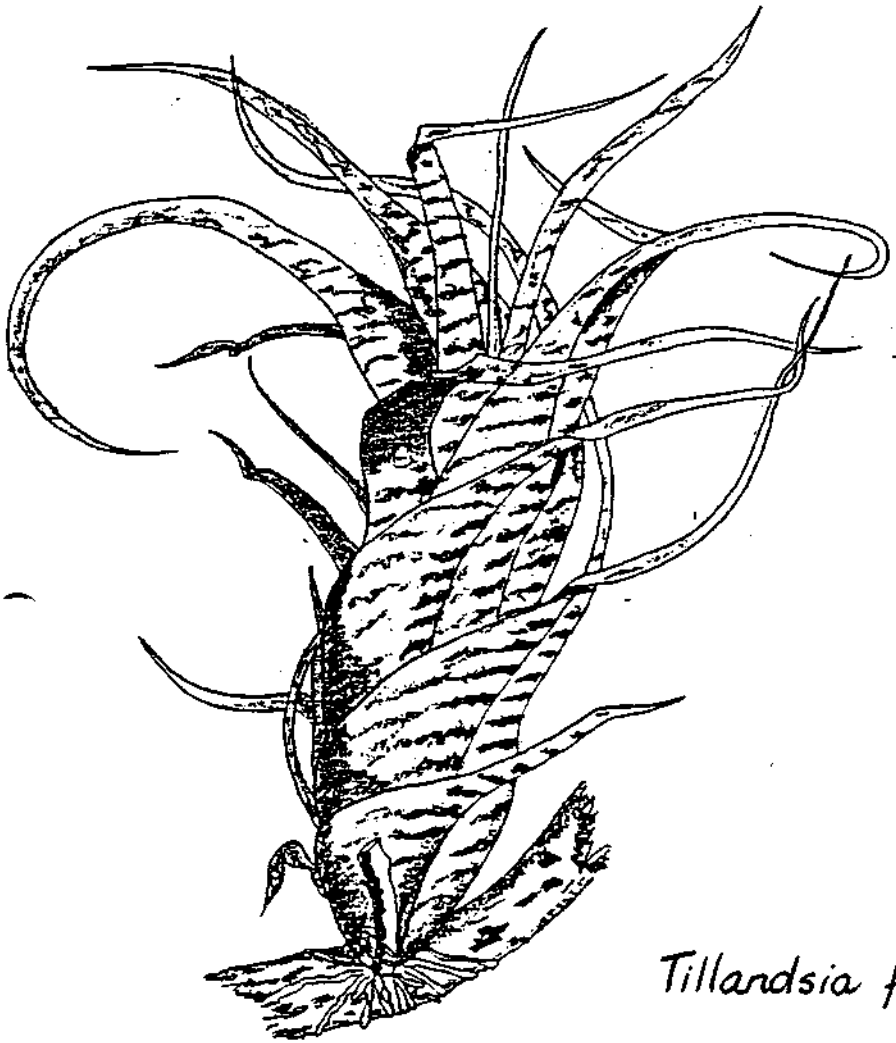

Tillandsia flexuosa.

THE BROMELIAD SOCIETY OF QUEENSLAND

General Meetings are held on the third Thursday of each month except December, at the Uniting Church Hall, 52 Merthyr Road, New Farm, commencing at 7.30 p.m.

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AUSTRALIA. 4006

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PATRON:	Mr. H. Caulfield	
PRESIDENT:	Mr. John Higgins	8002561
SECRETARY:	Mr. Greg Stewart	2779965
TREASURER:	Mrs. Lorraine Wilson	3901266
EDITOR:	To be appointed	
COMMITTEE:	Mrs. P. Hobbs, Mrs. P. O'Dea, Messrs. L. Butt, D. Hobbs, M. O'Dea, N. Ryan	

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PROGRAMME

NOVEMBER, 16th	General Meeting
	Xmas Party & Break-up
JANUARY, 1st, 1990	Subscriptions due and payable
JANUARY, 18th	General Meeting

EDITORIAL

This issue of Bromeliaceae is late to press and distribution because of problems encountered with publication.

Most members are aware that the position of Editor was not filled during the Election of Officers at our February, 1989 Annual General Meeting. Since that time, efforts to fill this position have failed. During the intervening period, I have acted as Editor, in addition to being President, and most of the articles have been contributed by a small, dedicated group of members. During the latter part of 1989, this meagre resource failed, and the Bromeliaceae publication was affected.

This issue has now been filled, and late publication is possible, but no material is available for the January - February, 1990 issue, which is also past publication at the time of writing.

Under these circumstances, the future of the Bromeliaceae is in doubt, at least in its present form. Members are urgently requested to contribute suitable articles, preferably original, to the Editor for publication.

On a more pleasant note, the Mini-Show conducted in October by our Student Stewards and Judges was very successful. A list of Class winners is included in this issue, and our congratulations go to these winners. Most classes were well supported by the members, with many excellent plants entered. The Judges and Stewards gained valuable experience, and the members gained a better insight into the presentation of plants for the show bench.

John Higgins

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SECRETARY'S NOTES

SEPTEMBER: 57 members and 4 visitors attended.

The old argument about involvement in the R.N.A. surfaced again, and a lively debate ensued. A decision re 1990 participation will be made at the January meeting.

All members were reminded of Bob & Mavis Paulsen's Field Day and B.B.Q. on 30th September.

Final details of the Royal Horticultural Society of Qld Show were advised, and members were urged to do all possible to ensure a successful weekend.

The Treasurer reported a cash balance of $2154.17 as of 31.8.89.

POPULAR VOTE:

ADVANCED	*Tillandsia bulbosa*	Peter Paroz
NOVICE	*Tillandsia multicaulis*	Ann Lasser

The Plant Commentary was given by Lorraine Wilton.

Peter Paroz delivered an extremely interesting talk on moisture management in your greenhouse.

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OCTOBER: 58 members and 4 visitors attended.

The President thanked members for their support of the R.H.S. Show. It was an outstanding success, with our display being very good.

Bob & Mavis Paulsen's Field Day was a great success, and many members suggested we have more Field Days incorporating a B.B.Q. tea.

The Treasurer reported a cash balance of $2327.85.
The sum of $14885.00 was reinvested at 17% for 12 months with ESANDA.

The Combined Show Committee was elected for 1989/90 being - Greg Stewart : Rolly Reilly : Bob Cross : Graham Besgrove : Wendy Besgrove :

The Christmas Party will be held at the November meeting, and good quality plants will be available for the raffle. The Society will supply the eats for the party.

The Mini Show, which was judged by the student judges, went extremely well, with a good cross section of plants. The judges answered all questions on their method of judging, which proved very interesting.

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DAMNED IF YOU DO : DAMNED IF YOU DON'T

After the October Mini-show, there was some lively discussion regarding trimmed leaves and the use of leaf shine for plants on a competition table. B.S.Q. follows the judging standards of the B.S.I. and the current situation is that leaf trim is allowed, and leaf shine is not. As with most instances where a value judgement is made, there are pro's and cons, and there is bound to be some dissention with the decision.

While leaf trimming is allowed, it is a cultural defect and is penalised according to the effect on the plant. A small trim on one leaf which is not readily apparent suffers only a minor penalty, while several leaves cut to a knife point (with two cuts of the scissors) attracts a greater demerit. If the trim affects the conformation, then the plant will be downgraded in this category also.

Leaf trimming is optional, and the exhibitor must decide whether to trim or not to trim. A little "out of season practice" on grooming plants will let a grower understand under what circumstances the point score of a plant will be upgraded by judicious leaf trimming.

Effectively, leaf trimming is limited to removing small defects (mostly from leaves with entire margins). Leaf trim on a spiny leaf (e.g. **Aechmea bracteata**) would leave an obvious clue, but this may still be preferable to leaving a badly marked leaf as is.

When trimming leaves, I prefer to use a razor blade or a very sharp craft knife. I run the knife along the edge of the leaf, taking a fine cut each time, preserving the shape of the leaf until the defect is removed.

Peter Paroz

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MOISTURE MANAGEMENT STRATEGIES OF BROMELIADS

Water is an essential requirement for all living things and a soft leafed bromeliad has a moisture content in excess of 90%. Within the bromeliad family, plants have evolved in a number of different ways to ensure that they have sufficient water for their needs.

Moisture management can be considered from two view points -

(1) Moisture acquisition
(2) Moisture conservation

MOISTURE ACQUISITION --

One of the most obvious evolutionary features of bromeliads is the development of a tank to impound water to sustain the plant over dry periods. Tank forming bromeliads have evolved into two distinct forms. One type is the multi-leafed plant with a small pond of water in the axil of each leaf. This is typified by the large vrieseas, such as *Vriesea gigantea* or *Vr. fosteriana* which can impound about ten litres of water; and *Glomeropitcairnia erectifolia* is reputed to hold up to twenty litres. The second type of development is typified by *Quesnelia marmorata*, with very few leaves and a single central tank. This is an interesting contrast of evolution.....a large number of small tanks with a relatively large surface area v. a single tank with very restricted surface area. There does not appear to be any advantage of one type over the other, and both seem to be well adapted to their environments.

In addition to providing a moisture reservoir, the water supports a mini ecosystem of algae, insects and small animals, and the detritus from their presence undoubtedly contributes to the nutrition of the plant. The question whether some of these plants are active carnivores is an interesting one and does not appear to have been resolved at the present time.

Ananus comosus has evolved a very efficient water harvesting mechanism. It is a large plant with channelled leaves which funnel any water from dew or fog to the centre of the plant. The 'cups' at the leaf axil are small but contain interfoliar roots with copious root hairs so that the water is quickly absorbed.

Many of the pitcairnias have evolved a different mechanism for water foraging. These plants develop an extensive fibrous root system to enable extraction of water from a large volume of soil.

A distinctive feature of bromeliads is the trichome development, which allows absorption of water into the leaf. At a high trichome density, the leaves are quite silvery in appearance and this is considered to be of some additional advantage by reflecting heat thereby reducing leaf temperature. This development is typified by the silvery leafed tillandsias, often referred to as 'atmospheric tillandsias'. These plants are very efficient at absorbing moisture from dew and fog. With a more pronounced trichome development, we have a 'hairy' appearance as in *Tillandsia tectorum.* This insulating layer has an additional beneficial effect.....as well as keeping the leaf surface cooler it increases the distance between the leaf surface and free air, both of these reducing moisture loss.

MOISTURE CONSERVATION -

A number of genera in the Bromelioideae and Pitcairnioideae have evolved extensive water storage tissues to store water over dry seasons. This takes the form of thickened leaves adapted for water storage as in many dyckia, hechtia, and *Puya laxa* . In some dyckia, the leaves are very short and thick, reducing the surface area, and further minimising moisture loss. This strategy is sometimes referred to as 'drought enduring'.

Pitcairnia heterophylla is a 'drought evader'. This plant is deciduous, dropping its leaves in autumn and remaining dormant during winter, the dry season in its natural habitat.

A water conservation mechanism that is not visible is that of Crassulacean Acid Metabolism, C.A.M. or C_4 metabolism. All plants use the energy of sunlight with the chlorophyll of the leaf to form sugars from carbon dioxide and water. This sugar is then transported to other tissues where it is used as an energy source for growth. The most energy efficient conversion is the C_3 or Calvin-Benson pathway, but there is a penalty. For the carbon dioxide to diffuse into the leaf during daylight, the leaf pores (stomata) must be open and this allows moisture loss from the leaf. One way of expressing this loss is to measure the water used as a ratio to the gain in dry matter. A typical tank bromeliad with C_3 metabolism - *Catopsis nutans* - has a ratio of 2000:1.

With C.A.M., the stomata remain closed during the day and moisture loss is minimal. The stomata open at night, take in carbon dioxide which is converted to malic acid in the leaf. Since it is cooler at night and humidities are higher, moisture loss is low. During the day, the malic acid in the leaf is broken down to carbon dioxide in the leaf and this carbon dioxide is converted to sugar by the C_3 path. This is not nearly as energy efficient as the direct C_3 conversion but requires much less water; a C_4 tillandsia such as *T. paucifolia* has a water/dry matter ratio around 200:1. The most efficient C_4 bromeliad is *Ananas comosus* with a ratio around 50:1. Plants with C.A.M. metabolism will be slower growing but able to colonise much drier areas.

What are the implications of these adaptations for the culture of the plants. These variations are SURVIVAL strategies and while they give some indication of cultural requirements extra care may be required if plants are to be grown at their best.

Tank bromeliads will suffer from moisture stress if the tanks are without water for any appreciable time. This poses a problem for growers in areas with cold winters. The remedy is to fog the leaves frequently with a fine spray but leaving the tanks dry.

Drought evasion is a strategy for SURVIVAL, and these plants can survive long periods without water, but often at the expense of severe leaf tip dieback. However, for good culture, these plants benefit from a regular supply of moisture, and this does wonders in avoiding leaf tip dieback. (leaftip dieback may also be due to potassium deficiency).

Pit. heterophylla should be allowed to dry out when it is dormant and water and feeding delayed until growth commences in spring. C.A.M. plants need a supply of carbon dioxide at night, and for bushhouse plants this is not likely to be a problem. However, plants grown in a tightly sealed glasshouse may suffer from lack of carbon dioxide and slow growth.

Bromeliads have a number of interesting features with great diversity of size, form and colour. When we consider the strategies that have evolved to provide water for the plants survival, this adds another dimension to the fascination of these plants.

Peter Paroz

Ref: D. Benzing -- 'Biology of Bromeliads'

OCTOBER MINI-SHOW : RESULTS

CLASS 1: NEOREGELIA UNDER 20 cm

1.	*Neoregelia lilyputana*	P. Hobbs
2.	*Neoregelia pauciflora*	P. Hobbs
3.	*Neoregelia punctatissima*	G. Gleeson

CLASS 2: NEOREGELIA OTHER THAN PROVIDED FOR

1.	*Neoregelia carolinae meyendorffii albo marginata*	P. Hobbs

CLASS 3: BILLBERGIA

1.	*Billbergia Muriel Waterman*	G. Vauhkonen
2.	*Billbergia Perrimans Pride*	D. Upton
3.	*Billbergia Fascinator*	G. Vauhkonen

CLASS 4: CRYPTANTHUS

1.	*Cryptanthus ti*	G. Gleeson
2.	*Cryptanthus tricolor*	D. Upton
3.	*Cryptanthus it*	D. Reilly

CLASS 5: DYCKIA

No entries received

CLASS 6: ANY OTHER GENERA

1.	*Tillandsia stricta*	R. Reilly
2.	*Tillandsia argentea*	L. Wilton
3.	*Pitcairnia andreana*	J. Laussohn

BEST PLANT OF SHOW -

Billbergia Muriel Waterman G. Vauhkonen