

AN ACCOUNT OF *DROSERA* SECTION *PROLIFERA*

RICHARD NUNN • Malvern • South Australia • Australia • Richardjnunn1@gmail.com

GREG BOURKE • Manager, Blue Mountains Botanic Gardens • NSW • Australia • Greg.bourke@bgcp.nsw.gov.au

Introduction

The species that comprise *Drosera* section *Prolifera*, *Drosera adaelae*, *D. prolifera*, and *D. schizandra*, or as commonly known, “The Three Sisters”, are endemic to Far North Queensland. They are unique to the genus in that they are found growing exclusively in rainforest habitat. Over the past 8 years the authors have made four separate field trips to observe these unusual and uncommon *Drosera*. The literature published to date on these taxa is general, often based on observations of cultivated plants. One can easily form the superficial view that they grow relatively close to each other in similar micro-habitats, it is only when herbarium sheets, field observations, and personal accounts are scrutinized that a different story emerges. The objective of this account is to show the broad area these species occur and to highlight the similarities and differences in their micro-habitat. Australia is a vast continent and the area that these species inhabit is approximately a 400 km stretch of hinterland that runs roughly parallel to the coast from Townsville, north to Cape Tribulation.

Taxonomy, Distribution and Habitat

(adapted from, Lowrie 2014 and Lowrie *et al.* 2017 and annotated with the author’s field observations)

*Drosera* section *Prolifera* C.T.White

Publication: Victorian Naturalist 57: 94-95 (1940).

Type species: *Drosera prolifera* C.T.White

Plants perennial; hairy-rooted; leaves erect to semi erect, together forming an open, leafy rosette; lamina when mature, reniform, lanceolate or obovate; stipules red, reduced to 2 small trichomes attached to base of petiole on upper side; styles 3 or 4, terete, reddish in lower half, white above, bilobed at apex to form a ± Y-shape configuration, each free lobe apex truncate; stigmas white, simple, at the tips of each spreading lobe, papillose.

Key to *Drosera* section *Prolifera*

- 1a: Plant with an open rosette of erect and semi erect leaves.....2
- 1b: Leaves in a rosette ..... 3
- 2: Leaves narrowly lanceolate .....*Drosera adaelae*
- 3a: Leaf lamina reniform .....*Drosera prolifera*
- 3b: Leaf lamina obovate .....*Drosera schizandra*



Figure 1: *Drosera adelae* in shaded conditions near Cardwell, North Queensland (left; photo by Greg Bourke). Flower at same location (right; photo by Richard Nunn).

***Drosera adelae*** F.Muell. (Fig. 1; Back Cover)

Publication: *Fragmenta Phytographiae Australiae* 4(30): 154, t. XXXIII (1864).

Type location: Dalrymple's Creek, Rockingham Bay

#### Etymology

The epithet *adelae* is possibly derived from “Adelae de L’Arbre”, or the genitive singular of Adela, a Latinized form of Adele. The identity of the lady in question is unknown (Australian Plant Census).

#### Distribution

*Drosera adelae* is endemic to Queensland. Its range extends from Rockingham Bay, Hinchinbrook Island, Cardwell, Abergowrie to Kennedy. Additional sub-populations have been documented in the extensive Walter Hill Range, particularly Tully Gorge National Park.

#### Habitat and Field Notes

This species grows in the foothills of mountains along the sandy banks of creeks, seeps, among rocks and the splash zones of waterfalls, it also follows creek lines into the coastal plains. *Drosera adelae* is a relatively widespread species of the lowlands, but highly localized. This may be because *D. adelae* tolerates a broader range of conditions; it can be found by waterfalls in full sun, through to dark, closed-canopy rainforest but always associated with areas that remain wet well into the dry

season. Plant coloration may be related to exposure to light, those in brighter conditions producing more red pigmentation, however observations of cultivated plants from several locations indicate there may also be genetic variation (G. Bourke pers. obs).

#### Site 1: Waterfall, Kennedy, North Queensland

A short drive up an old disused road in the hills behind Kennedy to an elevation of 500 m. The plants were observed growing in rock crevices in the spray zones of a perennial waterfall. At various times of the day the plants are exposed to full sun.

#### Site 2: Creek crossing, Bruce Highway, Cardwell area, North Queensland

Along the Bruce Highway at various intervals, creeks, fueled by water from the rainfall in the hinterland, make their way to the ocean. In some of these creeks *Drosera adelae* can be found growing on the banks in peaty sand. Dense populations thrive in the permanently wet, shady, and warm conditions. Mosquitos and ants are abundant, making field observations an uncomfortable experience. In most years these creeks are constantly in flow, however it has been observed in the driest years that there is no water and the plants recede to fleshy roots.

#### Description (Lowrie 2014)

A fleshy, hairy-rooted perennial herb with a loose, open rosette. Stem 2-10 cm tall, generally 1.5-2 mm diameter. Leaves in the early stages of growth erect and circinate, becoming horizontal with age, spent leaves lying prone around the basal portion of the stem. Juvenile leaves are obovate, subsequent leaves narrowly elliptic, and mature leaves lanceolate, alternately arranged in a spiral along the stem. Petiole short, almost sessile and glabrous. Lamina 10-25 cm long, 7-10 mm wide, with a raised longitudinal midrib on both surfaces along its entire length. Inflorescence a terminal, one-sided helicoid cyme, 25-35 cm long, many-flowered. Peduncle and pedicels covered with scattered sessile glands and scattered wispy pilose hairs. Pedicels 5-6 mm long, semi-erect and lengthening in fruit. Flowers 0.6-0.8 mm in diameter, red, reddish orange or cream, petals broadly lanceolate, margins entire, 2.5-3.5 mm long, 0.3-0.4 mm wide at the base, dilated to 1.2-1.5 mm wide near the center, then abruptly narrowing to 0.5-0.6 mm wide and forming an acuminate apex. Sepals green, lanceolate, 2-2.5 mm long, 0.5-0.6 mm wide at the base, dilated to 0.8-0.9 mm wide near the center, then quickly narrowing to 0.3-0.4 mm wide and forming a long acuminate apex, margins and apex entire, abaxial surface glabrous. Stamens 5, each 4-4.5 mm long, the filaments and anthers white, bi-lobed and reddish at the apex, the pollen creamy white, or yellow in the red flowered forms. Ovary green or reddish, subglobose, 0.9-1 mm long, 1-1.5 mm diameter. Styles 3 or 4, rust-orange at the base, white at the apex, 0.6-0.7 mm long, 0.1-0.15 mm in diameter, bi-lobed at the apex and forming a T-shape with each free lobe, 0.4-0.5 mm long, curved along its length. Stigmas white, simple, located at the tips of the free paired lobes, papillose, style-stigmas positioned horizontally from the apex of the ovary.

#### Phenology

This species flowers from June to November. It is capable of perennating through adverse conditions by retreating to its fleshy roots, as happens at locations within its range that dry out completely during the dry season. Whilst self-fertile, *Drosera adelae* often forms large clonal colonies through the formation of plantlets along its roots and rarely from its leaves. It is also capable of producing plantlets directly from its flowers in a similar manner to *D. prolifera*.



Figure 2: *Drosera prolifera*, Noah Creek, North Queensland (left; photo by Greg Bourke). Flower of cultivated *Drosera prolifera* (right; photo by Greg Bourke).

***Drosera prolifera* C.T.White (Fig. 2)**

Publication: The Victorian Naturalist 57(5): 94-95 (1940).

Type location: Cook District: Thornton Peak (in sheltered places near the summit) alt. 4000 ft.

**Etymology**

The epithet *prolifera* is from the Latin *proles* (offspring) and *fero* (to bear), a reference to the ability of this species to produce offshoots, usually arising from the inflorescence.

**Distribution**

*Drosera prolifera* is endemic to North Queensland. It is recorded from the summit and flanks of Thornton Peak and a small number of watercourses draining from that mountain.

**Habitat and Field Notes**

This species grows in rainforest areas among rocks and on sandy banks along creeks occasionally flooded by monsoonal rains. The ability of *Drosera prolifera* to produce additional plants on every flowering peduncle ensures that crowded colonies of plants are quickly formed in suitable sites.

**Site 1: River embankment, Noah Creek, North Queensland**

A difficult 3-hour walk up a branch of Noah Creek. Initial part of the walk required struggling through rainforest filled with Rattan (*Calamus muelleri*) and Screw Pine (*Pandanus tectoris*) and

the odd Cassowary nest, followed by 2 hours of climbing over progressively larger boulders, some reaching the size of a small house. Plants were observed on a small moss-covered embankment, forming dense colonies in partially shaded rainforest habitat. Plants grew down to the water's edge and at time of higher rainfall would have been inundated.

#### Site 2: Thornton Peak, North Queensland

Although the authors did not visit the type location, it is worthy of including notes from others as the habitat and conditions are clearly different at this higher elevation. Plants found at and near the summit of Thornton Peak, on moist rock ledges. The vegetation at this elevation, although rainforest, is more open and stunted than at lower elevations. Rainfall is 10 m per year and the weather is cooler and more unpredictable than lowland areas.

#### Description (Lowrie 2014)

A green, fleshy, hairy-rooted, perennial herb with a small number of erect to semi-erect active leaves, together forming an open leafy rosette up to 6-8 cm in diameter, leaves erect at first, then semi-erect and later flat on soil surface to make way for new, central leaves. Flowering peduncles long, lateral, positioned just above soil surface, peduncles similar to strawberry plant runners in that they produce additional plantlets at their tips after flowering, thus producing crowded colonies of individual plants. Lamina when mature, reniform, 20-25 cm long, 22-27 mm wide, adaxial surface with clear white or red tipped insect-catching glands positioned around margins and smaller red tipped glands within, abaxial surface glabrous; petiole 2-4.5 cm long, 2.5-3 mm wide, semi lenticulate in section, with a longitudinal rib on adaxial surface, dilated a little at base, glabrous. Stipules red, reduced to 2 small trichomes attached to base of petiole on upper side. Inflorescence peduncles 1 to 4, 18-20 cm long, producing a vegetative shoot at its apex after anthesis, flowers 4 to 8, widely-spaced; pedicels curved, 3-5 mm long; bracts linear, 1-2 mm long, opposite and slightly below pedicel, fruiting peduncles almost prostrate. Sepals beige, lanceolate, 0.8-0.9 mm wide at base, dilated to 1-1.2 mm wide just above center, then quickly narrowing to 0.3-0.4 mm wide and forming long  $\pm$  sharp, but gnawed acuminate apex, 3.5-4 mm long, margins entire, abaxial surface glabrous, in face view apices positioned within corolla at angles of a perfect pentagon shape, each sepal perfectly positioned between petals. Petals adaxial and abaxial surfaces reddish purple, obovate, 0.5-0.55 mm wide at base, dilated to 1.8-2 mm wide near apex, 2.2-2.5 mm long, margins entire, apex crenate. Stamens 5, 1-1.2 mm long; filaments dilated in upper half, white in lower half, reddish above; anthers and pollen white. Ovary reddish, broadly obovoid, 1.2-1.5 mm long, 1.2-1.5 mm in diameter at anthesis, glabrous. Styles 3 or 4, terete, reddish in lower half, white above, 0.8-0.9 mm diameter, 0.6-0.7 mm long, bilobed at apex to form a  $\pm$  Y-shape configuration, each free lobe, 0.4-0.5 mm long, apex truncate. Stigmas white, simple, at tips of each spreading lobe, papillose, Styles positioned horizontal from apex of ovary. Seeds dark brown to black (mainly black),  $\pm$  an ovoid to obovoid shape, sides irregular distorted in and out slightly, 0.53-0.63 mm long, 0.35-0.4 mm in diameter, apical pole often narrowing, apically truncate, funicle positioned proud of basal pole, 0.013-0.015 mm long, 0.01-0.013 mm in diameter, surface deep irregular reticulate-alveolate honeycomb-like cells, cell ridges smooth and undulating.

#### Phenology

This species flowers all year round. Plants may die back to their fleshy roots if habitats dry out in the dry season.



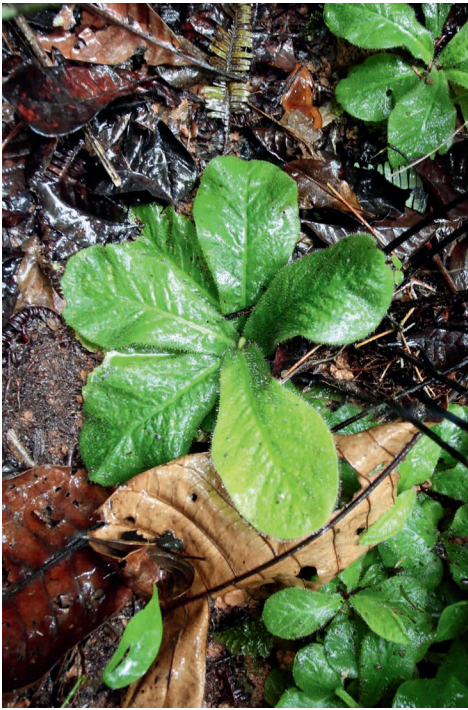


Figure 3: *Drosera schizandra* grows the largest rosettes of all *Drosera*, Mount Bartle Frere, North Queensland (left; photo by Greg Bourke). *Drosera schizandra* in bloom, Mount Bartle Frere, North Queensland (right; photo by Richard Nunn)..

***Drosera schizandra*** Diels (Fig. 3; Front Cover)

Publication: Das Pflanzenreich 26: 80 (1906).

Type location: Queensland. North Queensland, Mount Bartle Frere

#### Etymology

The epithet *schizandra* is from the Greek *schistos* (divided) and *andrus* (male), in reference to the divided anthers of this species.

#### Distribution

*Drosera schizandra* is endemic to Queensland, where it is known only from the rainforest covered lower slopes of Mount Bartle Frere.

#### Habitat and Field Notes

This species grows in rainforest at an altitudinal range of 300-600 m. in areas among rocks in deep shade, and in damp sand along the banks of streams. Large, mostly clonal colonies exist along some of the old logging trails on the lower slopes of Mount Bartle Frere. Plantlets form along exposed roots, while broken leaves occasionally produce plantlets in the wet season. *Drosera schizandra*, *D. adela* and *D. prolifera* grow in similar rainforest habitats. However, of the three, *D. schizandra* favors the darkest, most shady habitats.

#### Site 1 and 2: Logging Trail, Mount Bartle Frere, North Queensland

Although only about 80 km from Cairns, Mount Bartle Frere, takes about 2 hours to drive from Cairns. A 45-minute walk along a disused logging trail covered in Rattan, Pandanus and wild Strawberry, with copious leeches. The first site is a small embankment in near total shade, yielding a dense colony of plants growing in sandy clay. Plants range in size up to a dinner plate in diameter. Further along the trail, a much larger colony of plants was found growing in more sun but still in rainforest habitat. The plants had colonized the disturbed and exposed embankment cutting along the side of the trail. Warm days and cool nights are experienced at this intermediate elevation.

#### Site 3: River edge, Mount Bartle Frere, North Queensland

Along the same trail a few hours more walking down to approximately 300 m, the trail finishes at a fast-flowing river. *Drosera schizandra* was observed growing amongst the rocks in moist sand. These plants were smaller and more exposed to the elements than those at the previous 2 sites.

#### Description (Lowrie 2014)

A large, fleshy-rooted perennial herb with a few-leaved rosette 16-20 cm in diameter, each leaf varying in length and width, mature leaves semi-erect and adpressed to the soil. Lamina when mature obovate, 8-10 cm long, 4-5 cm wide, entire except irregularly crenate apex and commonly a little emarginate, mid vein prominently raised on adaxial and abaxial surfaces, with additional venation branching outwards from mid vein on both surfaces, but prominently raised only on abaxial surface, adaxial surface covered with long, translucent white trichomes with red-tipped glands, abaxial surface sparsely hirsute, hairs mainly along raised midrib and lateral veins. Juvenile leaves distinctly petiolate; mature leaves sessile or very shortly petiolate; stipules lacinate, attached to base of petiole on upper side; petiole semi-terete in section, 2-2.5 mm in diameter. Inflorescence 1, peduncle 12-14 cm long, 10-25-flowered, arising from center of rosette; peduncle and pedicels covered with non-glandular hairs; pedicels 5-10 mm long. Bracts linear 2.7-3 mm long. Sepals greenish, lanceolate, 4-5 mm long, 0.9-1 mm wide at base, dilated to 1.6-1.8 mm wide just above center, then narrowing towards apex, margins entire in its lower parts, irregularly serrate in upper parts, with a deeply serrate apex, abaxial surface covered with non-glandular hairs. Petals adaxial and abaxial surfaces a very dark reddish purple, obovate, 1.5-2 mm wide at base, dilated to 4-5 mm wide near apex, 5.5-6.5 mm long, margins entire, apex crenate. Stamens 5, red; filaments V-shaped, base leg dilated in middle, 1.3-1.5 mm long, apex bilobed and reflexed, 0.9-1 mm long; anthers and pollen yellow, positioned on underside of reflexed apical lobes of filament. Ovary red, obovoid, 1.2-1.5 mm long, 1.1-1.4 mm in diameter at anthesis; carpels 3, bilobed, glabrous. Styles 3, terete, red, 0.9-1 mm long, semi-erect, bilobed, lobes curved and reflexed a little, each lobe with 1-3 white stigma lobes. Stigmas papillose. Seeds unknown.

#### Phenology

This species flowers from November to July. Although a rare event, it can retreat to its fleshy roots if its habitat dries out in the dry season.

#### Discussion

*Drosera adelae*, *D. prolifera*, and *D. schizandra*, although differing morphologically, especially in terms of their leaf shape, appear to have evolved from a common ancestor, they have similar floral parts; the stamens and receptive styles are prominently displayed at anthesis because the petals fully

Table 1: Micro-habitat observations of <i>Drosera</i> section <i>Prolifera</i> sites.						
	<i>Drosera adelae</i> site 1	<i>Drosera adelae</i> site 2	<i>Drosera prolifera</i> site 1	<i>Drosera prolifera</i> site 2*	<i>Drosera schizandra</i> site 1 & 2	<i>Drosera schizandra</i> site 3
Elevation	20 m	500 m	100 m	1300 m	600 m	300 m
Substrate	sandy peat	accumulated organic matter in rock crevices	moss growing over granite	sand in sheltered areas along rock faces	sandy clay	moist sand
Light	50% shade	bright light	50% shade	50% shade	deep shade	50% shade
Moisture	normally constant but can dry out in extreme drought	year-round moisture from waterfall.	constant, fed by seeps	constant, fed by seeps	very wet in rainy season, dryer in winter months	access to year-round moisture from proximity to river
Growth cycle	can die back to roots in drought	year-round	year-round	year-round	year-round	year-round

\* the authors were unable to visit the type location for *Drosera prolifera* on the summit of Thornton Peak and hence have relied on literature and personal accounts for the data in the table.

reflex. The anthers, being on the underside of the exposed reflexed lobes of the stamens, shelter the pollen grains from the frequent, heavy rains. In addition to these floral similarities, all have chromosome counts of  $2n = 30$ , as well as similar seedling characteristics that indicate a close relationship (Lowrie 2014).

## Conclusion

The fieldwork undertaken in conjunction with a detailed literature and herbarium review provides the following conclusions

1. The species in *Drosera* section *Prolifera* are closely related and have evolved from a common ancestor, although they are now morphologically quite different.
2. All three taxa inhabit rainforests, however their micro-habitats are different, with *Drosera adelae* being a tropical lowland species, *D. schizandra* preferring more shade at elevations ranging between 300-600 m, and *D. prolifera* being predominantly a montane species occurring on the summit of Thornton Peak at 1300 m, but with isolated populations close to sea level.
3. Although endemic to Far North Queensland, each species is geographically isolated, and they never co-occur.

## References

Bourke, G., and Nunn, R. 2012. Australian Carnivorous Plants. Redfern Natural History Productions Ltd., Poole.



Erickson, R. 1968. *Plants of Prey*. University of WA Press.

Lowrie, A. 1987-1998. *Carnivorous Plants of Australia*, vol. 1-3. Nedlands, Western Australia.

Lowrie, A. 2014. *Carnivorous plants of Australia: Magnum Opus*, vols. 1, 2, 3. Redfern Natural History, Poole, Dorset, England.

Lowrie, A., Robinson, A., Nunn, R., Rice, B., Bourke, G., Gibson, R., McPherson, S., and Fleischmann, A. 2017. *Drosera of the World*, volume 2, Oceania, Asia, Europe, North America. Redfern Natural History, Poole, Dorset, England.

Marchant, N.G., and George, A.S. 1982. *Droseraceae*. *Flora of Australia*, Vol. 8. pp. 9-64.



# PetFlyTrap.com

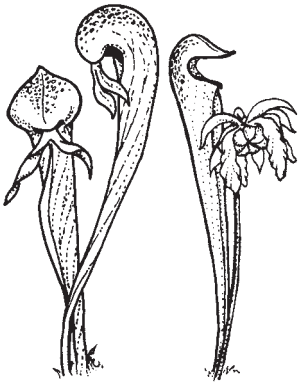
## THE ORIGINAL VENUS FLYTRAP



- Phone/mail order and Internet U.S. sales
- Visits by appointment only
- *Dionaea*, *Drosera*, *Nepenthes*, *Pinguicula*, *Sarracenia*, books, supplies, and **much** more
- Everything is **IN STOCK** and ready to ship! (No **OUT OF STOCK** items on our site!)
- Multiple sizes of most plants
- Rare, nursery-grown, imported lowland, intermediate, and highland *Nepenthes*
- Shipped potted and ready to **GROW!!**



**www.PetFlyTrap.com**  
**service@petflytrap.com**  
**281-433-3290**  
**facebook.com/petflytrap**



# CARNIVOROUS PLANT NEWSLETTER

Journal of the International  
Carnivorous Plant Society  
[www.carnivorousplants.org](http://www.carnivorousplants.org)

Volume 46, Number 3  
September 2017



**Front Cover:** *Drosera schizandra* on the bank of a disused logging trail, Mount Bartle Frere, North Queensland. Photo by Greg Bourke. Article on page 92.

**Back Cover:** *Drosera adelae* can attain red coloration when grown in full sunlight, here seen growing in rocks near a waterfall, Abergowrie, North Queensland. Photo by Greg Bourke. Article on page 92.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Advertisers should contact the editors. Views expressed in this publication are those of the authors, not the editorial staff.

All correspondence regarding dues, address changes and missing issues should be sent to the Membership Coordinator at the ICPS. Do not send such correspondence to the editors. Checks for subscriptions should be made to the International Carnivorous Plant Society in US funds. Dues, including a subscription, are \$30 per year.

International Carnivorous Plant Society, Inc.  
2121 N. California Blvd., Suite 290  
Walnut Creek, CA 94596-7351, USA  
[icps@carnivorousplants.org](mailto:icps@carnivorousplants.org)

President  
Vice President  
Secretary  
Treasurer  
Board Member  
Board Member  
Board Member  
Membership Coordinator  
Webmaster  
Media Coordinator  
Seed Bank Manager  
CPN Editors  
Managing Editor  
Editor  
Editor  
Editor  
Science Editor  
Science Editor

Marcel van den Broek, [marcel@carnivorousplants.org](mailto:marcel@carnivorousplants.org)  
Richard Nunn, [richardnunn@carnivorousplants.org](mailto:richardnunn@carnivorousplants.org)  
Keith Becker, [keith@carnivorousplants.org](mailto:keith@carnivorousplants.org)  
Ryan Ward, [ryan@carnivorousplants.org](mailto:ryan@carnivorousplants.org)  
Alex Eilts, Conservation Director, [alex@carnivorousplants.org](mailto:alex@carnivorousplants.org)  
Jan Schlauer, Cultivar Registrar, [jan@carnivorousplants.org](mailto:jan@carnivorousplants.org)  
Bob Ziemer, [bob@carnivorousplants.org](mailto:bob@carnivorousplants.org)  
Carolyn Becker, [carolyn@carnivorousplants.org](mailto:carolyn@carnivorousplants.org)  
John Brittnacher, [john@carnivorousplants.org](mailto:john@carnivorousplants.org)  
Chad Williams, [chad@carnivorousplants.org](mailto:chad@carnivorousplants.org)  
Joe Griffin, [joe@carnivorousplants.org](mailto:joe@carnivorousplants.org)  
[editor@carnivorousplants.org](mailto:editor@carnivorousplants.org)  
Bob Ziemer  
Barry Rice  
Karl Herold  
John Brittnacher  
Fernando Rivadavia  
Jan Schlauer

Date of effective publication of the June 2017 issue of Carnivorous Plant Newsletter: 2 June 2017.

The ICPS is the International Cultivar Registration Authority (ICRA) for the names of cultivated carnivorous plants according to the International Code of Nomenclature for Cultivated Plants. Send relevant correspondence to the ICPS, Inc.

Carnivorous Plant Newsletter is published quarterly in March, June, September, and December by the ICPS, Inc., 2121 N. California Blvd., Suite 290, Walnut Creek, CA 94596, USA. Periodicals postage paid at Walnut Creek, CA and additional mailing offices. Postmaster: Send address changes to ICPS, Inc., 2121 N. California Blvd., Suite 290, Walnut Creek, CA 94596, USA. Printed by Allen Press, Inc., 810 E. 10th Street, Lawrence, KS 66044. Logo and masthead art: Paul Milauskas. © 2017 International Carnivorous Plant Society. All rights reserved. ISSN #0190-9215



# CARNIVOROUS PLANT NEWSLETTER

Journal of the International Carnivorous Plant Society

Volume 46, No. 3

September 2017





