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POLLINATOR OBSERVATIONS IN CARNIVOROUS PLANTS AND ASSOCIATED SPECIES

Allen Lowrie

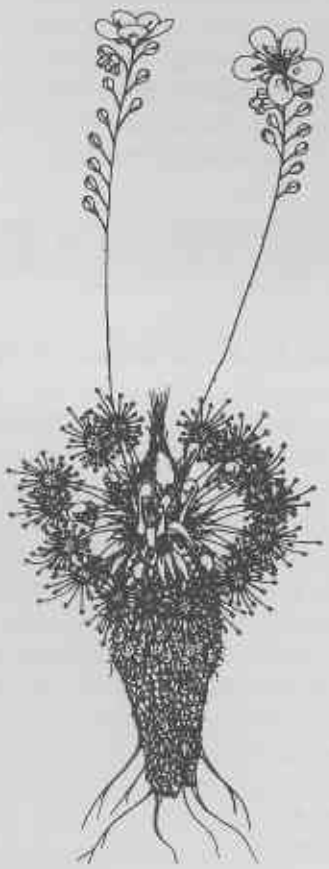
Each time I am in the field I am constantly on the lookout for the pollinators of carnivorous plants - strangely, a rarely observed event. Very little is known about the pollinators of these plants and it is always a privilege to view pollinators at work when they are encountered.

The insect pollinators I have witnessed pollinating carnivorous plants in south-west Western Australia are *Bombyliid* flies. These same insects are also pollinators of many *Stylidium* species (triggerplants), a genus of plants commonly found in the same habitats as most carnivorous plants throughout south-west Western Australia.

At many locations I have observed floral mimicry between a triggerplant, *Stylidium repens* and a pygmy sundew *Drosera parvula.* Even though the triggerplant has a 4-lobed laterally paired flower and the sundew a 5-lobed circular flower, both species are clearly mimicking each other. Each species has small bright white flowers with red spot marks near their petal bases. It is conceivable that these two unrelated plant species too maybe using the services of the same pollinator.

If the same pollinator serviced these two unrelated species, pollen would be dabbed onto its body in two segregated zones. In the case of the triggerplant because of its column length and position, the pollen would be placed on the upper parts the pollinator's body. The sundew's pollen would be smeared onto the pollinator's belly from the 5 erect anthers as it sipped nectar from around the base of the ovary. The placement of each species' pollen onto segregated areas of the same pollinator's body would insure that each species does not dilute the other's pollen patch. This also insures pollen in these segregated patches will be delivered to the correct species' stigma/s.

Stylidium repens



Drosera parvula

On an expedition in June 1995 to the remote region of the Kimberley, at a beautiful location on the banks of Grevillea Creek on Beverley Springs cattle station, I was privileged to see two noteworthy events, one of a pollinator at work on a carnivorous plant the other an unusual flowering phenomenon. Here, in a wet, very rich in different species herb-field, many different carnivorous plants grew together. The following species were recorded:- *Drosera indica* (3 forms); *D. burmanni; D. ordensis; D. petiolaris; Utricularia antennifera; U. caerulea; U. chrysantha; U. fistulosa; U. lasiocaulis; U. limosa; U.* aff. *leptoplectra; U. quinquedentata; Byblis filifolia* as well as a number of *Stylidium* species, *S. costulatum; S. fissilobium; S. flumenense; S.claytonioides; S. pachyrhizum; S. quadrificatum; S. schizanthum;* and *S. semipartitum.*

At this location there were three clearly different *Drosera indica* 'species'. One species had reddish foliage and large mauve flowers with yellow stamens. A second species also with reddish foliage and orange flowers with yellow stamens. The third species in this *D. indica* complex was the green foliaged densely glandular white flowered species bearing large blood-red cobra-hooded-like stamens. No hybrids between these individuals were found. I have observed these same species as well as other combinations of these and yet other species of *D. indica* within the same habitat at numerous other locations throughout tropical

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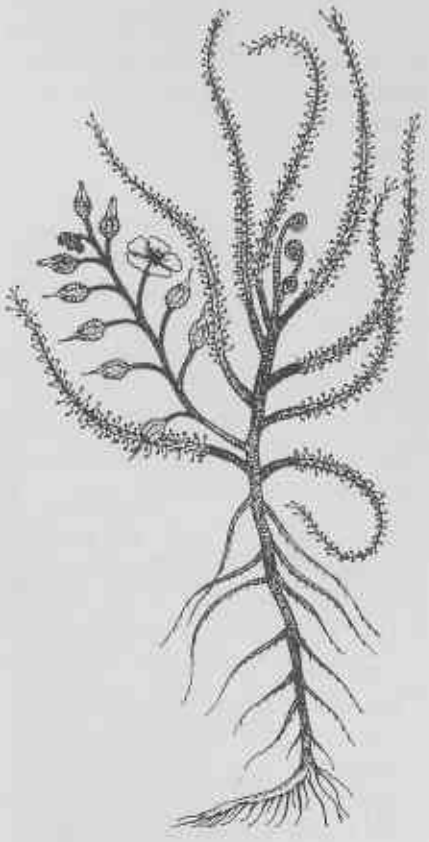
northern Australia every year since 1988. It is not unusual to find two or more different *D. indica* within the same habitat. Dr. John Conran (Adelaide University-Botany Dept.) and a number of his students as well as myself have been collectively studying the *Drosera indica* complex for a number of years. A number of good morphological character differences within the complex have been discovered. John Conran and his students are currently applying chromosome and DNA studies to the plants and it is hoped that this cutting-edge research will throw further light on relationships within this rather difficult complex.

The Grevillea Creek location produced two noteworthy observations. I had just finished photographing all the carnivorous plants and triggerplants in this herb field, and Pauline (my wife and assistant) and I were taking a break from the intense two hour photographic session. It was hot and very humid and about 11 a.m. The first strange happening that caught my eye while I was having a breather sitting on my camera case was: all the white flowered species of *Drosera indica* with blood-red stamens I had just finished photographing, were closing their flowers without any explanation. The flowers of the orange and mauve flowered forms of *D. indica* at this same time however were still fully open.



Drosera indica

About the same time a large green woolly bee flew into our view. Right before our eyes we witnessed this insect pollinating all the orange flowered *Drosera indica* in its flight path. It zoomed to and fro from side to side and from one orange flower to the next as it worked its way away from us across the herb field. Each time it landed right dead centre in the middle of the slightly cupped flower right in amongst the stamens and stigmas. Just as quick as it landed the pedicel of the flower (which clearly could not support the weight of the green woolly bee), tipped completely over to become momentarily umbrella-like and flipping the insect out at the same time. The flower then flipped back just as quickly to its original upright position to be on display once again.

It was amazing, it only took a second or two from the time the insect landed to the time it was tipped out of the flower. No sooner had it been dumped from one flower it had just as quickly landed on another flower to repeat the process once again. Pauline and myself watched in utter amazement as we followed the insect zigzagging from side to side right across the herb field and in doing so visited every orange flowered *Drosera indica* in that area. The insect did not miss a beat. Every flower numbering about 50+ before us in a width of 5 metres over a forward distance of 10 metres (one of the borders of the herb field) was visited. Not one orange flower was missed. The insect at the time of this observation bypassed all the mauve flowered *D. indica* as well as all of the other different coloured flowers (of which there were many) in its flight path.

This insect clearly had one thing on its mind and that was orange flowered *Drosera indica.* This observation may explain how three different forms of *D. indica* can coexist with each other and carry on as if they were individual species (which after all our research may prove to be the case). This observation clearly showed that the orange flowered species was pollinator specific.

Unfortunately I did not see what insect was pollinating the mauve or white flowered species of *D. indica* at this site. Furthermore, I could find no evidence as to why the white flowered *D. indica* closed its flowers so early in the day. Both these points remain unsolved. I would be most interested in hearing from others of any observations they may have seen with regard to the pollinators of carnivorous plants and triggerplants.

Detailed reference list available - Ed.

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Want to know more about carnivorous plants?

You need to read Allen's three detailed and superbly-illustrated books:

Carnivorous Plants of Australia. Allen Lowrie
Pub: Uni WA Press
Vol 1 1987
Vol 2 1989
Vol 3 1998

As WA is a world hot-spot for sundews, they should be on every plant-lover's bookshelf! - *Ed.*