



Highly Commended

Science Writing Year 5-6

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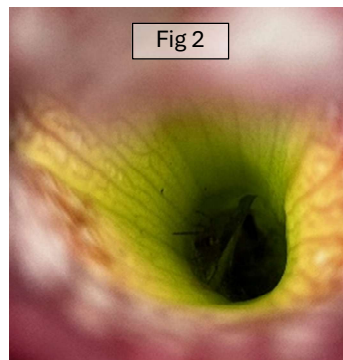


Species Survival: Sundews and Influence on Humans

In December 2023, I visited The Royal Botanical Gardens in Kew, London. Kew is both a public botanical garden and science institution, with a strong focus on promoting the importance of climate change education, biodiversity loss and protecting plants. I was fascinated by the forked sundews, *Drosera binata*, in the Princess of Wales Conservatory. Seeing them made me think, “Why are these plants carnivorous?” I decided to research them and discovered it was because they had needed to adapt to survive as a species.

Why did they need to adapt to survive? They lived in very muddy, boggy places and in such environments, there are limited nutrients required for the plants to grow and thrive. Nitrogen is the key nutrient for leafy growth. Mud is low in nitrogen; however, insects are high in nitrogen. As a result, carnivorous plants have evolved, over millions of years, to catch insects for food.

I saw several types of carnivorous plants at Kew, including Venus flytraps, sundews, pitcher plants and bladderworts. They are all related to sundews and have similarly evolved to be carnivorous to survive in nutrient poor environments. They have different methods of killing their prey. The Venus flytrap, *Dionaea muscipula* (Fig 3) lures insects with a strong scent of pollen, but when the insect lands on the leaf, it snaps shut. The pitcher plant lures insects with a scent of citrus, then the insects fall inside because the pitcher plant is very slippery (Fig 1, 2, 4).



Clockwise from far left (photos taken by author at Kew Gardens):
Fig 1: Crimson pitcher plant, *Sarracenia leucophylla*
Fig 2: Insect trapped within a pitcher plant
Fig 3: Venus flytrap, *Dionaea muscipula*
Fig 4: Purple pitcher plant, *Sarracenia purpurea*

But back to my favourite - the sundews! They have a unique way to capture food. Sundews (Fig 5) are ‘flypaper’ plants, which means they catch prey with sticky glands at the tips of hairlike tentacles on their leaves. *Drosera* comes from the Greek word ‘*droseros*,’ which means dewy. The insects think the glands are non-threatening dew drops, and get stuck when they fly in. Then the sundew’s tentacles coil around the insect, smothering it. The sundew digests the insect using special enzymes from the glands in the tip of its tentacles. The diet of the sundews is predominantly mosquitos, which are abundant in the moist environment where sundews grow. Not only has the sundew evolved to be able to catch insects for nutrients, but it has also adapted its appearance to help lure its prey.



Fig 5: Forked sundew, *Drosera binata* (photo taken by author at Kew Gardens)

Despite the hardships, there are more than 150 species of sundew on every continent except Antarctica. In South Australia, there are populations of sundews in the Mount Gambier area, Adelaide area, and Kangaroo Island. From the map (Fig 6), you can see the sundews are classified as endangered to rare. The threats to sundew survival today include foot traffic, weeds, and water shortages. These threats are all due to human activities, even though we are trying to minimise our effect on the environment.

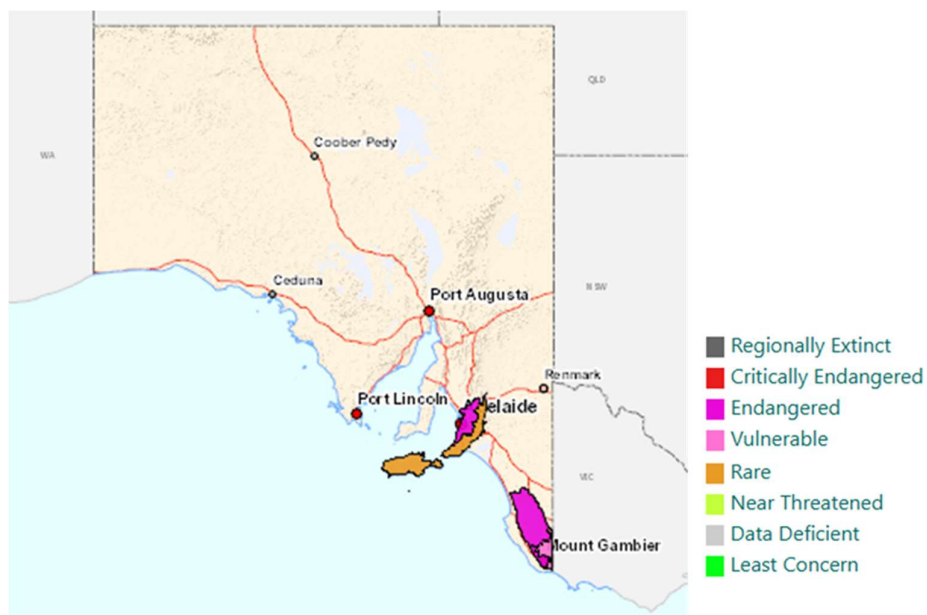


Fig 6: Map of South Australia with distribution of sundew populations and level of concern (Reference 2)

Another adaptation of the sundew plant is the ability to self-pollinate. The sundew flowers are white with yellow pollen growing on stalks at the centre. Being able to self-pollinate means that they could technically survive even if only one plant exists.

The story of the sundews made me think. What would humans need to do to survive if our environment changed, or if we had no access to the same food supplies? Could we suddenly change our diet, or reproduce by ourselves? Our environment *is* changing, because of climate change, and just like the sundews, our food sources are under threat for example, higher than average temperatures and different weather patterns in the tropics are leading to coffee plants dying. Other foods affected by climate change include staples like soy, wheat, and rice. So, what do we do about it?

In addition to trying to stop climate change, we need to go back to what our ancestors did, by growing food and shopping locally. Growing our own food reduces the 'food miles' of what we eat. Food miles are how far from its origin food travels before it gets onto our plates. Shopping locally and eating locally sourced foods also reduces food miles.

However, unlike the sundew, we do not have millennia to adapt and must make these changes quickly. At the Botanical Gardens in Kew, I learned how they are actively leading research into sustainable practices to prevent biodiversity loss and increase the sources of food available to us. Currently, 75% of the global food supply comes from only twelve plant species and five animal species. Furthermore, we only consume less than 1% of known edible plant species. We need to change our behaviours and what we eat, like the sundews did.

Other ways to be sustainable include simple things at home like conserving water, or turning off the lights when you are not at home to reduce our energy consumption. Always make sure you do the three Rs: reduce, reuse, and recycle can also help the environment. Being sustainable will help us fight climate change and survive in our environment, just like the sundews did!

References:

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Junior Scientist researching at Kew, 14 December 2023