



The spectacular foliage of *B. gigantea*

***Byblis* – the Rainbow Plants**

By Stewart McPherson

Byblis is the most beautiful genus of all of the sticky-leaved insect-eating plants. All *Byblis* plants produces delicate, leaves lined with sparkling droplets of glue which reflect light with a silvery brilliance, and this has earned the genus the English name ‘the rainbow plants’.

Byblis are named after the story of the Greek goddess Byblis which is recorded in Publius Ovidius Naso’s (Ovid’s) work *Metamorphoses* written around 8 AD. Ovid records that Byblis, the daughter of Miletus and Tragasia of Crete and granddaughter of Apollo, fell deeply in love with her brother Caunus and wrote him a letter in which she declared her undying love for him. In her letter, Byblis listed incestuous couples of the immortal gods that were brothers and sisters in an attempt to justify her feelings to her brother. Caunus was appalled by Byblis’s attraction and immediately left Crete and abandoned her. Byblis was heartbroken but also so in love with Caunus that she followed him through Caria and Lycia to Phoenicia where she wept for her lost love and in desperation and exhaustion, died and turned into an eternal fountain of tears as a testimony to her sorrow. *Byblis* is so called, because the plants’ glittering leaves of *Byblis* bare similarity to the fountain which Byblis became.

The genus was first discovered during Captain James Cook’s first voyage to Australia. On June 11th 1770, Captain Cook’s vessel, the H.M.S. Bark Endeavour, run aground on a shoal of the Great Barrier Reef and over the course of several weeks, the ship was repaired on the banks of what is now the Endeavour River in Queensland, Australia. The delay in the voyage enabled Joseph Banks, Herman Spöring Jr. and Daniel Solander, the naturalists on board the H.M.S. Bark Endeavour to study the local flora and fauna and collect many specimens of Australian plant life in the surrounding area to take back to England. The three naturalists explored the area that now surrounds the settlement of Cooktown (where the H.M.S. Bark Endeavour was brought aground and repaired) and among the plants which they collected were specimens of *Byblis liniflora* – recorded as growing along the banks of the Endeavour River. In 2006, I travelled to Cooktown in an attempt to refind the original population of *Byblis* which the naturalists discovered. Despite a long search, I could not find *Byblis* plants nor any remaining *Byblis* habitat and it is possible that both may have since been entirely wiped out around the Cooktown area.

In 1808, the first species of this genus (*B. liniflora*) was formally described and named by English botanist Richard Anthony Salisbury. 31 years later, a second species *B. gigantea* was collected by James Drummond and published by John Lindley in 1839. Benjamin Bynoe, a surgeon and naturalist aboard the H.M.S. Beagle, collected specimens of a further species apparently in 1848, and this led to the naming of the third species *B.*

filifolia, which was described by the botanist Jules Émile Planchon. Until very recently, it was widely regarded that the genus consisted of only two species (*B. gigantea* and *B. liniflora*) and that *B. filifolia* was a synonym of *B. liniflora*. However, the recent research of Australian botanist Allen Lowrie and colleagues has proven that this is not the case and *B. filifolia* has been rightly reinstated and a further four distinct species have since been described. Based on the current classifications, the seven species of this genus can be divided into two sub groups – the perennial species (*B. lamellata* and *B. gigantea*) and the annual species (*B. aquatica*, *B. filifolia*, *B. guehoi*, *B. liniflora* and *B. rorida*). The perennial species are considerably larger and more robust than the annual ones although it should be noted that in ideal conditions, in some cases, some of the annual species can survive for more than one year.

Byblis are herbaceous annual or perennial plants which produce long, delicate, filiform leaves that taper towards their ends. The foliage is loosely arranged in a generally erect or sometimes scrambling rosette and plants consist either of one main stem, or often in the case of the perennial species, several stems. All parts of the plants, except the flowers and the roots, are lined with sessile and stalked glands. The glue-secreting stalked glands produce a sticky, water based, adhesive liquid. Unlike most sticky-leaved insect-eating plants, the stalked glands of *Byblis* are typically devoid of colour which gives the leaves of *Byblis* a pure silver shine.

Older specimens of the perennial species of *Byblis* can form erect, somewhat woody stems, gradually accumulating a skirt of dead foliage. The roots of the annual species of *Byblis* are fine, fibrous and relatively delicate and serve to mainly anchor the plants in the soil. Those of the perennial species are fleshy and can extend up to 50cm in length, and evidently represent organs for the storage of water and nutrients.

The flowers of *Byblis* are borne individually on long, glandular scapes that are reminiscent of the leaves. The flower consists of five large petals which vary in shape and size between the seven known species. Generally, the petals are 5 – 20mm long and 5 – 15mm wide, and are triangular or almost circular in shape. The margins of the petals can be either smooth or notched depending on the species in question.

The petals of the flowers of all species of *Byblis* are typically violet, mauve or purple, but pale lavender and white flowered forms of *B. gigantea* and *B. filifolia* have been discovered and may exist in the other species too. The flower bears five conspicuous curved stamens that are 2 – 10mm in length and release bright yellow pollen from an apical pore. The pistil is 2 – 8mm in length and extends away from the centre of the flower. The pistil is often curved and the stigma is small, circular and rough in texture. The sepals are oval or triangular and in most species, lined heavily with small stalked glands. The flowers of *B. gigantea* and *B. lamellata* (and probably most if not all other species of *Byblis*) incorporate a buzz-pollination mechanism which releases pollen only to a specific range of pollinators that regularly visit the flowers of *Byblis* and therefore will reliably deliver the valuable pollen to nearby *Byblis* plants. It is the low-frequency buzzing vibration of the beating wings of certain insects that releases the pollen from the anthers. The vibrations of the beating wings of the insects cause the



The glistening leaves of *B. gigantea*

pollen to spurt out from a hole at the end of the anthers and stick to the insects' bodies, ready to be delivered to the stigma of another flower. This pollinator-selective mechanism may have evolved as a result of the overall relative rarity of *Byblis* populations and the relative abundance of plants that produce flowers of similar shapes and colours.

All seven species of *Byblis* occur in Australia and in the case of at least one species (probably *B. filifolia*) also on the island of New Guinea (in the Indonesian province Papua). The perennial *Byblis* are found only in Western Australia and are distributed across small geographic ranges in the vicinity of Perth. Unfortunately many of the original stands of the perennial species of *Byblis* have since been destroyed through urban expansion and agricultural development and the status of the wild populations of these species appears to be increasingly worrying.

The annual species of *Byblis* are distributed across the tropical north of Australia although at least one species of *Byblis* (probably *B. filifolia*) also occurs across the strait on the island of New Guinea, in both the Indonesian half of the island (the province of Papua) and also in the independent country of Papua New Guinea. Unfortunately most herbarium specimens of the *Byblis* from New Guinea were collected at a time when it was thought that the genus only consisted of *B. gigantea* and *B. linifolia* and so it remains unclear precisely which annual species occur there.

Considering the vast size of the wetlands of the island of New Guinea, the remote north of Australia and the Cape York Peninsula and also considering how short the history of botanical exploration across these regions has been, it seems highly possible that further species of *Byblis* may await discovery. It should be acknowledged that the ranges of many of the annual species will probably be expanded as our understanding of the distribution of the *Byblis* species increases.

All species of *Byblis* predominantly grow in highly leached, acidic, seasonally moist substrate that consists of peaty-loam and quartzitic sand. All seven species display a clear dislike of heavily shaded habitat and grow in greatest abundance and most healthily in areas where surrounding vegetation is low growing and sparse. Grass trees (*Xanthorrhoea sp.*) are sympatric to the perennial species of *Byblis* in Western Australia and in that region, populations of *Byblis* are often found growing in open, sunny clearings. *Byblis* habitats are seasonally moist or seasonally wet, often consisting of depressions that are temporarily flooded or the margins of bogs.

Rainfall across northern Australia is highly seasonalized and generally concentrated during the summer months of December to April. In contrast, Western Australia has a winter wet season and receives rain mainly between May and September. The differing rainfall patterns across the continent cause the various species of *Byblis* to grow at different times depending on their location. The perennial species of Western Australia grow predominantly during the winter and spring of the southern hemisphere whereas the annual species grow during the southern hemisphere's summer and autumn.

The annual species survive the dry months as dormant seed which germinates and grows rapidly with the onset of the rainy season. The perennial species survive the dry months also by seed, but mostly as living plants which either die back to their woody stems and fleshy roots or by reducing their foliage and thereby cutting their surface area and loss of water through evapotranspiration.

All species of *Byblis* (especially the annual species of the north of Australia) may be frequently exposed to temperatures in excess of 35°C during the height of the summer. In winter, the perennial species can encounter temperatures as low as 5°C whereas temperatures in the north rarely fall below 15°C.

Byblis are among the most beautiful of all carnivorous plants, but also are among the least well known. The survival of these incredibly beautiful plant species depends upon the conservation of their delicate natural habitats, both in Australia and New Guinea. With responsible management and the right conservation policies, these unique and remarkable species will have a future in the wild.



B. aquatica growing in northern Australia