In conclusion, with respect to insect and other non-fungal, non-bacterial or non-viral pests, pest control in CP is pretty straightforward with many of the commercial preparations being useful at lower dosages. Cygon 2E will have to now be retested to make sure that the condition apparently caused by its application was caused by it alone or by a subsequent infection by cyclamen mite or both. Due to the resolution of this problem, we have resumed the growing and propagation of all sensitive species, and a research project that had to be suspended has now been resumed.

*Plantfume is manufactured for Plant Products Corp., Blue Point, Long Island, NY 11715

OBSERVATIONS ON BYBLIS GIGANTEA IN SOUTHWESTERN AUSTRALIA

by Larry DeBuhr

During a recent trip to southwestern Australia, I had the opportunity to see Byblis gigantea growing in the wild. I found the plants growing at two locations which were quite different in many respects, and I would like to describe these two areas and offer some observations about Byblis gigantea. Those interested might refer to the short note by J. A. Mazrimas in CPN IV, 30 (1975).

The first area where I found Byblis gigantea was the famed Cannington Swamp within the metropolitan area of Perth, Western Australia. The area has a low, flat topography and after the winter rains has very wet soil. The soil is composed primarily of white sand with a moderate amount of accumulated humus. Growing with B. gigantea were the common mud and sand flat species Polypompholyx multifida and Drosera menziesii and the less common Utricularia hookeri. The vegetation is low open scrub composed of small woody shrubs with some herbaceous species. Like most of southwestern Australia, the Cannington Swamp dries out during the hot dry summer. During this period B. gigantea dies back to its rootstock as described by Mazrimas in CPN IV, 30 (1975).

Naturally occurring fires are frequent in southwestern Australia, and part of this location had been burned several years before. Most of the plants in SW Australia are adapted to survive fires, and B. gigantea showed no apparent adverse effects from the fire. The species probably escapes the fire by means of the rootstock which is near or below the surface of the soil and out of reach of fires.

The importance of fires in SW Australia is further demonstrated by the fire-induced seed germinated as reported in CPN III, 33 (1974) and CPN IV, 30 (1975). Fires and/or repeated intense summer heat is probably responsible for induction of seed germination of B. gigantea in its natural habitat as well as in cultivation.

The second location where I saw B. gigantea was about 140 miles north of Perth and about 35 miles inland. This site was at the top of a well-drained hill with soil composed of a mixture of white sand soil and laterite pebbles. Laterite is reddish in color and contains large amounts of iron. Because of abundant spring rains, the soil was moist but not soggy. The vegetation was composed of very dense scrub composed of shrubs about 2-4 ft. tall and growing close together. According to several botanists in Western Australia, B. gigantea is actually more common in this general area than around Perth. At this locality there were more plants for a similarly-sized area than at Cannington Swamp. B. gigantea apparently has a wider tolerance to soil types, soil moisture, and habitat preference than is commonly believed.

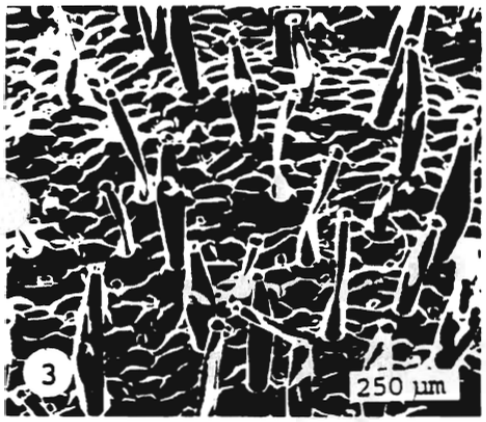
Mazrimas mentioned in his short note that Byblis, because of its insectivorous nature, "is capable of growing in soil with low nitrogen content free from competition of other plants." This is an old concept that, as a generalization about all insectivorous plants, should be re-examined. The soil in SW Australia is, as a whole, very sterile, yet the vegetation is commonly quite dense with a large number of different species. Byblis gigantea is definitely not without competition from other plants. This is true of most of the Drosera species in Western Australia also. In SW Australia the density of the vegetation decreases with both extremes in soil moisture--with swamps and with deserts. It would appear that, at least in SW Australia, excessive soil moisture is more of a limiting factor for plant growth than is soil fertility. That is, more plants can tolerate the low soil fertility than can tolerate aquatic or semi-aquatic habitats.

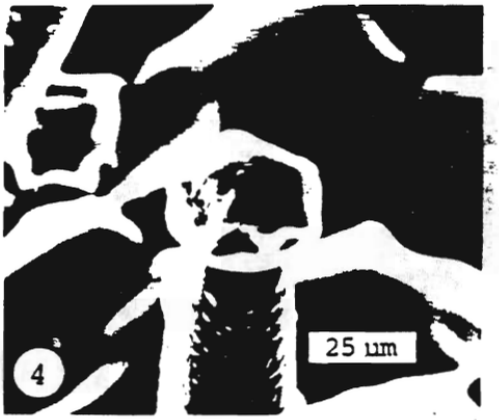
An observation that may be of interest to some of the readers involves floral mimicry between the flowers of B. gigantea and the flowers of Thysanotus multiflorus, a member of the lily family that was found growing at both localities with B. gigantea. Floral mimicry between plants deals with the occurrence of similar floral structure and color in the flowers of two plants that grow together but are not related. The condition is a result of adaptations of both plants to the same pollinator. The flower of Thysanotus multiflorus is the same size and color as the flower of B. gigantea. Both species flower at the same time, and both have stamens located on one side of the flowers and twisted. Presumably both species are pollinated by the same insect.

SEM OF PINGUICULA by Richard M. Adams II









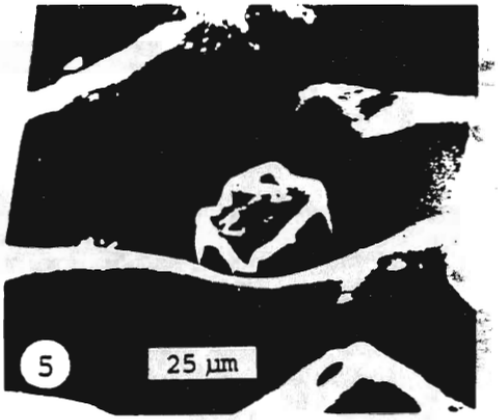




FIGURE 1: Habitat of Byblis gigantea in well drained laterite-sand hill about 140 mi. north of Perth, W. A.



URE 2: Plant of B. gigantea growing in Cannington np.



FIGURE 3: Flower of B. gigantea. Note twisted stamens and style. The small white spots are grains of sand which get into most closeup pictures made in the field in Western Australia.

It was reported by Mazrimas in CPN IV, 30 (1975) (see also CPN I, 38, 1972) that when the flower of B. gigantea is vibrated, pollen is released through pores at the tip of the anthers. Research has indicated that plants which conceal their pollen and later release the pollen through terminal pores do so in response to the vibrations of the wings of insects foraging for pollen. (See "Behavioral aspects of coadaptations between flowers and insect pollinators" by L. W. Macior in Ann. of the Missouri Botanical Gardens, 61 (3): 760-769, 1974)

These few field observations serve to illustrate the almost total lack of biological information about Byblis gigantea and the need for extensive field investigations. The ecology of B. gigantea is not thoroughly known, and extensive ecological and biological studies are indicated. Most carnivorous plants show biological phenomena, in addition to their carnivorous nature, which should be studied.

SEM OBSERVATIONS OF A BUTTERWORT

by Richard M. Adams, II, Department of Biological Sciences
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(The author gratefully acknowledges the SEM time and technical assistance granted by The Dudley Observatory, Albany, NY, particularly by Messrs. Douglas Hallgren, Tony Laudate, and Bill Radigan; and the critical review of the manuscript by Drs. George Smith and Peter Tobiessen, Union College.)

Pinguicula macrophylla Kunth (Lentibulariaceae), native to Central America, is a rosette-forming carnivorous plant of the "fly-paper" type (Fig. 1). Although the leaves appear to be nothing extraordinary by superficial examination, their upper surfaces are covered with innumerable glands of two types: Stalked glands secrete muscilage which attracts and holds insects, and sessile glands secrete a proteolytic enzyme which digests the insects so that they may be absorbed by the plant as a source of nutrients. These glands are invisible to the unaided eye, but the stalked glands appear as a fine pubescence and can be observed with a handlens (Fig. 2).

The purpose of this investigation was to observe the upper leaf surface with a scanning electron microscope (SEM), a machine made available circa 1967 and used for examining the surface features of specimens at a magnification range of from 20x to 100,000x with high resolution (up to 100A) and great depth of field.

Materials and Methods. A Pinguicula macrophylla plant collected in Guatemala was placed in a substrate consisting of 3:2:1 horticultural treefern: milled Sphagnum moss: perlite, and grown under fluorescent lights (30 cm. [12 in.] from two 40 watt Sylvania "Wide-Spectrum Gro-Lux" bulbs) at room temperature and approximately 80% relative humidity.

Leaves were excised and prepared by the method of Panessa and Gennaro,[3] (4 days in 5% glutaraldehyde fixative, overnight in 2% uranyl acetate post-fixative, 4 days in 50% glycerine), with the exception that absolute ethanol was substituted for water in the glycerine solution, to achieve further hardening of the tissue to reduce its distortion under vacuum.

The specimen was drained of excess solution on lint-free cloth, then affixed to an SEM stub which was coated with silver conductive paint and allowed to dry to tackiness before application of the tissue. A thin metal coating was vacuum applied before viewing on a Cambridge Instrument "Stereoscan" SEM.

Results and Discussion. Figure 3 is an overview of the leaf surface. The epidermal cells, reminiscent of jigsaw puzzle pieces, are visible, together with the stalked and sessile glands. The use of 50% glycerine in ethanol rather than in water promoted greater tissue hardening of the stalked glands resulting in significantly less distortion and collapse of the stalks, which was a significant technical problem with this species. There is still some tendency for the stalked glands to collapse, however. The stalks of this species are longer (averaging 0.30 mm) than those of other species examined (P. vulgaris, 0.08 mm;[3] P. grandiflora, 0.10 mm).[1]

Figures 4 and 5 are close-ups of a stalked and sessile gland, respectively. The "droplets" on the stalk (Fig. 4) are likely coating artifacts. They were not affected by direct electron bombardment, and are therefore not likely to be liquid. The ridge circumscribing the sessile glands (Figs. 3,5) is a feature not previously described in this genus.

In the 1940's Lloyd[2], using light microscopy, reported 16 cells per stalked gland and 8 per sessile gland of P. vulgaris. In SEM photographs by Panessa[3] (P. vulgaris), 4 cells per gland of each type are visible; similar photos by Heslop-Harrison[1] (P. grandiflora) corroborate those of Panessa for sessile glands, but secretions obscure the comparable surface of the stalked glands. In our study no multiple cells are definitely distinguishable on