'We have two boys, men now. The older, Francis, is here married to a fine girl and we have two grandchildren, and we have just concluded a joyous Christmas (for the kids)...The younger son became a Rhodes scholar and got his Ph.D. at Oxford in physiology with a first and is now at the Rockefeller Institute in New York. He is married and we have us a granddaughter, looks like her father or mother or someone...Faithfully yours, F. E. Lloyd."

(He wrote this letter at the young age of 72.)

JOE MAZRIMAS writes: "Several people inquired about conditions and preparations needed for dormancy of various CP. In California, I set my plants of Sarracenia, Dionaea, and N. American Drosera outside under a lath house about October first. During this time, they slowly acclimate to the cooling weather climate from the warm temperatures in the greenhouse. I don't cover the plants at all but I make sure they have sufficient water to remain moist but not saturated. I find that covering the plants in plastic bags or several layers of canvas encourages the production of fungal and mold infections. Similarly, storing plants in the refrigerator in plastic bags to induce dormancy conditions is also dangerous practice because the plants are prone to rot. So, the best policy is to allow the plants to have access to fresh air. During this time, Sarracenia pitchers start turning brown from the top down. Dionaea traps turn black, and Drosera leaves stop growing and the tight winter bud forms. It takes approximately three to four weeks for the plants to reach a true dormancy state, after which they are resistant to cold temperatures. I find that plants can withstand 20° F. (-7° C.) quite well for long periods of time. They probably can tolerate lower temperatures without covering to 10° F. (-12° C.). When temperatures lower than this are predicted, I would cover the plants lightly with a canvas cloth or tarp allowing free flow of air at the sides. Usually, the containers were frozen solid for weeks at a time without any serious adverse effects on the plants. Severe cold periods will sometimes cause some damage of the first leaves that emerge from Dionaea or Sarracenia, but subsequent leaves are normal in appearance. In conclusion, when the leaves have mostly turned brown or black, I trim them off about one to two inches above the rhizome. I hold back on the water and just maintain sufficient moisture in the medium to prevent wilting. Under these conditions, many of my plants survive the rigors of winter quite well, and I anxiously wait to see the first leaves poking through the moss announcing the awakening of the spring season.

R. W. RAMSDEN writes: "I am a CPN subscriber and CP enthusiast myself, as well as an owner of Chicago's largest independent lamp supplier. If any of your readers wish to buy Sylvania "Gro-Lux" and "Gro-Lux wide-spectrum" lamps or Westinghouse "Agro-lite" fluorescent lamps, they may be purchased from me at a discount of 50% off list price. Lamps are available in 18-inch, 24-inch, or 48-inch lengths. I prefer to sell the lamps in multiples of six; however, I will accommodate all orders. Merchandise is sent by UPS with standard C.O.D. and freight charges. Eight-foot lamps must be shipped by truck. We also carry the G.E. and Norelco equivalents to "Gro-lux" at the same prices. If any technical information is needed, or if I can be of service in relating my personal experience with CP grown under these types of lamps, I would be pleased to report. Anyone interested write to: R. W. Ramsden, National Electric Supply, 5311 North Kedzie Avenue, Chicago, Illinois 60625."

## SHORT NOTES

### PEST CONTROL IN CP

by Leo C. Song, Jr.
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In CPN 2(4):60, it was pointed out by the author that the application of Cygon 2E, a systemic pesticide (penetrates the plant, rendering it toxic for a time against biting and sucking pests), resulted in severe leaf deformation and apical growth disturbances in some species of Drosera (notably D. adelae, binata complex, brevifolia, capillaris, capensis, montana, and spathulata complex), Byblis liniflora, Pinguicula, and less severely in Sarracenia. This condition resulted in the death of severely affected plants, but in the case of those with roots that were able to produce adventitious shoots (D. adelae, binata complex, capensis, and to a certain extent D. aliciae and the other members of the spathulata complex) this condition re-appeared on the new growth each year even though the use of Cygon had been discontinued in the form of direct applications. Since we still had to use it to control pests on other plants, these species were exposed to varying concentrations of Cygon vapor and spray drift, especially those growing in the greenhouses.

The distortion seemed to disappear during the cooler parts of the year only to reappear when the weather warmed up, which coincided in many cases with the applications of Cygon 2E on surrounding plants. Even those plants that were seemingly exposed to vapors very briefly would become distorted and eventually succumb. It was decided at this point to suspend the growing and propagation of sensitive species--we would concentrate on the resistant species such as D. filiformis, both forms and the hybrid, Drosera burmanni, rotundifolia, X nagamoto, the pygmies and the tuberous types. Materials of sensitive species were distributed as seeds, leaf cuttings from asymptomatic plants, and even seedlings not previously exposed to Cygon, to several people in the local area, mainly Bob Hanrahan in Santa Ana

(Orange County, California) and Jeff Collier in the San Fernando Valley (Los Angeles County) who were at that time warned of the results of treatments with Cygon.

Things seemed to go well at first, but then these individuals began to notice the same problem appearing in these plants as well as their progeny. An entire terrarium was affected after the introduction of a single plant(Collier, personal communication). At that time, Jeff Collier sent a sample of the affected material to the L.A. County Agriculture Dept. They made a positive identification of Cyclamen mite (Speneotarsonenus pallidus) which can cause the same type of distortion in some plants--cyclamen and African violets. This would account for the apparent spreading of what we formerly had called the Cygon Disease.

Taking our cue from this, we sent samples from Bob's plants to the Orange County Agriculture Dept. The agriculture inspector on his twice-a-year rounds of our area had also seen the affected plants here at California State University, Fullerton, and he took a sample. They at first said it could be a type of growth hormone damage, such as inadvertent exposure to 2,4,D, but we said to look for mites also. A few weeks later, we got the same identification--Cyclamen mite.

At about this time, we decided to begin a regular program of fumigation of all our greenhouses with Plantfume 103*, generally sold in 3.5 oz. cans, which is sufficient to treat 10,000 cu. ft. It is a preparation of 0,0,0,0-tetraethyl dithiopyrophosphate, which is ignited and produces a penetrating white smoke. The gas is effective against many types of mites, aphids, and mealy bugs--which was our main reason since the gravid females in many cases leave the plants and lay eggs in crevices, under pots, etc., and even live inside the pitchers of Sarracenia. Scale in the soft stage is also controlled, this being a serious pest of Sarracenia and Nepenthes. Fumigation is ideal for treating these plants because of low residues, relatively short exposure times (overnight), the ability to penetrate inside pitchers, and to kill any target pests in the area.

At this point a word of caution. A use permit is required (at least in California) for this pesticide and a monthly report is required regardless of quantity used. This permit is issued by a county agricultural inspector provided that it will not endanger anything in the vicinity. It is best to check with your county inspector or the equivalent for more details.

We use the following method for fumigation in our greenhouses. Since the greenhouses are not airtight, the gas is able to diffuse out, thus reducing the killing power. We therefore use what amounts to about a triple dose of gas plus adequate air circulation by the use of fans and blowers to rapidly distribute the gas upon generation. This is done as soon as the sun is low enough so that the ventilation thermostats are not tripped. A 40-watt light bulb controlled by a timer is placed under the ventilation and heater thermostats. The timer is set to turn the bulb on for a few hours just before dawn which heats up both thermostats, turning on the coolers/vents and turning off the heat at the same time. The use of heat is recommended as this gas is most effective between 70-80° F./ 21-27° C. This process flushes the gas without the necessity of having to manually work the controls, thereby avoiding an exposure hazard.

The houses are fumigated on days on which we do not water as the foliage must be dry. This presented a problem since Drosera, Pinguicula, Byblis, and Drosophyllum, etc. are always "wet" and pitcher plants have water inside the pitchers. After a few test plants were placed in the greenhouses and exposed to the gas without apparent damage, our entire collection of plants, including seedlings, was treated. Plants that were in the lath house were put on carts and transported to the greenhouse for treatment. At least two and sometimes more treatments were given within a week of each other. Plants in the greenhouses have received subsequent treatments with only some foliar damage--edges slightly burned in some Sarracenia and Dionaea.

The results from the fumigation alone have been excellent. The Drosera species and Byblis liniflora affected with the cyclamen mite have shown signs of recovery with normal leaves and flowers being produced. Mealy bug has been eliminated or greatly reduced from the Sarracenia and there are no visible scale. An unknown Drosera, possibly D. madagascariensis, whose tip had been killed by the mite attack, has produced a new shoot. To further insure the control of the mite, all susceptible and affected plants have been treated upon recommendation of the Orange County Agriculture Dept. with Kelthane 35 WP, a very effective miticide, in a 35% wettable powder. We feel that the use of wettable powders is better than liquids since the organic solvents used to dissolve the active ingredients may cause most of the damage noted. Kelthane is used at about half the recommended dose (1.5 tbs/gal) for house plants, which works out to be about 2 tsp/gal (2tsp/4L). A wetting agent is also added, Basic H (a Shaklee product) being one of the safest at 1 tsp/gal water. Half this dose could be used if distilled water is used to avoid excessive foaming.

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.