

corrugations of the pitcher lip, pitcher shape and lid markings and shape. As was pointed out in previous CPN articles regarding Dionaea, narrow endemism does not seem to prevent marked individual variations in the plants and the same might be true for Cephalotus. Only further cultivation and time will tell.

A CP COURSE IN MICHIGAN  
by Larry Halcomb

A course on CP was recently held at the University of Michigan's Botanical Gardens. The class, very ably taught by Larry Mellichamp assisted by his wife Audrey, lasted two days, September 27 and 28, 1975.

The first day, Saturday, consisted of a lecture and open discussion on a brief history, kinds, trapping mechanisms and culture of CP. Everyone discussed and benefitted from sharing cultural information. Displays of books and plants along with microscope setups were scattered around the room in which the class was held. There was a slide show showing Don Schnell's and Fred Case's plants and greenhouses and many excellent pictures of CP in their natural habitat taken by Larry Mellichamp.

The second day, Sunday, started with a lecture on planting seeds, repotting plants, taking cuttings, etc. Then, in a greenhouse, these things were demonstrated and students were given actual plants to work with and keep. Among plants received were several Drosera filiformis, several Drosera binata var. multifida, Dionaea muscipula, Cephalotus follicularis(!!), several Utricularia species; seedlings of Sarracenia flava and Darlingtonia californica; seeds of Drosera filiformis, Drosera rotundifolia, Sarracenia oreophila, Sarracenia leucophylla, Sarracenia flava, Sarracenia purpurea; cuttings of Drosera filiformis, Drosera binata, and Drosera binata var. multifida.

To top it off, the group traveled to Mud Lake Bog about ten miles northwest of the Gardens where D. rotundifolia and S. purpurea grow abundantly in the wild. As eight weary, muddy students washed themselves off, not a complaint was heard. Everyone thought it well worth it.

HEALING (AND POISONING) WITH DROSERAS

by Susan Verhoek-Williams

From ancient times to today plants have supplied either the major or the most important part of many medicines. In days when diseases and cures were linked with sorcery and philosophy, a plant as novel as Drosera was sure to be employed in medicine. Surely a plant which retained drops of dew even in the midday heat must have special powers, if not a special understanding with the Sun!

The alchemists of old, in their dual search for the universal remedy for disease and for the Philosopher's Stone which would turn "base" metals into gold, held sundews in high esteem. For medieval alchemists the Philosopher's Stone with its health-giving powers became not so much an actual object but rather the spirit of the world which caused all matter to be transmuted through various stages to the highest state, gold. The closest earthly substance to spirit is air, and therefore materials which had been in close contact with air were thought to contain some of the essence of the Stone. Hence, snow, rain and dew were considered to be part of the universal Elixir of Life. Dew was believed able to dissolve gold. Because it apparently was more "in tune" with the sun, the "dew" on a sundew was considered the most powerful.

In France, sorcerers (as alchemists were popularly known) used Drosera in their potions. Laymen ascribed to it both harmful and beneficial effects. A single plant brought into the house was thought to cause pernicious fever. Outdoors, however, one who searched for a sundew and rubbed its leaves over his skin on St. John's Eve would become indefatigable. Searching was necessary; a person who simply blundered upon the plants would be confounded and never find the spot again.

It was easy to tell if Droseras were nearby, at least so it was believed in the Bourbon region of France. There, it was said, the plants glowed at night and by day green woodpeckers marked the spot; they could be seen flying strangely as they maneuvered to pluck the sundews, which were used to harden their beaks.

Sorcerers and laymen alike collected the plant on St. John's Eve (Midsummer Eve), midnight being considered the time to gather the most effective plants. The gathering was perilous; the collector had to do his collecting walking backwards to avoid being followed by the devil. Devil or no, walking backwards in a bog at midnight would give a collector an uneasy feeling.

Men and women interested in more earthbound things than sorcery probably also experimented with sundews in their quest for cures. Sensitive people who handled the leaves may have

noticed reddening and blistering on their hands. Perhaps a wart disappeared at the same time. Fresh, mashed Drosera leaves or an alcoholic extract of the leaves has been used in Germany, Indochina, and America to cure warts and corns. And if it was good for warts and corns, why not bunions and freckles? It has been used against both of those conditions, and sunburn also.

The sunburn treatment is of the type practiced in homeopathic medicine. This philosophy of medicine holds that in order to cure a disease it must be treated with a medicine which produces the same symptoms in a healthy person. Therefore, since tincture of Drosera causes reddening and blistering of normal skin, homeopathy would use small doses of it to cure skin which was reddened and blistered by the sun.

How Drosera came to be used internally is more difficult to explain. Perhaps it was a simple matter of trying any plants and selecting those which worked, or seemed to. Or perhaps it was the homeopathic philosophy that discovered the medicinal effects. Sheep occasionally became ill with terrible fits of coughing which were eventually fatal. The poisoning was thought to be the result of eating sundew plants. So again, fighting symptom with symptom, sundew extracts and teas were prescribed for coughing diseases in humans-- tuberculosis, asthma, catarrh of the lower respiratory tract, and whooping cough. Reports of this use are prevalent in German and French medicinal plant books even as recently as the late 1960's. Pharmaceutical preparations have been sold under the names Herba Droserae, Herbe Rorellae, Herba Roris solis and, in Italy, rossoli. Drosera was mentioned in the French pharmacopoeia as late as 1965.

Herba Rorellae was a favorite whooping cough remedy because of its practical value--it worked. But no one knew why. Before scientific investigation of sundew extracts were made, it was thought that the medication had an antibiotic action against whooping cough bacteria. This turned out not to be true. Instead, the action of the medicine was discovered to be antispasmodic. Several studies made between 1933 and 1956 identified the active ingredients in Drosera tinctures as compounds of the class called naphthoquinones. All Drosera species tested so far contain one or more naphthoquinones, the two most common being 7-methyljuglone and plumbagin. Drosera longifolia, D. intermedia, D. rotundifolia, and D. anglica contain plumbagin. Drosera intermedia and D. anglica contain 7-methyljuglone. (For the distribution of these quinones in other species, see the paper by Zenk, Fürbringer and Steglich.)

In Madagascar, D. ramentacea is used medicinally for cough. These plants contain ramentaceone, 7-methyljuglone, and plumbagin. According to Luckner and Luckner, Herba Droserae is no longer being obtained from D. rotundifolia but from D. ramentacea.

Scientists, most recently Bezanger-Beauquesne in 1955 and Krahl in 1956, have treated pieces of guinea pig and rabbit intestine with extracts of Drosera and found that muscle spasms in the intestine walls are initially strong but gradually reduce in both amplitude and frequency. Krahl found that a naphthoquinone from D. rotundifolia also suppressed cough caused by electrical stimulation of the laryngeal nerve. Even more recently, Ramanamanjary and Boiteau found that subcutaneous injection of an alcohol extract of D. ramentacea protected guinea pigs from bronchial spasms artificially induced by histamine and acetylcholine.

Herba Rorellae is prepared by first gathering the rosettes at flowering time. The folk healers already had stumbled onto the fact that a greater amount of active ingredient was present at the time of flowering; St. John's Eve, June 23, which is specified as the collecting date in many accounts of medicinal and magical plants, falls early in the flowering season. After the rosettes, without the roots, are gathered, they are air dried. Drying reduces the plant volume by as much as 90%. It is this extreme reduction in size as well as the relative scarcity of the plants that causes the high price of the drug. As a home remedy, the fresh or dried leaves are infused in water to make a tea. To obtain the tincture used pharmacologically, 200 grams of the dried plants are macerated in 1000 grams of alcohol for ten days and the solution filtered. Tinctures of Drosera are sold in approximately this form. To isolate pure plumbagin or methyljuglone requires about six extraction and distillation steps.

A number of workers have found that the amount of naphthoquinone in commercial tinctures varies widely. Sometimes this may be due to the varying amounts of chemicals in the plants themselves. In addition, even tinctures rich in naphthoquinones lose potency after a time on the shelf.

When used externally, the leaves are used fresh, mashed, and applied either alone or with salt when a blistering or reddening agent (rubefacient) is required. External uses have been reported from Germany, Indochina, Nepal, and the United States.

Various recipes for taking Herba Droserae internally are given. As a tea, Fischer records

a single dose of 1/2 gram of sundew with honey or brown sugar added. For pharmaceutical preparations in France, Garnier and colleagues describe the usual doses as 0.5 to 2 grams per dose, or 3 to 10 grams per 24 hours. A complex medication is made of Drosera extract, Syrup of Poppy, Syrup of Orange Flower, and sugar syrup, to be taken by the spoonful. For infants, 2 grams of Tincture of Drosera and 200 grams of Sirop de Coquelicot (Syrup of Poppy) can be mixed. For the elderly, Drosera is also part of an infusion prescribed for cases of arteriosclerosis. This tea contains hawthorn leaves, buckthorn bark, licorice root and strawberry.

Drosera-based cough medicines have progressed from folk medicine to clinical use and finally to validation by scientific studies that isolated the active ingredient. Such folk medicines which were successful against one condition were often tried against other diseases as well. In the case of sundew, treatments have been used for a variety of abnormal conditions in addition to coughs, arteriosclerosis, and skin problems. Perhaps one day these remedies will be tested for efficacy: The French have used it for stomach maladies. Homeopathic medicine has prescribed the drug for eye and ear inflammation, tic douloureux, and rheumatic joint pain. In Germany Herba Rorellae prepared from D. rotundifolia has been sold to relieve morning sickness, liver pain, and dropsy. It has been used as a tranquilizer and a diuretic and has been accorded aphrodisiac properties (as have been the majority of medicinal plants, including D. filiformis and D. longiflora). Many of these European cures have also been employed in the United States. In India, D. peltata is used as an antisyphilitic and blistering agent. Drosera is included among the medicinal plants of Brazil and in Mexico the Chinantec Indians use a species of the subgenus Rorella to treat toothache and intestinal troubles.

On the reverse of these healthful and reputedly healthful effects are some very detrimental ones. Clinical treatment with Drosera is specifically contraindicated in cases of high blood pressure. Another study has shown that intramuscular injection of the extract results in digestion and death of muscles and blood vessels.

As a general rule it is never wise to resort to a home-prepared plant remedy. Self-diagnosis can lead to improper and potentially dangerous treatment. Pharmaceutical preparations of Herba Droserae have been shown to contain varying amounts of naphthoquinone. Home-concocted remedies can contain even less standard doses. Overdoses of Drosera extracts, probably because of extreme amounts of naphthoquinones, cause irritation of the skin and mucous membranes, intestinal irritation, severe cough, and bloody diarrhea. According to Jacobs and Burlage's compendium, D. rotundifolia causes the pleural surface of both lungs to become studded with tubercles, "produces shuddering in man, a sense of constriction of the chest, rawness in the throat, pains in the bowels, diarrhea, sweat and diminished secretion of the urine." Were this not enough, D. rotundifolia and D. peltata are reported to produce cyanide.

So, having read this, if you don't walk backwards when collecting Drosera--at least don't chew the plants.

#### Medicinal Uses of Drosera Species

<u>Species</u>	<u>Antispasmodic for cough</u>	<u>Corns &amp; warts</u>	<u>Rubefacient</u>	<u>Other (See Text)</u>	<u>Country of use</u>
<u>D. burmanni</u>			X		India
<u>D. filiformis</u>	X		X	X	US
<u>D. indica</u>		X			Indochina
<u>D. intermedia</u>	X				France
<u>D. longiflora</u>	X	X	X	X	France US
<u>D. peltata</u>			X	X	India Nepal
<u>D. ramentacea</u>	X		X		Madagascar
<u>D. rotundifolia</u>	X	X	X	X	France Germany US
<u>Drosera spp.</u>				X	Mexico
					(unspecified) Brazil

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THE DROSERA BINATA COMPLEX

by J. A. Mazrimas

We get frequent requests to differentiate between the variants of the Drosera binata complex which all grow in Australia along the eastern seaboard. It is interesting that the variants are self-sterile but interfertility is good when variants are crossed with one another. A description follows on how to differentiate between the various types.

The "T" form is the simple one with the petiole dividing into two leaves which grow in this way for years. I've never seen its leaves divide any further. Its petiole is of uniform width throughout.

The var. dichotoma is more complex in that the leaf portion divides either one or two more times to produce a maximum of eight points. The leaf is somewhat wider than the petiole (about three times) and frequently the width is non-uniform at the base of the branch point; that is, the leaf branches unequally so that one portion of the leaf is noticeably wider than the other.

Finally, we come to the var. multifida whose leaves exhibit many branchings up to 27 points as described in CPN 4,48,1975. The leaves divide evenly so that they have a uniform width throughout. The tentacles seem to exhibit more red color than var. dichotoma in the strongest light. The leaves have nearly the same width as the petiole which supports the branched structure.

The flower color is usually white on all three variants. However, a rare pink flower form is known to occur with var. dichotoma and var. multifida.

All three variants make very good basket plants since the petioles grow long and seem to flop over the pot. I hang my pots of these plants by wire to a pipe attached to the roof of the greenhouse. The plants relish the extra light and the beautiful leaves grow thickly over the pot showing off their dewy tentacles in the morning light. I use an inexpensive plastic pail to pot the plants and fill the bottom half with pure perlite and fill the rest with sphagnum moss and perlite mix. I water to fill pail up to the level of the perlite layer.