purpurea genetic influences somewhere in the history of the plant. This would explain the stockiness and indumentum. There is one problem, and I am working on it still. The plants appear in rather large (relatively) uniform stands where they occur, and the *purpurea* influences may therefore be genetically fixed which would indicate at least a form taxon. Some stands have *S. purpurea* growing nearby while others do not, but the last does not bother me since any number of things could have happened to *purpurea* where it might have been and in hybrid seed dispersal.

I will leave you with that incompletely solved problem, and many more you will see for yourself as you gain experience in exploring our Gulf coast pitcher plant stands—while they last!

Herbarium Samples and Preserving CP Specimens

By Randy Lamb, Suite #106, 5030 East Hastings Street, Burnaby, British Columbia, Canada V5B 1P6

Have you ever tried to describe a plant to another person, or imagine one that they were describing? It is not as easy as it sounds! Human nature being the way it is often causes unintentional exaggeration or misinterpretation. We can all imagine how the stories of giant man eating plants came about! Botanists solved such plant description problems centuries ago by preserving specimens and then storing them in herbariums or "plant libraries" for reference and study (Altschul 1977, James 1950).

The plant press is the "workhorse" of the herbarium and consists of two wooden lattices measuring 30x46 centimetres which have repetitive layers of paper, blotters and corrugated cardboard "ventilators" between them. The layers are arranged so that each plant sample is within a folded paper and ends up with a blotter on either side of it. The ventilators are spaced every two plant layers to speed the drying process. The whole press in turn is held together by a pair of adjustable binding straps. Due to the number of plants collected in the field, a plant press may often end up nearly half a metre thick by the end of the day. Once dry, the plants are mounted with glue or tape to standard 29x42 cm (heavy manila paper) herbarium sheets along with their collection data and are then filed taxonomically and/or geographically (MacFarlane 1985).

Both easy and inexpensive, herbarium samples are an efficient means of documenting and identifying new plants found in the field or for recording species that you grow at home. The advantage of herbarium specimens are that they last indefinitely, the whole plant can be

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Finished laminated herbarium samples and supplies used. Photo by R. Lamb.

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examinedclosely and the actual size of the plant can be seen. Plant photography definitely has its merits but can often be misleading if not all parts of the plant were photographed or if size references were not included.

Some types of carnivorous plants don't readily lend themselves to being pressed and mounted such as *Pinguicula* and *Utricularia* but *Drosera* is adequate by this method. Other more dimensional species such as *Sarracenia* and *Nepenthes* require extra practice and skill, and are often better suited to alternative techniques such as freeze-drying (Shivas, 1983) or the use of silica gel (Shanos, 1985).

After pressing and mounting several CP specimens, I decided that due to their small size, limited quantity and delicate nature it would be necessary to modify the classical herbarium technique as follows. I found that an old standard sized hardcover textbook of 100 or more pages serves well as a "field press" because it is small, light weight and portable. To prepare your "press" first fold ten or more pieces of note paper in half, insert them separately into the book at equal intervals and then place a couple of rubber bands around the book to keep it closed. The rubber bands will also hold a pencil which you will need for sample labelling.

The leaves, flowers or complete plants with clean roots are placed and positioned naturally into the book's folded papers one at a time. The date, location and species name if known are included on the paper as well and then reinserted back into the book. Unless pressed immediately, the tentacles of *Drosera* will curl and aquatic *Utricularia* will wilt leaving you with specimens of poor quality. Remember to practice pressing and mounting with spare or non-cp plants first so that the more valuable species are not sacrificed unnecessarily. The extra pages between the specimens in the book will absorb most of the moisture, but I recommend transferring your samples to a second book after a day or two to speed the drying process. You will also have an opportunity when transferring the press papers to hold them up to a light to see if the specimens require any repositioning.

After one or two weeks the plants should be dry enough to be removed and depending on their size placed onto unlined standard sized file cards or larger notepaper sized pieces of white cardboard. Although not a standard procedure, I recommend plasticizing the delicate specimens as follows to prevent damage from handling. A piece of clear self adhesive plastic film or laminate that is slightly larger than the card being used is then placed over the specimen and applied carefully to avoid air bubbles. After trimming the excess plastic from the edges of the card, the original collection data is transferred onto its back and your plasticized herbarium sample is completed.

The most impressive herbarium sheets are created by pressing all the developmental stages of a particular species and then mounting them together to show its complete life history (seeds, seedling, adult in flower and seed capsule). You can also combine your best pressed samples with a high quality photocopier and produce your own personalized CP letterhead. The possibilities are endless! The completed herbarium samples will retain their colour for years providing they are kept dry, cool and protected from light. The use of standard sized file cards and note paper sized cardboard for the herbarium sheets allows them to be conveniently stored in file card holders, photo albums or three ring binders. Once the pressing and mounting techniques are mastered and spare high quality samples accumulate, you can trade with other collectors from around the world to create your own CP herbarium.

All of the supplies needed for making herbarium samples can be bought at office and stationery supply stores. The clear self adhesive plastic film can be found under the trade name "Teneka foil" and costs approximately $3.50 for a 40x100 cm roll. Have fun and the next time you write another CP'er about a particular plant of yours, try using a photocopy of its herbarium sample as your writing paper and knock their socks off!!

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Early History of *Drosera* and *Drosophyllum*

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Fossil evidence:

Fossil *Droseraceae* pollens from the Eocene (55-38 MYA) include two types: *Saxonipollis,* with several species in Europe and Asia which must have been early *Aldrovanda*; and the Australian *Fischeripollis halensis,* may be an ancestor of the local Sundews (since *Drosera* is the only genus in the Southern hemisphere).

The first real *Drosera* pollens appear in sediments from the Miocene (22-5 MYA). The oldest were found in New Zealand (Inferior Miocene) (MILDENHALL, 1980). Other examples are the badly preserved *Droserapollis gemmatus* from Taiwan (HUANG, 1978) and a *Droserapollis* from Germany (KRUTSCH, 1970). The latter site also has yielded the pollen of a late form of *Fischeripollis, F. undulatus (ibidem),* which one has difficulties interpreting. As a probable ancestor of *Drosera* in Australia, possessing *Dionaea*-like pollen, and given the floral similarities between the Venus' Fly Trap and *Drosophyllum,* the genus (or subfamily?) *Fischeripollis* seems to be ancestral to all terrestrial *Droseraceae.*

We have shown in a recent article [CPN 17 (1988) n°4] that the initial stages of *Dionaea* trap evolution may have taken place under water. Now if this is true of one descendant of *Fischeripollis,* then it also may apply to the others. What is more, the structure of the simplest *Drosera* flowers is almost identical to the one of *Aldrovanda,* the only aquatic among the *Droseraceae.*

Evidence from modern plants:

In contrast with *Aldrovanda* and *Dionaea, Drosera* leaves do not tell us much about the origin of their traps. The same goes for regressive leaves which usually still possess ordinary tentacles. The scale leaves of many tuberous *Drosera* seem to be non-specific features with parallels in many unrelated groups, e.g., *Darlingtonia, Sarracenia, Cephalotus.* The winter leaves in section *Psychophila* (*Drosera uniflora, D. arcturi, D. stenopetala* and maybe *D. regia*) could be more interesting, but not much has been published on them yet. In *D. erythrorrhiza* previously ordinary plants sometimes produce glandless leaves during one season, then revert to normal (DIXON *et al.,* 1980). This may be a type of regression, but does not tell us much either.

Why do *Drosera* regressive leaves not produce remnants of archaic trap features as in *Dionaea* and *Aldrovanda*? Could it be that the normal tentacles are this genus' original trapping device? There are indeed palaeogeographical reasons for thinking that the sundew stalked glands