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Live Storage of Palm Pollen

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Early Experiments

One of the earliest reports on the storage of live palm pollen was by Kaempfer in 1712. He related how the Orientals cut off the male flowers of *Phoenix dactylifera*, shortly before they opened, and suspended them in a dark, dry place where the pollen remained fertile until the "next year." In 1749 Gleditsch of Berlin had some pollen of *Chamaerops humilis* sent from the garden of Bose in Leipzig, in order to test whether the female plant in his possession would produce fruits with fertile seeds. It proved successful, proving that the pollen had survived the nine day journey to Berlin without damage. This test was repeated in 1750 and 1751 with the same success. Sixteen years later Kolreuter sent pollen of *Chamaerops humilis* in envelopes from Karlsruhe to Berlin and St. Petersburg (Petrograd) with the intention of ascertaining its power of retaining fertility. Although the trip took several weeks, plants which were pollinated with the shipped pollen bore fruits profusely.

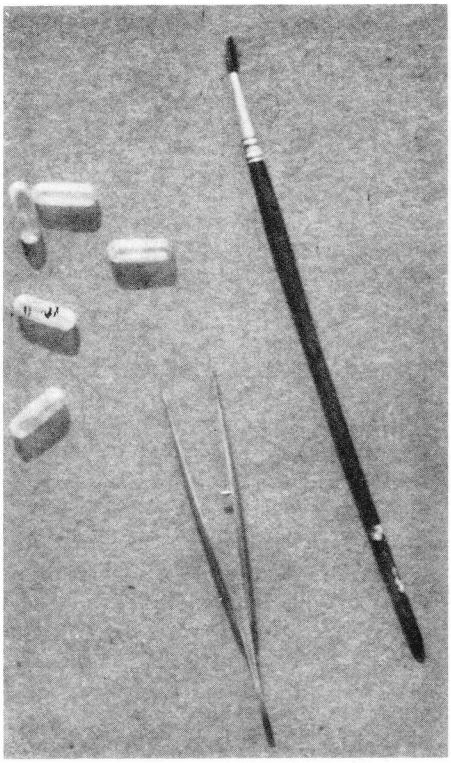
The earliest thorough study on the viability of pollen is apparently that by Max Pfundt (1910). It was in this rather interesting work that the foregoing historical observations were found. Pfundt was involved in testing the effect of humidity on pollen viability and concluded that "the life duration of pollen is evidently dependent upon the moisture content of the air, . . ." and that "many [species] live longest in dry (30% relative humidity) or even very dry air (over H_2SO_4)."

Although I do not have first-hand experience with long-term pollen storage techniques, such as freezing or drying, such procedures are possible, and experiments on a small scale should prove very useful. In Jamaica, the Coconut Industry Board has been involved in the hybridizing of *Cocos nucifera*, a project requiring freeze-dry storage of various pollen collections. Whitehead (1962) described experiments with freeze-dried pollen in sealed containers under an inert gas in addition to his own experiments with coconut pollen. Freeze-drying techniques are not within the realm of the average palm enthusiast. Whitehead noted, however, that "unopened male flowers from inflorescences of 'Jamaica tall' palms were placed in separate newspaper envelopes and ovendried at 40°C (for approximately 2 days). Pretreatment in this way has resulted in greatly increased quantities of pollen."

Procedures

The first rule in the collecting of live, viable, pollen for storage or shipping is: *keep it dry*! Don't collect flowers in the rain or with heavy dew; fungal contamination will inevitably result.

For my own work the following technique was quite satisfactory. In the case of tiny flowers with limited quantities of pollen, such as with some species of *Chamaedorea*, entire buds or flowers were collected. These should be spread out on dry, smooth paper in a dry draft-free room or even a warm (not hot) oven for a few hours in order to dry out the floral tissues as much as possible. Or portions of inflorescences can be col-



1. Materials for collecting pollen.

lected at full bloom or as soon before as possible. The pollen is collected by allowing the stamens to shed on a piece of paper in a draft-free room. Pollen should then be stored in gelatin capsules and placed in an airtight container with dry silica gel containing a color indicator. It may even be necessary to dissect unopened anthers from flowers and permit them to dry in the gelatin capsules and silica gel. It is very important not to store more pollen in a capsule than will effectively coat the wall when dry, otherwise the possibility of fungal and bacterial contamination becomes serious. Fragments of the flowers or anthers should be removed from the capsules when dry. It is probably better to store more capsules with less pollen than run the risk of inadequate dehydration.

The pollen of at least one genus of palms, *Thrinax* (Read 1975 p. 49), has been determined to remain quite viable for periods up to 4 months at room temperature (about 26°C). Samples of pollen maintained dry in gelatin capsules that were kept in containers of silica gel at room temperature in Jamaica, were sown on a nutrient medium at intervals over a four month period. Pollen viability was excellent at first (between 70 and 80%), when tested during the first week. Three weeks later samples were again tested with the results that about 41% of the grains germinated.

After 5½ weeks of dry storage at room temperature, there was still 37% viability. However, after 6 weeks, viability dropped rapidly to only 1% germination of pollen sown on fresh medium after about 10 weeks of dry room temperature storage. Refrigeration undoubtedly will increase the life span of the pollen, as long as the pollen is sufficiently dry. Remember that in a humid climate, moisture will condense on the packages or vials upon removal from refrigeration. Therefore, allow the vials or polyethylene bags to return to room temperature before removing the capsules. A small camel's hair brush can then be used to pick up pollen from the capsule walls for application to the female flower parts in order to effect pollination.

Materials Needed

(1) Small vials or polyethylene bags (zip-type) containing a quantity of dehydrated silica gel, with cobalt chloride indicator to insure that the gel is still dry when used.

(2) Gelatin capsules (available at most drugstores).

(3) Tweezers.

(4) Small camel's hair (or other) paint brush.

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POLLEN EXCHANGE

Over the years quite a number of members of The Palm Society have acquired a fair collection of palms many of which are now mature. Some of these plants lose a certain attractiveness when they get tall and so a desire comes to acquire young plants to replace the old ones, or perhaps, just to enlarge the collection. However, getting new plants is not always easy and the obvious solution lies in growing palms from seed. But, seeds are not always easy to get either, so why not produce one's own?

As most of us know, some palms are dioecious (male flowers on one plant, female on another) so we must have a plant of each if we want seeds. Often we must hand pollinate since the natural insect pollinators are usually not present in our homes, gardens, or greenhouses. Or, we have just a single plant of a given species and so it becomes a question of either finding pollen to fertilize the female plant, or giving pollen to someone who has such a plant, and asking for a share of the resulting seeds, if any. Because, over the years, I have several times needed pollen and could not find any, an idea was born: to start a service for those who would like to try their hands at producing seed but don't have what it takes to do so.

The plan is to establish a sort of clearing-house for those who 1) have female plants and need pollen, and 2) have pollen but no female plants. Mary Collins, Horticulturist at Fairchild Tropical Garden, has agreed to handle such a clearing-house. Perhaps in very special cases pollen could be stored here in Miami, but generally she will try to put interested members in touch with each other.

Some palms, like the *Chamaedoreas* in the northern hemisphere, seem to bloom in the spring although there is no hard and fast rule. Most produce male flowers before the female ones (or at the same time) so the pollen needs to be held only a short time, if at all. However, sometimes the males bloom last so that by the time the pollen is ripe the female flowers have long since dried up. How to preserve pollen is discussed above in this issue.

This therefore, is to introduce a new service to members—a *pollen finding* service. If you are interested, please let Mary know what you can furnish in the way of pollen, or whether you need pollen for your female plant.

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