Viability of Palm Seeds*

NAT J. DE LEON

In any discussion of palms, the subject of viability of seeds is an important one. To be able to grow and appreciate palms, we must in most instances start from seed. Many failures of germination have been attributed to poor practices, but if we could trace the circumstances under which the seeds were collected and sent, we would find that the seeds had passed their period of viability in transit so could not have germinated anyway. An understanding of the viability of seeds, therefore, will greatly improve chances of obtaining germination.

A palm seed has a thin seed coat within which lies an embryo, the young plant body, and the endosperm or albumen upon which the embryo feeds until it can absorb nutrients through its own developing root system. It is unlike many dicotyledonous seeds which go into a state of dormancy until conditions are favorable for germination. Instead, the embryo of the palm seed, which is always next to the thin surrounding seed coat, begins to shrink and dry up when conditions are unfavorable. It is the length of time required to complete this shrinking process with which we are concerned—the longest period that can safely elapse between maturation and planting of the seed.

Exact time periods are difficult to give because of many variable factors. Several general rules, however, can be applied to palm seeds. Those coming from palms of sub-tropical areas, from areas having distinct hot and cool seasons or wet and dry seasons, and seeds with thick endocarp remain viable for some time. Two to three months is usual for this group which includes *Acrocomia, Archontophoenix, Arecastrum, Arikuryroba, Attalea, Borassus, Brahea, Chamaerops, Coccothrinax, Colpothrinax, Copernicia, Dictyosperma, Elaeis, Erythea, Howeia, Hyphaene, Jubaea, Mascarena, Nannorhops, Opsiandra, Orbignya, Paurotis, Phoenix, Pseudophoenix, Rhapis, Sabal, Scheelea, Serenoa, Syagrus, Thrinax, Trachycarpus,* and *Trithrinax.* It should be expected that as seeds become older there will be a proportionate decrease in germination.

Palms from those parts of the tropics where changes in temperature and rainfall are slight and palms from low swampy areas bear seeds that are very short-lived, remaining viable from two to three weeks. Here the decrease in germination falls off sharply toward the maximum length of time. Genera known in this class include *Actinorhytis, Areca, Balaka, Bentinckia, Bismarckia, Calyptrocalyx, Calyptronoma, Chambeyronia, Clinostigma, Cyrtostachys, Didymosperma, Drymophloeus, Eugeissona, Euterpe, Gronophyllum, Iguanura, Iriartea, Jessenia, Linospadix* (*Bacularia*), *Loxococcus, Mauritia, Metroxylon, Nenga, Normanbya, Nypa, Oenocarpus, Oncosperma, Orania, Pinanga, Podococcus, Ptychoraphis, Raphia, Rhopaloblaste, Roscheria, Salacca, Socratea, Stevensonia, Veitchia, Verschaffeltia and Wettinia.* Seeds of these genera give us the most germination trouble.

There is, however, an intermediate class of palms from tropical areas. These palms bear seeds which remain viable for about four to six weeks. Genera of intermediate nature are *Aiphanes, Arenga, Astrocaryum, Bactris, Caryota, Chamaedorea, Chrysalidocarpus, Cory-*

*Presented at the Palm Conference, Fairchild Tropical Garden, April 18, 1958.

pha, Cryosophila, Diplothemium, Geonoma, Heterospathe, Latania, Licuala, Livistona, Phytelephas, Pritchardia, Ptychosperma, Reinhardtia, Rhopalostylis, Roystonea, and *Synechanthus.*

Most of the species within a genus react in a like manner. In genera where there are a great many species we may expect exceptions to the rules. Thus we find that *Pinanga Kuhlii* seeds remain viable longer than those of most species. We also find that seed of *Chamaedorea erumpens* remains viable longer than its intermediate range would suggest.

There are several palm genera that have never been introduced into cultivation in the United States, but we can safely predict the viability of their seeds by the areas from which they come and by their relationship to other genera. Thus seeds of *Prestoea,* which have not been introduced, should be short-lived since the genus is closely allied to *Euterpe, Jessenia,* and *Oenocarpus.*

It is interesting to note, in going over lists of palms that have long been cultivated in South Florida, that nearly all of the species that are well established belong to genera in the long and intermediate classes of viability. The reasons are rather apparent, for during the days of active seed introduction air transportation was in its infancy and costs were prohibitive. This same situation reveals itself in other tropical botanical gardens. When great distances had to be crossed, only those seeds capable of remaining viable for some time germinated. Nowadays, with good air transportation reaching many areas of the world, we have been able to obtain good seeds of many palms in the short-lived group.

The above information applies to seeds handled in the customary manner; that is cleaned, placed in a container, and shipped. It does not apply where efforts are made to prolong viability by protecting seed from the drying effects of air. The material most frequently used for protection is dry peat-moss. The practice at the Botanic Gardens, Singapore, for a long time has been to pack palm seeds in dry peat-moss enclosed in small tins and send by sea mail. Sometimes the seeds germinate enroute and the young sprouts die due to lack of moisture, but seeds of even some of the shortest-lived palms such as *Pinanga* may be received in good condition after eight to ten weeks in transit. Germination is usually thirty to fifty percent. The late Dr. David Fairchild, when on his expedition to the East Indies, sent seeds packed in peat-moss by air. Though air transportation was less highly developed than it is today, seeds of many of his rare palms germinated.

When good air transportation is available seeds may be picked fresh and sent direct by airmail without packing material. Unless unduly delayed, such seed should germinate. When delays in shipping are expected or when air facilities are not well established, seeds should still be packed in dry peat-moss soon after collection despite the added effort and expense.

Seeds should be sown as soon after collection as possible to obtain the fastest possible germination. The older the seed, the longer it takes to germinate, providing it is still viable. In old seeds the shrinking of the embryo has already begun. It therefore takes extra time for the embryo to absorb water and regain its original proportions. Last year, the Fairchild Tropical Garden received a shipment of *Arenga pinnata* seeds collected in Cuba. The seeds were quite fresh and germinated within two months. At the same time, I received seeds of this

palm from North Borneo. There was an interval of five weeks between the date of collection and the date of receipt. Before sowing, some of the embryos were examined. They had already begun to shrink. The actual time of germination with the addition of bottom heat was six months. At one month intervals, some of the embryos were again checked. By the fourth month, they appeared to be well proportioned and filled the cavity again.

Although viable, seeds of most palms will not germinate during the winter months in sub-tropical areas unless they are placed in a glasshouse or other means of applying warmth are used. They will, however, remain viable until spring if the germinating medium is kept slightly moist. Too much moisture will cause seeds to rot.

It is hoped that the information given here will be of some use to anyone attempting to grow palms from seed. The importance of the short period of viability should be impressed on the collector and shipper by those persons who seek foreign sources of seed.

The Preparation and Germination Of Palm Seeds*

H. F. Loomis

Among the several thousands of palm species only the coconut, date and African oil palm have great commercial importance. Several other species are of minor value, while the majority of palms are planted as ornamentals or for their botanical interest. Little has been written on the preparation and germination of palm seeds in general; most references relate to those few species cultivated for their commercial products. While much can be learned from these papers it is the vast group of non-commercial palms that holds most of our interest.

Naturally, the ideal palm seed for planting is that from fully ripe fruits, planted within several days of harvesting under conditions that will induce rapid germination. However, these conditions are not always attainable, for the seeds of many species have to be shipped great distances, and the care they receive before arrival at their destination has much to do with the results obtained after planting.

The three factors most injurious to palm seeds up to the time they are planted are (1) extreme drying out, causing the embryos to shrivel and reducing viability in proportion; (2) the formation of surface molds, many of which seem able to penetrate readily to the embryos and affect their viability; and (3) excessive age. Under the best conditions most palm seeds are short-lived, several months at most, and seeds obtained from individuals or institutions who make a practice of drawing them from stored bulk collections should be under suspicion. Cutting through the seed coat and examining the embryos to see if they are greatly shrunken or discolored from the white to creamy-white seen in viable seeds may make it possible to avoid the planting and long care of worthless samples.

*Presented at the Palm Conference, Fairchild Tropical Garden, April 18, 1958.