

POINTERS FOR SUCCESSFUL GERMINATION OF PALM SEED

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My first experiences at germinating palm seed showed that freshness of the seed was an important factor. Fresh seed of the 'Kentia', *Howeia fosteriana*, and *Phoenix canariensis* palm was available and germination never presented a problem. Seed of *Phoenix roebelini*, 'Dwarf Date', had to be imported so was up to many months old at arrival. Germination was poor and sporadic.

Subsequent tests with a variety of palm seed showed conventional techniques such as filing, chipping and acid baths for aiding germination of hard-coated seeds were ineffective.

In 1958 Dr. Walter Hodge, then President of the Palm Society, visited the Botanic Gardens and this led to exchange of seed and information from authorities such as Bruce Ledin, Stanley Kiem, Nat De Leon, Harold Moore Jr., and a host of others.

As a result of the exchange of ideas, a lot of experimentation, experience, and a regular supply of seed, the following facts clearly emerged:

1. Seed must be freshly harvested to successfully germinate.
2. Only mature seed will germinate.
3. Many palm seeds, despite their solid appearance, are viable for a short period only.
4. Correct storage from harvesting to sowing is of the utmost importance. Pack in slightly moist peat moss or vermiculite in a plastic bag.
5. Temperature of the atmosphere and the seed-raising media greatly influences germination.

These all are simple factors common to a wide range of seeds so why must palms differ?

Some knowledge of the palm seed is essential to understand just how it may quickly lose its viability. The palm seed normally has a thin outer coat. It is made to appear hard by the endosperm which is tightly held against the shell or seed coat. The embryo of the young plant is supported by the endosperm. When the seed is exposed to hot, dry temperatures, the embryo

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shrinks very rapidly. The greater the shrinkage, the slower is the germination, the plants are less vigorous and also percentage germination is lower.

This is why seed of many species should not be gathered off the ground if they appear to have been there for any length of time. If there is browning of the endosperm the seed is getting old; if clear white, it is fresh.

The results of an experiment carried out with *Livistona australis* using 100 seeds freshly harvested and 100 seeds which had been on the ground beneath the tree for approximately six weeks, are shown in Table 1.

Table 1. The effect of aging on germination of 100 *Livistona australis* seed in 4-inch deep flats of equal parts peat moss, sand, and vermiculite.

	Number Germinated	Days to Germinate
Fresh seed	100	42
Seed off ground	46	52 to 60

Further evidence of the importance of using fresh seed was obtained with *Linospadix* seed kept in uncontrolled storage for six weeks. These seeds failed to germinate. In the following year fresh seed were harvested and planted the same day and all germinated within 35 days. Some benefit can be obtained from soaking seed collected off the ground (Table 2).

Table 2. The effect of soaking 100 seeds in water for 48 hours. *Livistona australis* seed collected off the ground.

	Number Germinated	Days to Germinate
Dry Seed	42	50 to 74
Soaked Seed	68	48 to 60

Temperature and atmospheric conditions can also influence germination of palm seed as shown in Table 3.

Table 3. The effects of temperature and atmospheric conditions on germination of *Livistona australis* seed.

	Flats in the open	Greenhouse: bottom heat (25°C)	Greenhouse: bottom heat (25°C) + cloche cover
Average day temp. (°C)	27	25	—
Average night temp. (°C)	21	22	—
Percent germination	92	100	100
Days to germinate	49	42	38

While temperature was not measured beneath the cloche it would have reduced the daily fluctuation and probably was close to 25°C throughout. This speeded up the germination.

I also found that 98% of freshly harvested *Phoenix roebelenii* seed placed in a plastic bag with moist sphagnum moss germinated in 33 days while the same seed in conventional peat-vermiculite-sand flats took 46 days to reach 90% germination.

Recently I saw this method being used in Fiji for the germination of *Licuala grandis* seed. I was informed that germination took place in less than 90 days, which is fast for *Licuala*.

Of course it must be realized that palms germinated in this way have to be handled very early. They are picked up by tweezers and placed into community containers or, better still, singly into tubes. Seed of *Archontophoenix* could be tipped out on to flats and covered, and handled again at a later date.

The main advantage of the plastic bag method appears to be —

- (1) No watering required.
- (2) Faster germination.
- (3) Greater germination percentage with some species.

It appears desirable to completely remove all outside pulp prior to sowing whether it is still fleshy or dried; the major reason being to lessen the likelihood of fungal infection. The flesh of *Kentia* is removed by soaking in tepid water for 24 hrs. During my American tour in 1970, I found some palm growers immersed their seed in a fungicide preparation prior to sowing, maintaining that even small particles of pulp left on the seed could induce fungus development detrimental to germination.

Seed also has to be free of insect infestation. A variety of weevils attack seeds of many species prior to maturation. Locally produced seed of *Phoenix roebelenii* is often affected, therefore it has to be inspected prior to sowing.

Local experience has also shown that shallow seed-raising vessels can have an adverse effect on the germination or growth of some palms. With some species the hypocotyl moves down very quickly and when it strikes a solid bottom it is damaged. Germination ceases immediately or if top growth has commenced, the young plant quickly dies. In other cases, when in a shallow vessel, the roots of palms which grow rather rapidly can become much entwined and may be severely damaged during the transplanting operation.

Transplanting is best if done at the stage when the seed leaf has become fully developed. Under controlled growing conditions, transplanting may take place almost at any time if required; however, under most conditions, October to March normally produced the easier establishment of palms.

There is no magic in the raising of palm seed; it is merely a common sense approach to collecting, storing and dispatching — and finally sowing and transplanting. In every case, speed and thoroughness are the essentials.

THE NEED FOR PLANT BREEDER'S RIGHTS IN AUSTRALIA

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Unless some form of national protection is established the achievements of plant breeders will be small and the immense possibilities of breeding from our native flora will not be realized. With other countries having their protection legislation this will be our loss unless we act quickly. Another factor is that with this protection overseas it is now almost impossible to introduce our strains to them without having reciprocal protection.

I, and other breeders, have made great efforts over recent years to get this established but nothing has been achieved. It has, however, been a great pleasure to know that all our State and Federal Nurseryman's Associations have formed a Plant Breeder's Rights Committee and are very active in this field. Currently, States have the power to enact appropriate legislation but I can not see the possibility of uniform legislation unless the states give this power to the Australian Federal Government.

An ordinary patent was taken out three years ago on a winter-flowering carnation in the hope that a basis for a High Court test case may be developed. In the absence of any favorable advice the patent has now elapsed. Perhaps different wording of the original patent would have improved the chances and if anybody is considering launching a patent of his own I will be pleased to supply a copy of our legal advice.