

**THE KENYA FORESTRY RESEARCH INSTITUTE**



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Processing, Storage, and Germination of  
Prunus africana Seeds

CHRISTIAN SCHAEFER

Kenya Forestry Seed Centre

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## 1. Introduction

*Prunus africana* (Hook f.) **Kalkm.**, **formerly** called *Pygeum africanum*, is a species widespread in the moist tropical Africa. In Kenya, the species occurs in the highland forests of Mt. Kenya, the Aberdare Range, Tugen Hills, the western part of the Mau Range, Timboroa Forest, Cherangani Hills, Mt. Elgon, Kakamega and Nandi Forests. *P. africana* is associated with a large variety of species such as **Podocarpus gracilior**, *Polyscias kikuyuensis*, *Cassipourea malosana*, *Celtis africana*, *Albizia gummifera*, *Aningeria adolfi-friederici* etc.

Local names of *P. africana* are:

Muiri (Kikuyu), Mweria (Meru), Tenduet (Nandi/Kipsigis), Kanukwa (Tugen), Mwiritisa (Luhya).

Muiri produces a useful, hard, and durable timber that is easy to work. It

is utilized for heavy construction work, railway sleepers, furniture, and, more important, long-lasting bridge deckings (DALE and GREENWAY 1961).

With the growing appreciation of indigenous trees there has been a rising demand for *P. africana* seedlings. However, most nurseries are not able to meet their targets since they depend on digging out wildings in the forest. Seeds have hardly been available due to problems of short viability and unsuitable storage methods. This paper discusses the methods that have been tried to improve viability and make storage of the seeds of this species possible.

## 2. Seeds and Seed Handling

### 2.1 Reproductive System

*P. africana* generally produces hermaphrodite flowers, i.e. male and female organs are integrated in one flower (ROYAL BOTANICAL GARDENS 1960). They are whitish, 7-15 of them along an axis and they can be seen easily from the ground. The fruits form a drupe with a thin dark red to red-brown pulp when ripe, about 0.7 cm in length and up to 1.1 cm wide with a depression in the centre. The pulp is highly relished by monkeys and birds. The pulp covers a papery-shelled thin pericarp with one or two delicate seeds inside.

## 2.2 Experiments on Storage and Germination

Seeds of *P. africana* have a *high* germination rate of 70-80% when freshly sown. At this stage **their** moisture content (MC) is as *high* as 45%-48% (pulp removed). Dried **seeds shrink within** the pericarp and can be felt when fruits are shaken.

It was assumed that the desiccation is the reason for poor germination capabilities of *P. africana* seeds. In an experiment fresh seeds were depulped and kept in a well-ventilated shed for 2 days. In this short period their MC plummeted from 47 to 15% indicating that the thin, papery pericarp allows a rapid desiccation of the seeds.

Germination of these seeds was as low as 4%. Another **seedlot** which had been kept desiccating in the shed for 3 weeks to

an MC of 9.2% produced a germination capacity of 4% as well. Soaking the seeds in cold water for 48 hours did not improve it.

After the rapid desiccation within 2 days, seeds of the first seedlot were mixed with different media: damp sawdust, peat, or sand and kept in open boxes in the coldstore (+3 °C). There was little hope that the seeds could regain viability. But after two months the seeds had not only reached the moisture level of fresh **seeds** (48%), but also the seedlots stored in moist peat and sawdust yielded a germination rate of 35% (the seeds stored in sand were much lower). After 5 months of storage the germination capacity had risen to 76% (storage in peat) and 62% (**storage** in sawdust) with the MC standing at 50% (SCHAEFER 1990).

These results show that it is possible to store seeds of *P. africana* for at least

half a year in an appropriate medium in a coldstore. Although storage in peat produces slightly better results, it is recommended that sawdust is used as a storage medium since it is easier to **obtain and gives satisfactory results**, too. Even seeds dried in the shade for a short time regain moisture and viability through this type of storage.

No development of mould fungi was observed during storage. But after 4-5 **months the radicle of the seeds starts** emerging with hardly any difference between the storage media. Basically this does not affect the seeds if they are handled carefully. They should be packed and transported with the storage medium without exposure to the sun and sown immediately. The radicle development during storage at  $+3^{\circ}\text{C}$  indicates, however, that storage temperatures should be reduced to  $+1^{\circ}\text{C}$  for more effective suppression of metabolism in the seed.



### 2.3 Effect of the pulp

It has been claimed in the past that it is not necessary to depulp *P. africana* fruits if the pulp has not been removed by birds and monkeys. There may not be a big difference in germination between fruits with pulp and depulped ones if the fruits are sown freshly. But there is a clear difference between the two types when they have been stored. For instance, in another experiment fresh seeds were divided into two lots; one was depulped and the other left with pulp on, and both were stored in moist sand. After five months the depulped seeds had a germination capacity of 39% at a MC of 50% whereas none of the fruits with pulp on germinated (MC of 62%).

Attempts have been made to sow green fruits. At this stage depulping is not possible. However, the germination results have been very poor due to

prematurity of the fruits (SCHLOTE, 1987).

## 2.4 **Recommendations for handling and storage**

### 2.4.1 **The field nursery**

- (a) Only fresh fruits should be picked up from the forest floor. Dried fruits have shrunk seeds inside and will have no or extremely poor germination.
- (b) Fresh fruits with pulp should be depulped immediately and completely by soaking in water for a few hours and squeezing off the thin pulp by hand.
- (c) The depulped fruits should be sown immediately. Any delay causes desiccation and therefore a

reduced germination percentage. Direct sowing into the tubes seems promising.

- (d) If seeds are obtained from a central coldstore they should be left mixed with the storage medium, in most cases sawdust. Seeds should not be transported in a closed polythene bag which does not allow the required respiration - instead a gunny bag or a well-perforated polythene bag should be used. The bag must not be exposed to direct sun.
  
- (e) Fruits obtained from a coldstore as a fruit/storage medium mixture should be separated from the medium at once by floating in water and then sown immediately.

2.4.2 Collection for storage in a central coldstore

- (a) Collection and handling of seeds for cold storage must be accomplished in a quick and well organized process. Therefore it is advisable to collect fruits only at the beginning of the week.
- (b) Fresh fruits with or without pulp should be collected in bulk into **Hessian bags**. **Moist leaves from the forest floor** should be added to minimize the loss of moisture.
- (c) Immediately after collection the seeds should be taken to the **central extraction and coldstore unit, by the quickest means available.**
- (d) Depulping of fruits and removal of leaves must be done without delay.

The seeds are then spread in a thin layer in the shade in a well ventilated place so that excess water on the pericarp is removed. This drying process should not exceed 4 hours.

- (e) The fruits are then mixed with 2 times the volume of damp sawdust or peat. The mixture is filled into plastic boxes, drums or perforated polythene bags. All containers are left open to allow gaseous exchange.
- (f) The coldstore should be run fairly **near to freezing point, preferably at +1°C to suppress the emergence** of radicle and shoots as much as possible.
- (g) The seeds should be dispatched to the field nurseries as the fruit/storage medium mixture in

order to keep them moist. Packing should only be done before dispatch.

### 3. Conclusion

Kenya Forestry Research Institute has developed a method of successfully handling and storing seeds of *Prunus africana*: The fruit should be depulped immediately after collection as seeds stored with pulp lose their germination capacity completely. Seeds can be kept in a cold store for at least half a year without a considerable loss of germination capacity by mixing them with moist sawdust or peat to maintain a high moisture content.

Field nurseries are advised to collect fresh seeds for their own use locally since

the mother trees are ecologically adapted  
fresh seeds guarantees a high germination percentage  
storage capacities at the Seed Centre are limited.

In order to procure seeds of high viability, all seed collection and handling operations must be done quickly and uninterruptedly since the seeds are extremely sensitive to desiccation.

Following these guidelines it should be possible to raise seedlings of *P. africana* in large numbers for the various tree planting purposes.

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