



**Government of the Union of Myanmar  
Ministry of Forestry  
Forest Department**



**Comparative Studies on Taxonomic Characters  
of Some Meze Varieties Including  
Myitzuthka-Natpan.**

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မဇ္ဈိမသက္ကတပန်းအပါအဝင် မယ်ဇယ်မျိုးစိတ်အချို့တို့၏  
မျိုးခွဲလက္ခဏာများကို နှိုင်းယှဉ်လေ့လာခြင်း။

ဒေါ်ရင်ရင်ကြည်၊ B.Sc. (Botany) (Rgn.), ပန်းပုံစံပြတိုက်မှူး  
သစ်တောသုတေသနဌာန  
နှင့်

ဒေါက်တာတင်မြင့် B.Sc. (Rgn), M. S. (Fla.), Ph.D. (Univ. of Fla.),  
ကထိက၊ ရုက္ခဗေဒဌာန၊ မန္တလေးတက္ကသိုလ်။

စာတမ်းအကျဉ်းချုပ်

မဇ္ဈိမသက္ကတပန်းသည် မြန်မာပြည်တွင် ရှားပါးသစ်ပင်ဖြစ်သည်ဟု ဆောင်းပါးအရ သိရှိရ၍ ၊  
ယင်းအပင်သည် အမှန်တကယ် ရှားပါးသစ်ပင်မျိုးဟုတ်မဟုတ်ကို စမ်းသပ်လိုပါ၍ မျိုးခွဲပညာရပ်ဖြင့်  
လေ့လာ ခွဲခြားမှုပြုလုပ်ခဲ့ပါသည်။ မယ်ဇယ်ပင်နှင့် တူညီကြောင်း တွေ့ရှိရပါသည်။ ဤစာတမ်းတွင် ဒေသ  
(၅) နေရာမှ မဇ္ဈိမသက္ကတပန်းအပါအဝင် မယ်ဇယ်မျိုးတို့ကို မျိုးခွဲလက္ခဏာများနှိုင်းယှဉ်၍ လေ့လာတွေ့  
ရှိချက်များကို ဖော်ပြထားပါသည်။ ဤလေ့လာချက်များအရ မည်သို့ပင် အရပ်အခေါ်အားဖြင့် မယ်ဇယ်၊  
မဇ္ဈိမသက္ကတပန်း ဆိုစေကာမူ ရုက္ခဗေဒပညာရပ်ဆိုင်ရာ မျိုးခွဲပညာရပ်အရ မျိုးခွဲခြားသည့်အခါတွင်  
ယင်းအပင်အားလုံးသည် *Madhuca longifolia* သာ ဖြစ်နေကြောင်း တွေ့ရှိရသည်ကို တင်ပြထားသော  
စာတမ်းဖြစ်ပါသည်။

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**Abstracts**

This paper compares the taxonomic characters of the tree that generally goes by the local name, meze including myitzuthaka-natpan from five different localities viz., Amarapura, Taungdwingyi, Thayetkone, Taungyan village and Rangoon Zoological Gardens. The study shows that they all belong to the species *Madhuca longifolia* (Syn.) *Bassia longifolia* of the family Sapotaceae. The variations appear to be slight and insignificant.

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## 1. Introduction

Botanically meze is a species of a tropical genus *Madhuca*, a member of the family Sapotaceae, to which the common thagya-thi (*Achras sapota*) and Khaye (*Mimusops elengi*) belong. The common meze is a variety of *Madhuca longifolia* (Koenig) MacBride. It is commonly found in central and southern regions of the country. It is also reported from southern India and also from Sri Lanka. The trees of this species usually have a large crown are grown in the Central Dry Zone as shade plants. They are mostly evergreen or semi-evergreen, although in very dry places, they are sometimes deciduous. Specimens collected from various localities show slight differences in leaf size, fruit size and number of seeds per fruit (Clarke 1882).

In the recent years, articles in two popular local magazines mentioned some peculiar information about a rare plant, which was known under the name of "Myitzuthaka-natpan". On receiving the specimens of the said plant, identification was attempted in various ways and it was found that "Myitzathaka-Natpan" belongs to the species *Madhuca longifolia*. To confirm this conclusion, specimens from different localities were collected and a comparative study of all these were made. Only slight variations were found. (Hlaing)

## 2. Materials and Methods

Specimens of leaves and fruits were collected from Amarapura, Rangoon Zoological Gardens, Taungdwingyi, Thayetkone village and Taungyan village of Mindon Township. Observations of all these specimens had been started in 1983. While collecting the specimens at the different localities, the morphological characters were recorded from the fresh specimens. Floral and vegetative parts were pressed for herbarium sheets and some fruits were preserved in 95 % alcohol. Flowering specimens from all different localities were collected from April to early May. Fruiting specimens were collected in August.

To study the minor venation and other characters of leaves and detailed structure of flowers, the specimens from all five localities were kept in a solution of 5 % sodium hydroxide for 2 to 4 hours. These were then washed and finally cleared with chlorine water. The cleared pieces of leaves and whole flowers were stained with safranin in 50% alcohol. Wood sample from all these five localities were collected and sent to the wood anatomy section, F.R.I., for identification.

Specimens from the following five localities were purposely selected for the taxonomic studies.

Location A - Amarapura - Where the meze trees are very common along the bank of Taungthaman Inn and in low places.

Location B - Rangoon Zoological Gardens - The specimens from tree planted in Rangoon Zoological Gardens were collected to make a comparative study of specimens from moist and arid zones.

Location C - Taungdwingyi - The specimens from Kandawgyi at Taungdwingyi were collected to make a comparative study, since it was reported as a rare plant like the one at Thayetkone village.

Location D - Thayetkone Village - The specimens from the tree at Thayetkone village were collected and compared with the meze trees from others areas, since it was mentioned as a very rare trees in a popular journal.

Location E - Taungyan Village -The specimens from Myitzuthaka-natpan tree were collected for proper identification, since it was mentioned as a rare tree in Burma.

The characters of stem, bark and leaves were recorded. Measurements of the girth at 4 ft. 6 in were also made for all trees mentioned above. Leaf measurements were based on a total of fifty. Coloured slides and photographs were taken for future record.

The identification of all the meze and myitzuthaka-natpan had been made by using all the available taxonomic references. (Brandis, Clarke, Kurz, Van Royen, Troup)

The identification was confirmed by matching with the specimens at the Kew Herbarium, Royal Botanic Garden, London and Rijksherbarium at Leiden, the Netherlands (by the senior author in 1984). Preserved specimens and slides prepared for the present study are deposited at the FRI. Herbarium, Yezin.

### 3. Morphology

The species of the genus *Madhuca* are large deciduous trees. The main trunk is short and stout and is profusely branched. The outer surface of the bark is dark brown and thick, while the inner is pinkish, which secretes a milky latex. The leaves are simple and are clustered near the ends of the branches. The blades are elliptic to linear-lanceolate, with acute tips, entire margins and obtuse bases. The venation is reticulate and the lateral veins are subopposite. There are 10-12 pairs of lateral veins. The surface is silky or tomentose when young and glabrous in age. The leaves are glossy-green when mature. The petioles are cylindrical and are glabrous. The stipules are linear, pubescent and caduceous

The inflorescence are terminal fascicles of axillary flowers. The number of flowers on each twig varies from 17 to 45. The flowers are complete, regular and bisexual; (see Plate I) they are usually tetramerous and always hypogynous. The pedicels are long, slender and cylindrical. They are sometimes slightly pubescent or mostly glabrous. The calyx is composed of 4 free sepals in two whorls. The sepals are broadly elliptic in shape with acuminate tips. The outer two are glabrous and the inner ones are velutinous and are usually slightly smaller in size. The corolla is gamopetalous, cupuliform and 8- to 10- lobed. It has somewhat sweet and peculiar smell. It is glabrous and creamy-white in colour. The stamens are polyandrous and are 14-20 in number and in two whorls. All are fertile. The filaments are very short, inserted in the throat of the corolla. Anthers are ditheous, basifixed, introrse and longitudinal in dehiscence. The anthers lobes are puberulent or almost glabrous. The ovary is 8- carpellate, and with one ovule in each cell. And it is globose and covered with brownish hairs. The style is slender and the stigma is simple. The fruit is an ellipsoid berry, usually varying in size. It is glabrous and greenish in colour. The seed are also ellipsoid in shape and light brown to dark. They are with a narrow, linear scar and an apical hilum. Embryo has with thick cotyledons. (Clarke, Van Royen)



## 4. Taxonomic Treatment

### 4.1 Genus Description

Madhuca J. F. Gmelin, Syst, 799.1791

*Bassia* Koenig in Linnaeus , Mantissa 2 app. 555. 1771

*Azaola* Blanco, Fl. Fil. ed. 1, 402.1837.

*Kakosmathus* Hasskarl, Retzia 1.: 1855.

*Cacosmanthus* de vriese, Pl. Reinw 60.1856

*Dasyaulus* Thwiates, Enum. Pl. Zeyl. 175.1864.

*Dasillipe* Dubard, Ann. Mnn. Mus. Col. Mars. 21; 92.1913

Trees. Stipules small to large, usually soon caducous, rarely persistent for sometimes; leaves scattered to conferted at apex of the branchlets which sometimes grow in distinct flushes with flowers and leaves at their tips; secondary nerves archingly joined or diminishing until inconspicuous; tertiary nerves transverse to reticulate and parallel to secondary nerves. Flowers axillary in fascicles; Sepals 4, in two whorls of two, rarely 5, the inner sepals usually glabrous with membranous, fimbriate margin; Corolla gamopetalous, 8-10-lobed, usually wolly-pubscent between the stamens within; Stamens in one, two or three whorls, 16-40, subsessile or with a distinct filament, inserted in the throat of the corolla; Ovary 8-21-celled, with one ovule in each cell; fruit a berry, 1-4-seeded, rarely more-seeded, with persistent calyx and style; Seeds with narrow, linear scar; hilum apical; Embryo with membranous albumen, which is sometimes only partly developed; cotyledons thick (See Plate III). (Van Royen)

Type species: *M. longifolia* (koenig) Macbride.

It is a tropical genus of about 75 species ( of . P. Ven Royen, 1960) mostly distributed in Southeast Asia and Malaysia The genus is represented in Burma by the following two species and two varieties.

1. (a) *M. longifolia* var. *Longifolia*  
(b) *M. longifolia* var. *Latifolia*
2. *M. lobbii*

### 4.2 Species Description of *M. longifolia*

*M. Longifolia* (koening) MacBride, Contr. Gray Herb. NS. 53: 17. 1918.

*Bassia longifolia*\_Koenig in Linnacus, Mantissa 2 (App.) 563,1771.

*M. longifolia* Koenig) H.J. Lam, Bull. Jard. Bot. Bzz. Ser. 3 (8),  
P. 463.1927

*M. indica* Gmelin,Syst.,799,1791.

*Bassia villosa* Wallivh, Chat. no. 1828.1829.

*M. Latifolia* (Roxburgh) MacBride, Contr. Gray Herb. NS.53:17.1918

*Bassia latifolia* Roxburgh, Pl. Coast Corom. 1: 20. to .19.1795.

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(N. B. *M. butyracea* was transferred to a different genus *Diploknema*.)

Trees up to 45m; Branchlets slender, often thickened at the nodes, 2-10 cm in diam., pale cinnamonously to ferruginously sericeous, tomentose or woolly or greyish brown woolly-hirsute, glabrescent; Stipules caducous, linear up to 12 by 2.5 mm, acute and sometimes recurved at the apex, often involute along the margin, pubescent without, glabrous within; Leaves conferted at apex of branchlets, sometimes seemingly in whorls, broadly elliptic, elliptic-obovate, oblong, lanceolate or oblanceolate, sometimes ovate-elliptic, 7-25 by 2-9 cm, obtuse to obtusely acuminate or sometimes acute at the apex, the base narrowly to broadly cuneate or rounded, but close to the petiole abruptly narrowed and decurrent, densely woolly on either side when young, but becoming entirely glabrous ultimately, coriaceous; midrib grooved or not, sometimes prominulous above and narrowly to broadly crested as well, prominent below and rounded; secondary nerves 9-18 pairs, ascending at an angle of 60°-65°, curved or straight and curved at their tips only, diminishing until conspicuous nears margin, sometimes archingly joined or connected by thickened tertiary nerves, slender, distinct on either side but less prominent above than below; tertiary nerves transverse, slender by conspicuous on either side; Petioles 1.3-6.0 cm long, flat or grooved above and minutely crested as well, woolly-tomentose when young but ultimately glabrous, thickened in basal part; Flowers axillary in clusters of 3 to many, forming a terminal tuft between or immediately below the leaves erect when young later becoming pendulous; pedicels slender, irregularly angular, 2.5-7.0 cm long, brownish to yellowish woolly-tomentose but becoming glabrous or subglabrous in age ; Sepals ovate, ovate-lanceolate or elliptic-ovate, 1.2-1.7 by 0.6-0.9 cm, obtuse or acute woolly-pubescent on either sides except for a basal, central part on inside; inner sepals with membranous, glabrous, fimbriate margins. Corolla 1-2 cm long, 8-to 10-lobed; glabrous on either side; lobes elliptic or ovate-elliptic rather apart, 5.5-13.0 by 2.0-4.5 mm, obtuse at the apex, often irregularly serrate along the margin, narrower at the base; Stamens 16-30, in two or three whorls, 4.5-9.5 mm long; filaments subulate, 1 mm long or shorter, glabrous; anthers ovate-lanceolate, 5.0-7.5 mm long, connective acutely prolonged, either glabrous or with white hairs on outside; Ovary ovoid to globose, 2-3 by 2-3 mm., 8-11-celled glabrous or ferruginously hirsute: Style filiform, 1.5-3.5 cm long, glabrous; fruit ellipsoid, obovoid or subglobose, sometime oblique, 2.5-5.5 by 2.0-4.5 cm with along remnant of the style at the apex, 1-4-seeded; rarely more-seeded, ferruginously woolly but ultimately glabrous; pericarp fleshy; seeds ellipsoid, 2.5-3.8 by 1.2-1.5 cm, obtuse or subobtuse at either end; Scar ovate, greyish; albumen absent. Recently Van Royen has revised the taxonomy and nomenclature of the genus *Madhuca* of the Malaysian area. He merges *M.indica* J.F. Gmel. and *M. longifolia* (Koenig) MacBride under the latter name and distinguishes two varieties , viz. var. *longifolia* and var. *latifolia* (Roxb.) Cheval. (Blumea, 1969, 10(1) 53).

#### 4.3 Key to the varieties of *M. longifolia*

1. Leaves obtuse or acute at the apex, flowers more than 10 in each cluster; Corolla lobes as long as the tube; Filaments almost absent (i.e. anthers sessile).....*M. longifolia* var. *longifolia*
  1. Leaves obtusely acuminate at the apex flowers more than 7 in each cluster; Corolla lobes longer than the tube; Filaments about 1 mm long .....*M. longifolia* var. *longifolia*
- The two varieties can be distinguished by the combination of the following characters.

<i>M. longifolia</i> var. <i>longifolia</i>	<i>M. longifolia</i> var. <i>longifolia</i>
Leaves 7-25 by 2.0-5.7 cm obtuse or acute at the apex, secondary nerves 11-18 pairs.	Leaves 13-25 by 4.5-9.0 cm obtusely acuminate at the apex, secondary nerves 9-12 pairs.
Petioles 1.3-2.5 cm long	Petioles 2-6 cm long
Flowers many in each cluster	Flowers 3-5 in each cluster
Corolla lobes as long as the tube	Corolla lobes longer than the tube
Stamens 16-20	Stamens 20-30
Filaments almost absent	Filaments about 1 mm long

## 5. Observations

With the exception of the tree in the Rangoon Zoological Gardens, all the other plants from which the specimens were collected for present study are found in the Central Dry Zone of Burma. The trees of Amarapura, Mandalay Div. are found along the bank of Taungthaman Inn and thus they are in moist places. However, plants at Taungdwingyi and at Taungyan village, Magwe Div are growing in very dry places.

All five plants are large trees. Among them, Myitzuthaka-natpan (E) is the largest and the one at Taungdwingyi © is the smallest. Measurements of the girth at 4 ft. 6 in. are as follows:

- A. - Amarapura.....15 ft
- B. - Rangoon Zoological Gardens.....9 ft. 8 in
- C. - Taungdwingyi.....7 ft. 6 in.
- D. - Thayetkone village.....7 ft. 7 in.
- E. - Taungyan village  
(Myitzuthaka-natpan).....23 ft. 7 in

The colour of the bark is similar, but the bark of the tree at Rangoon is much darker in colour. The inner bark is also similar, pinkish and secrete a milky latex. The trees have mostly clear trunks except in Myintzuthaka-natpan and some meze trees of Amarapura, which have large big knobs on them especially near the base.

Leaf sizes show some variations. (Plate II). Average leaf sizes of all the varieties (based on total number of 50 leaves) are as follows :-

	<u>Leaf Blade</u>	<u>Petiole</u>
A. -	11.7 cm x 3.7 cm	3.2 cm
B. -	8.5 cm x 2.5 cm	2.5 cm
C. -	8.8 cm x 2.5 cm	1.7 cm
D. -	8.9 cm x 2.5 cm	2.1 cm
E. -	8.5 cm x 2.6 cm	1.7 cm

The leaves of specimens from Amarapura (A) are large than those of the other 4 specimens. And in those from C & E petioles are much shorter than the others. Number of lateral veins vary from 10 to 14 pairs. The leaves are similar in colour, mostly brownish in young stage and glossy green in age. Their petioles are variable in length from 1.5 cm to 3.5 cm.

Flowers from all five localities are very much similar. There is no variation in calyx, corolla, stamens and ovary characters. The colour of the corolla and the peculiar sweet smell of the corolla are also the same in all five specimens. Their

flowering period is from the first week of April to early May. Their pedicels are variable in length from 2.4 cm to 7.0 cm.

There are slight differences in size of fruits (see Plate IV). Fruiting period is from late May till August. In this study collections of all the fruits were made in August.

<u>Date of Collection</u>	<u>Length of Fruit</u>
A. - 4.8.85	4.5 cm
B. - 21.8.85	3.5 cm
C. - 9.8.85	4.8 cm
D. - 10.8.85	5.0 cm
E. - 10.8.85	5.2 cm

The epicarp colour of all the fruits is light green, but the specimens from (B) and (E) have fungal discolouration on the epicarp. More fruits were produced in (A). The fruits are usually one-seeded, although there may be a few exceptions. In (A) the fruits may be sometimes up to six-seeded, but in (B), (C), and (D) to-seeded fruits are rarely found. In (E) the fruits are only one-seeded.

Seeds from (A) are much darker in colour and slightly thicker than the other four. All the seeds are similar in shape.

## 6. Discussion and Conclusion

From the information above it is clear that all the specimens from the different localities belong to a single species, *Madhuca longifolia*.

The leaves from five different localities show no difference in anatomical features. The venation pattern and the minor veins patterns are the same.

The wood anatomy, as reported by the Wood Anatomy Section of FRI., is similar for all specimens. Thus the specimens all belong to the variety *Madhuca longifolia* var. *longifolia*. This means that Myitzuthaka-natpan and meze are of the same variety. They show no differences even at varietal level, although they have different local names.

## References

1. Brandis, D (1907). Indian Trees, Archibald Constable & Co Ltd. London
2. Clarke, C.B. (1882). Sapotaceae in J.D. Hooker's Flora of British India. 3:534-540. L. Reeve & Company, Kent.
3. Gamble, J.S.(1922). A Manual of Indian Timbers, Sampson Low, Marston & Company Ltd. London.
4. Hlaing, Chit (Paylaybin). (1983). Myitzuthaka-natpan, Taing Yin May Journal, Vol. 33, Number 19, Pg,20-21
5. Kurz, S. (1877). Forest Flora of British Burma. Vol. I. The superintendent of Govt. printing, Calcutta.
6. Ridley, H.N. (1925) The Flora of The Malay Peninsula, Vol. V. L. Reeve & Co., London.
7. San, Tint (1983) Thit Pin San Kye, Pay Phoo Lwa Magazine, 1983, September, Number 28, Pg. 48-49.
8. Troup, R,S.(1921) The Silviculture of Indian Trees, Vol. II, Oxford at the Clarendon Press, England.
9. Van Royen, P. (1960) Revision of the Sapotaceae of the Malaysian Area in a Wider Sense XX MADHUCA Gmelin. Blumea, 10:1-117
10. Council of Scientific & Industrial Research 1962. New Deli. The Wealth of India. Raw Material, Vol. VI. L-M.

PLATE I

Flowering Shoot With Young Leaves



PLATE II

Slight Variations In Size And Shape Of Leaves From Various Localities



PLATE III

Reproductive Parts

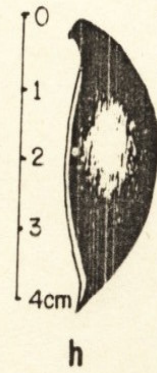
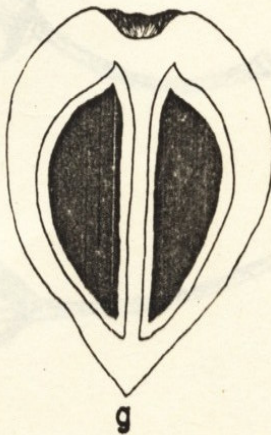
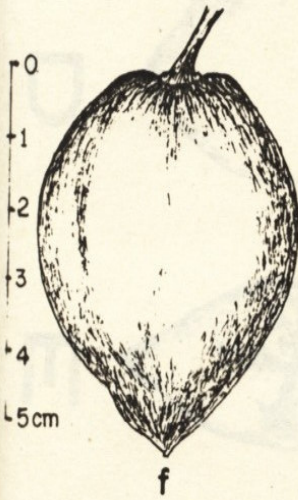
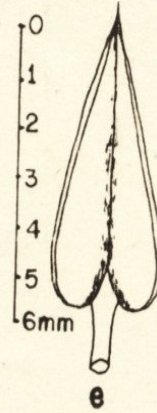
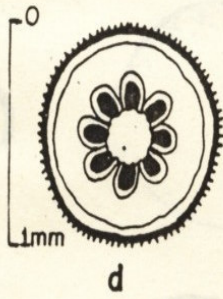
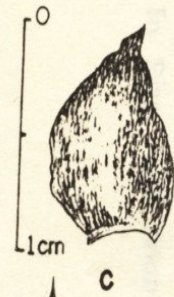
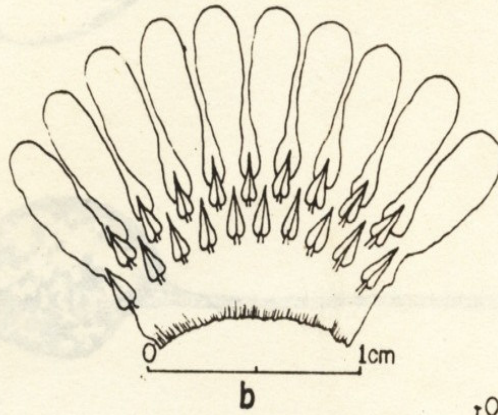
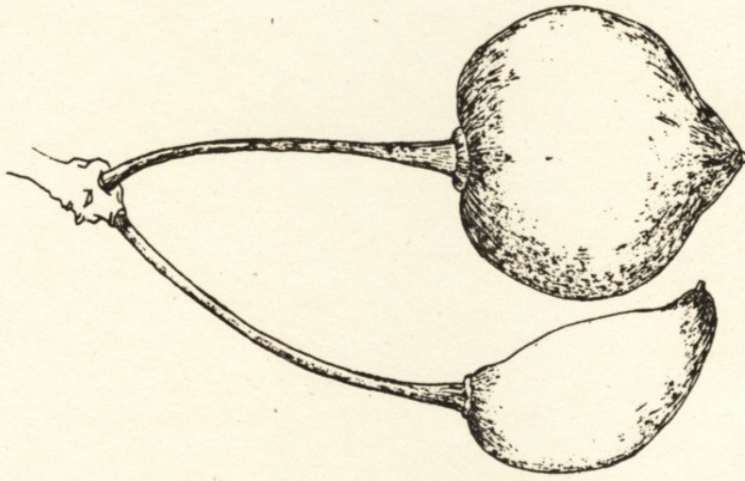




PLATE IV

Variations In Size And Shape Of Fruits From Various Localities



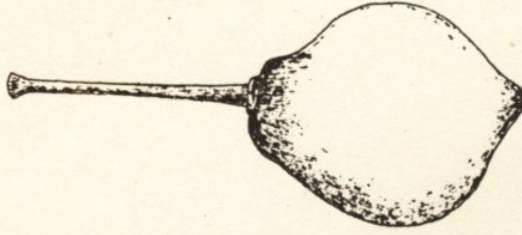
A

4. 8. 85



B

21. 3. 85



C

9. 8. 85



D

10. 8. 85



E

10. 8. 85