

Ohio State University, and currently at the Ida Casons Garden, Shipley, Georgia.

Mr. Fred Galle presented his paper, entitled "The Propagation of Magnolias by Seed." (Applause)

## The Propagation Of Magnolias By Seed

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Due to my limited experience with only one species (*M. grandiflora*) and only two specific references (1 and 2), I sent out letters to nurserymen and members of the Plant Propagators' Society, requesting their experiences and procedure in handling *Magnolias* by seed. I received twenty-five (25) replies from this inquiry and wish to thank the contributors, for I have compiled my talk from their varied experiences.

From the references and the letters, I obtained information on fifteen (15) species and several varieties. The most common species normally grown from seed were *M. grandiflora*, *virginiana* (*glauca*), *Kobus*, *acuminata*, *soulangeana*, and *stellata*.

Collecting and handling seed:—The cone-like fruits of magnolia, depending on the species and area, ripen from late summer to fall. The cones consist of several to many coalescent, one to two seeded follicles. At maturity the red to scarlet outer seed coat is fleshy and oily, and the inner seed coat is hard or stony. The seeds when ripe are usually suspended from the open follicle by a slender elastic thread or funiculus. The seed are best collected when the follicles begin to open and are placed in a warm building or greenhouse where they continue to open and expose the seed. Some cones, if collected too immature, will fail to open, making seed removal difficult.

Two nurserymen reported good germination of seed without removing the fleshy outer seed coat, however, all others recommended removal of the fleshy seed coat, taking care not to allow the seed to dry out. The failures and poor germination of imported seed are often due to improper handling and allowing the seed to dry out.

To clean the seed of the fleshy outer seed coat, water is generally recommended. Macerating in hot water is faster than using cold water, however, it was reported by John B. Roller, Verhalen Nursery Company, that with *M. grandiflora*, following the hot water treatment, the seed planted in outside beds would germinate in warm periods during the winter and consequently were frozen. This might be an advantage when planted in a greenhouse. Carl Kern uses a detergent in the final water rinses to remove any oily film or residue. Roger Coggeshall, Arnold Arboretum, uses a Waring Blender to clean seed. The metal blades, however, were replaced with a square piece of truck tire, thus cleaning the seed thoroughly and with no injury to the seed coat.

R. Fillmore, while at the Arnold Arboretum made the following test. Seed of *M. stellata rosea* were collected and divided into lots of fifty (50) each and planted separately in four (4) clay pots. The results are summarized as follows:

Lot No.	Oct. '47	Mar. '48	Germination May, '48	Oct. '48	Germination May, '49
1. (cleaned)	40 degrees	60 degrees	Good	40 degrees	
2. (not cleaned)	40 degrees	60 degrees	None	40 degrees	Fair
3. (cleaned)	60 degrees	60 degrees	None	40 degrees	Poor
4. (not cleaned)	60 degrees	60 degrees	None	40 degrees	Fair

The stated temperatures are approximate. The pots were kept in a cold or warm greenhouse for the indicated period.

Germination:—Handling of seed after cleaning is done several ways depending on facilities available. Clean seed can be planted directly in outdoor beds, cold frames, or under lath. A well-drained soil is desired and a sandy loam and peat moss mixture is generally used. Damping off and rodents are two serious problems. Semesan treatment of seed and sterilized soil will help to control damping off. A leaf mulch is generally used over the seed beds and removed in the spring.

Clean seed can also be sown in flats and placed directly in a cold greenhouse with germination of most species following in the early spring.

Stratification is also commonly practiced. Clean seed is stored in various mediums, such as sand, peat, and a mixture of 50% sand and 50% peat at a temperature of 40 degrees for 60 to 120 days. Coggeshall recommended enclosing seed and medium in a sheet of plastic polyethelene. I have found this method very satisfactory using standard plastic freezing bags. At the end of the stratification period, seed are sown in flats placed in a greenhouse. Hess Nursery plant half of their seed in the fall and stratify half as “crop insurance”.

Seedlings as they germinate are pinched off and potted or banded and can be transplanted in the spring to shade or lath bed.

A large number of magnolia seedlings grown are used for grafting stock and seedlings of most species are grafting size in one year. The Washington Arboretum report, however, brought out that some species may be somewhat irregular and unexpected—two species giving a double germination with three years between them, two others germinating twice with a year's interval and still others delaying three years before germination. This brings out the fact that all species do not respond under the same treatment and additional experimental work is necessary. Carl Kern also mentioned that *M. virginiana (glauca)* seedlings did not

respond to transplanting the first year and should remain undisturbed for one or two years.

Again in closing, I want to thank all the nurserymen who replied to my inquiry and, while I did not mention all their names, I want them to know they had a part in this talk.

#### LITERATURE CITED

- 1 MULLIGAN, B. O. AND L. J. MICHUND. 1951. Magnolia Seed Treatment and Germination. *Arboretum Bulletin* (Univ. of Washington, Seattle). Vol. XIV, No. 3
2. *Woody-Plant Seed Manual*. 1948. U.S.D.A. Misc. Pub. No. 654.

MR. LESLIE HANCOCK (Woodland Nurseries, Cooksville, Ontario): Would it be preferable to store the cleaned and sterilized seed in sterile Dutch peat?

MR. GALLE: It very likely would. I have seen the green seed which Professor Meahl mentioned and in connection with this, I am wondering how much of that is algae of some form or another that has not been determined and if, possibly, there is a symbiotic relationship between the seed coat and the green plant growing there.

MR. WILLIAM FLEMER (Princeton Nurseries, Princeton, N.J.): I would like to ask Mr. Carl Kern what kind of plants his seedling magnolias turned out to be in regard to hardiness and kind of flowers?

MR. CARL E. KERN (Wyoming Nurseries, Cincinnati, Ohio): My primary purpose for growing the *M. Soulangeana Lennei* seedlings was to produce a suitable understock. Of course, the flowers of all these *Lennei* seedlings vary in size. Some resemble the parent plant.

There is one point, however, I would like to stress. In cleaning magnolia seeds, as you all are aware, the pulp of the seeds contain a large amount of vegetable fats and oils. After the seeds have been de-pulped, the seeds are still coated with a layer of this material and this is a matter of great importance in the germination of the seed. Years ago, to remove the oily layer, I used a lye solution, however, today I have resorted to the common soap detergents. After giving the seeds three or four rinsings in the soapy detergents, we have clean seed.

MR GALLE: I think the variability of seedlings exists in nearly all the predominant varieties, such as *M. grandiflora* and also *M. virginiana*. Seedlings vary from types with a narrow-leaf lip to those without the open toe condition to rounded, short, and stuffy leaves. In our area we have 20-year old trees grown from seedlings. Each has a different leaf type. I think the thing that should be emphasized is that someone should collect and select some of the *M. virginiana* seedlings that retain the foliage.

PRESIDENT WELLS: Is there any grower in the room who has raised a good stand of magnolia from seed imported from Japan?

MR. CHARLES HESS (Hess' Nurseries, Mountain View, N.J.): I will answer that in my discussion later.

MR. FLEMER: I would like to ask whether in the opinion of the experts, *Magnolia stellata* is a true species or a selected type. We have raised *M. stellata* seedlings and many of them resemble *M. Kobus* and take a long time to bloom.

MR. GALLE: I think that it is a botanical species. Also there is a very distinct possibility of cross-pollination between these two. Many of the seedlings come into bloom later than *M. stellata*, but probably not as late as *M. Kobus*.

CHAIRMAN MEAHL: Ladies and Gentlemen, because of the time, I think that we should defer further discussion until the open discussion period at the close of this afternoon's panel. At this time we are to have a discussion of magnolia propagation by cuttings. You will notice on the program that Mr. Tom Dodd Jr., of Dodd Nurseries, Inc., Semmes, Alabama, is scheduled to give that report. However, Mr. Dodd is unable to be here. His paper will be read by Mr. Ray Keen, of Kansas State College, Manhattan, Kansas, who is at the present time a graduate student at Ohio State University.

Mr. Ray Keen read Mr. Tom Dodd's paper, entitled "Propagation of Oriental Magnolias from Soft-wood Cuttings." (Applause)

## **Propagation of Oriental Magnolias from Soft-Wood Cuttings**

TOM DODD, JR.  
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Mr. President, Ladies, and Gentlemen: I am very glad to bring to you this report on MAGNOLIAS FROM CUTTINGS. Dr. Snyder called me last October and asked that I take part in this meeting and I deem it a distinct honor and privilege to do so.

As you probably already know, the Oriental magnolia is a very important crop with the nurserymen in southern Alabama. It is the largest deciduous crop we have and second only to broadleaves in propagation and sales. I would estimate that there are upwards of two and one half million cuttings rooted annually in Mobile County alone. However, in this report, I refer to our own experiences, although our method of propagation is general throughout the county.

The most desirable wood for cuttings is the softest and most succulent wood on the stock plants. To get this type wood, we apply a liberal amount of commercial fertilizer, such as 6-8-4 or 4-10-7, at a rate of about two thousand pounds per acre after the last killing frost which occurs usually before March 15th. Such an application of fertilizer helps to stimulate an earlier growth, thus giving us the desired cutting wood. We