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Effect of Soil Mixtures on Root Growth of Paphiopedilum Orchids

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Osmunda fiber has been used for many years as a general potting material for orchids, terrestrial and epiphytic. The depletion of some sources, increasing labor and transportation costs have encouraged study of other materials for orchid potting.

The first report on experiments with potting materials appeared in N. Y. S. F. B. Bul. #106. This dealt with Cymbidium orchids. At the same time plants of Paphiopedilum insigne (Cypripedium) were used to test the effect of the same materials. A clay soil amended with readily available organic materials was used. Treatments were as follows: (1) clay soil, (2) clay soil and manure, (3) clay soil and moss peat, (4) clay soil and sedge peat, (5) regular mixture (osmunda, leaf mold, and manure, (7) sedge peat, (8) moss peat, (9) sawdust, (10) soil and Krilium (1 teaspoonful per 6" pot).



Manure

The clay soil and organic materials were mixed equal parts by volume. All mixtures were steam sterilized before use. Four plants were used in each treatment. The plants of Paphiopedilum insigne were grown at 55°F night temperature. The light intensity was decreased from April 1 to mid-October to about 2000 foot candles. The remainder of the year the plants were grown under full light intensity. Water was applied daily. Soil analysis was made of each treatment periodically to determine how often fertilizer need be applied to the plants. A 20-20-20 water soluble fertilizer using 1 oz. per gallon was applied at three week intervals.

The following nutrient levels were maintained:

Nitrogen	10-20 ppm
Potassium	4- 6 ppm
Potash	15-30 ppm
Calcium	over 100 ppm

Here, as with Cymbidium, flower production was

not considered as a criterion for determining the best soil mixture. Flower records, however, were taken for two years and give some indications of the effectiveness of a good soil mixture. The data is presented in the accompanying table. The treatments graded in order of best root growth and condition of soil mixture are likewise presented in the table.

In the treatments using moss peat, sedge peat and sawdust, the pots were well filled with healthy roots. The pots of moss peat had the greatest number of healthy roots. The greatest decrease in volume of material due to decomposition occurred with sawdust. Sedge peat was next, while least decrease was noted with moss peat.

In treatments where soil was amended with moss peat and sedge peat the greater proportion of the rooting occurred in the top 1 1/2 inch layer of soil.

In the regular mixture, roots were fairly well distributed throughout the pot of mixture. There were fewer roots, however, than in the peats and sawdust.

The soil treatment had few roots and they occurred in the top layer of soil. Soil treated with Krilium had the same amount of roots but they grew to the bottom of the pot.

In the treatment of soil and manure very few roots were produced and they occurred in the upper layer of the mixture.

The results presented indicate that Paphiopedilum insigne grows best in moss peat. The addition of large amounts of water to potting soil requires an organic

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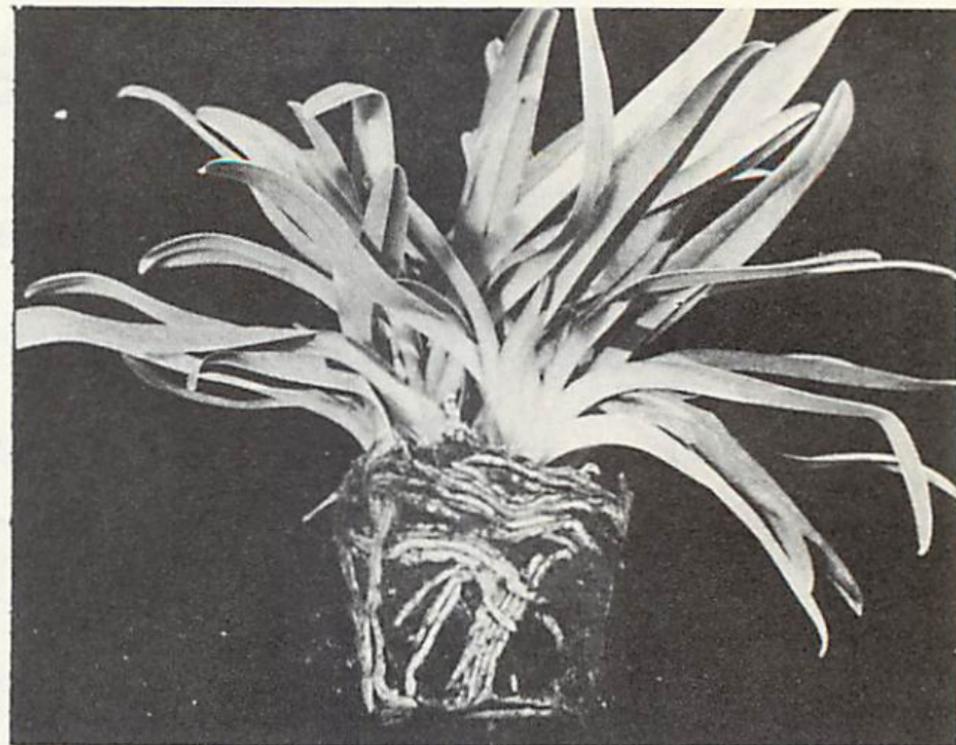
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material which provides good aeration. For a discussion on the uses of organic materials, particularly manure, refer to N. Y. S. F. G. Bul. #74.

Table

<u>Treatment*</u>	<u>Aver. No. Flrs. Per Plant 1952</u>	<u>Aver. No. Flrs. Per Plant 1953</u>	<u>Per cent Increase '52 - '53</u>
Moss Peat	2.75	4.00	45.4
Sawdust	2.75	3.25	18.1
Sedge Peat	2.50	3.25	30.0
Soil/Moss Peat	2.25	2.75	22.2
Soil/Sedge Peat	2.50	3.00	20.0
Regular Mixture	2.00	3.50	75.0
Soil/Krilium	1.50	1.75	16.6
Soil	1.50	3.50	33.3
Soil/Manure	1.25	2.75	20.0
Manure	2.75	3.00	09.0

*Arranged in order of best root growth and condition of soil mixture.



Peat Moss