Effect of Soil Mixtures on Root Growth of Cymbidium Orchids

Russell C. Mott, Experimentalist
Dept. of Floriculture and Ornamental Horticulture
Cornell University

The soil requirement for Cymbidium orchids are basically the same as for other greenhouse crops. A soil suitable for greenhouse use is composed of mineral materials, living and dead organic matter, water and air.

In April, 1952 an experiment was started to determine the soil requirements of Cymbidium orchids. Comparable plants of the hybrid cross C. Pauwelsii x C. Moira were used--four plants per treatment.

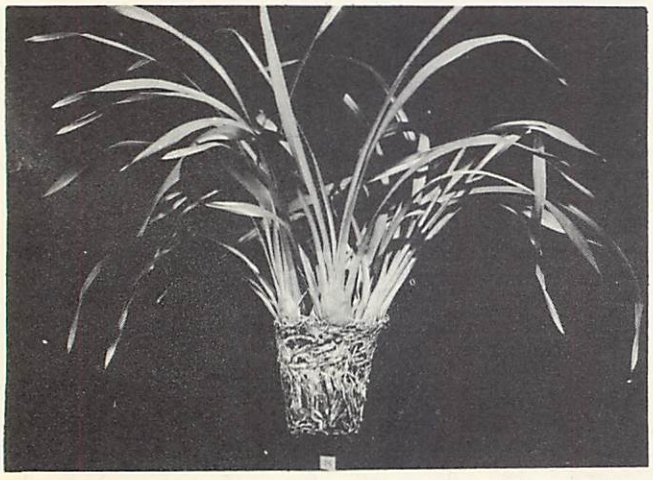
A clay soil amended with readily available organic materials was used to standardize the procedure. The following soil mixtures were used: (1) clay soil, (2) clay soil and manure, (3) clay soil and moss peat, (4) clay soil and sedge peat, (5) regular mixture (osmunda, leaf mold and manure), (6) manure, (7) sedge peat, (8) moss peat, (9) sawdust, (10) soil and Krilium (1 teaspoonful per 6" pot).

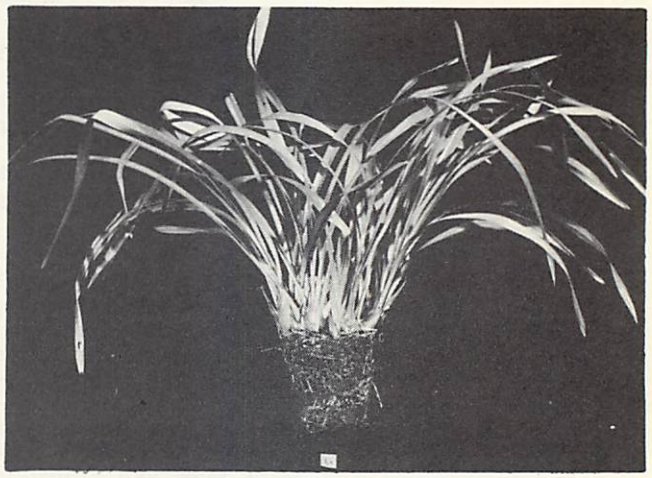
The clay soil and organic materials mentioned were mixed half and half by volume. All materials were steam sterilized (180°F for 1/2 hour). Nine-inch pots were used to accomodate two years' growth. Soil analysis was made of each mixture periodically. This was used to determine how often fertilizer need be applied to the plants. It was found that fertilizer applied once every three weeks was sufficient to maintain nutrient levels approximately as follows:

Nitrogen	10-25 ppm
Phosphorous	4- 6 ppm
Potash	20-30 ppm
Calcium	over 100 ppm

A 20-20-20 water soluble fertilizer was applied at three week intervals using 1 oz. per gallon.

The plants were grown in a greenhouse throughout the year where a 55°F night temperature was maintained. Full sunlight was given the plants the year around. Water was applied daily.





It is recognized that growers are interested in flower production. Since Cymbidiums are irregular in flowering habit, flower production was not used as a criteria for determining the best soil mixture.

The plants were removed from the pots and placed on a table for observation. They were graded on the condition of the roots, i.e. healthy root tips and the presence of dead roots. The color of the leaves and the decomposition of organic water was considered. The treatments graded in order of best growth; top and roots are tabulated in the summary.

The obvious differences were in the amount and condition of roots and the color of foliage.

The plants growing in peat had more roots than any other treatment. They were well distributed throughout the ball of peat and contained the highest number of healthy root tips. Plants in sawdust had the same number of roots as plants in peat but the rapid decay of the sawdust caused injury to the roots. This rapid decay resulted in a large decrease in volume of the sawdust. No additions were made during the course of the experiment. Sedge peat also decayed more rapidly, causing root injury. The roots of plants in soil were in good condition and fairly well distributed within the pot. The Krilium-treated soil contained more roots than the untreated soil. The Krilium-treated soil was comparable to soil and peat. Few roots grew on plants in the regular mixture. In the treatment using soil and manure and manure alone, there were many dead roots. The manure had broken down physically and the volume was reduced by 50 per cent.

The observation and data presented indicate that Cymbidium will grow in any soil mixture. Moss peat presented qualities for good plant growth. The moss peat was resistant to decay and retained its physical condition for two or more years. Moss peat will absorb many times its weight in water and yet be well aerated. The low pH of moss peat tends to repress

bacterial growth, lessening decay and the moss peat is practically free from disease. The low fertility of peat eliminates the danger of high soluble salts experienced with mixed composts and also lessens the danger of over fertilization. The buffering capacity of moss peat is effective in retaining nutrients.

Straight osmunda was not used because the high cost long ago prohibited its use for Cymbidium potting.

Experiments to test the usefulness of peat in the growing of Cattleya and other orchids are in progress.

Summary

Treatments Arranged in Order of Best Growth Top and Roots	Av. Length Pseudobulbs Prod. Over 2 yr. Period	Results
Moss Peat	5"	healthy roots, dark green foliage
Sawdust	5 1/4"	slight root injury, foliage good
Sedge Peat	6 1/2"	many good roots, green foliage
Soil and Moss Peat	5 1/4"	~~good roots~~ ~~but some dead~~
Krilium Soil	5 1/4"	good roots, green foliage
Soil	4"	good roots, green foliage
Soil and Sedge Peat	3 1/2"	injury to roots, foliage fair
Regular Mixture	3 3/4"	poor roots, foliage poor
Soil and Manure	4 3/8"	much root injury, foliage yellow
Manure	5"	severe root injury, yellow foliage