HOW TO TEST A GROWING MIX'S PORE SPACE AND WATER HOLDING CAPACITY

By Larry Hollar, Fafard Technical Services

Choosing the right mix is one of the most critical decisions a grower makes. As well as providing good support and proper nutrition, a mix must also provide sufficient air and water to the plant.

Too much air or too much water can stress a plant, resulting in poor growth or death. Growers need to ensure that the mix has the correct balance of aeration and water retention. A general purpose mix should have a total pore space volume (total porosity) of 65-85% and a total air-filled pore space volume (% air space) of about 10-20%.

Some available charts list the porosity percentages of various mixes. However, it is best for growers to determine these figures themselves.

Materials needed to do this test are:

(1) Size and shape of container used for growing the plants (i.e. -6-inch azalea pot).
(2) The mix being used.
(3) A graduated cylinder or measuring cup, measuring in milliliters (i.e. - Fischer Scientific, 71 Forbes Ave., Pittsburgh, PA 15219 at (800)766-7000 or other suppliers).
(4) Masking tape.
(5) Two watertight trays, 3-inches deep.
(6) A container of water.
(7) Paper and pencil, waterproof pen, and calculator.

First, determine total porosity. Begin by placing tape over the pot's drain holes so it will hold water. Be sure the tape is placed on the outside. Measure the amount of water by pouring into the graduated cylinder. Record this number.

Dry the pot out, being careful not to remove any tape. Fill the pot up to the marked line with the dry mix, then tamp it as you do at planting.

With the graduated cylinder, slowly pour water over the mix until it is thoroughly wet. Saturate the mix to get a thin film of water at the surface. Remember, mixes vary in rate of absorption and quantity of water absorbed.

Dry mixes may be hard to wet, taking up to several hours. Use of warm water can speed the process. In case of a long wait, cover the pot with plastic to prevent evaporation. Record amount required to saturate.

By completely saturating the mix, the water has displaced all of the air contained in the mix's pore spaces. Because water and air occupy the same volume, the volume of water added is equal to the mix pore space volume in the container used.

Calculate total porosity using the water volume required for saturation and volume of mix in the container:

$$\text{Total Porosity} = \frac{\text{milliliters of water}}{\text{Total volume}}$$

Example: If the total volume of the pot is 1,000 milliliters with 700 ml. needed to saturate the mix:

$$\text{Total Porosity} = \frac{700 \text{ ml.}}{1000} \times 100 = 70\%$$

Mixes with total porosity percentages higher or lower than the general range shown above are often used, but can be less "forgiving" in extremely hot or cool, cloudy weather.

Next, calculate the percent air space — the volume of air contained in the mix after drainage. After saturation, remove the tape, letting the water drain into a pan. This is the water held in the larger pore spaces, the "gravitational water." Measure the water volume drained. Calculate percent air space by dividing the volume of the drained water by the volume of the pot.

Example: 125 ml. drains from pot.

$$\% \text{ Air Space} = \frac{125 \text{ ml}}{1{,}000 \text{ ml}} \times 100 = 12.5\%$$

Growers find mixes with 10-20% air space in a 6-inch pot offer adequate aeration for a variety of plants.

Lastly, calculate water holding capacity. Note: less water drains out of the mix than is added. Water is retained by the smaller pore spaces for later use by the plant. The amount of retained water is known as the "water holding capacity." To calculate: Subtract the percentage of air pore space from the total porosity:

70% - 12.5% = 57.5% w. holding cap.

Mixes with low water holding capacity dry out faster than those higher in this property. In conclusion, most mix companies offer products with a wide range of aeration and water retention properties. When selecting a mix, choose one that fits best into your program.

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