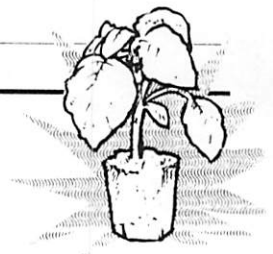

Quality Water Works

There's one thing everyone agrees on: If you want to grow plugs well, you'll need a good source of water.

by THEO BLOM

WATER requirements for seed germination are extremely small. The majority of water is used for environmental control, particularly in maintaining relative humidity and temperature.

However, high humidity (95%-100%) during the first three to five days is often difficult to achieve. A misting system in combination with the nozzle size and type, and operating pressure will determine how much water reaches the surface of the plug.

The composition of the water and the buffering capacity of the growing medium will determine whether the chemical composition of the growing medium will change.

Water Quality

Water quality includes several physical and chemical components:

Size of droplets. Small droplet size is important because smaller droplets are more effective in increasing germination and therefore improve it. Fogging with water droplets in the 5-20 micron diameter range results in better germination than with hand watering.

Temperature. Water in the range of 75°-85° F does not affect the temperature of the growing medium, but does evaporate more quickly.

Acidity (pH). Water pH may not strongly affect seed germination, but becomes more important during subsequent stages of the seedlings' development when roots start to absorb water and nutrients.

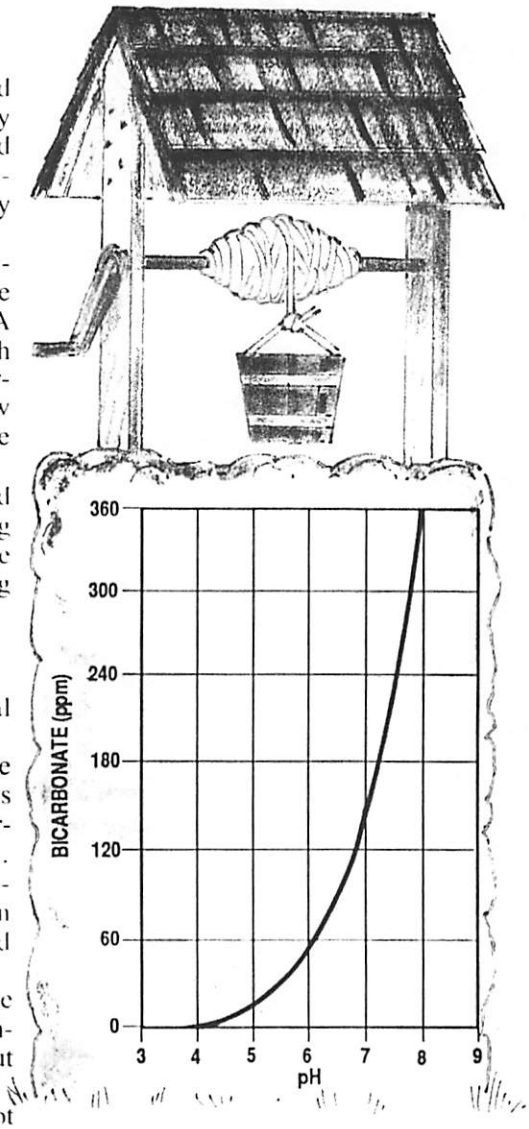

Figure 1. The relationship between pH and bicarbonate level for most well waters.

Nutrient Availability

Nutrient availability is directly affected by the pH of the water in the growing medium. The pH of the water is the result of the presence of weak acids and bases.

With a pH above 7.0, the bicarbonate (HCO_3) in the solution (see Figure 1) determines the buffering capability of the solution. Bicarbonates become toxic above 250 ppm. The main concern is that a high level may increase the pH in the growing medium over time. The precipitation of calcium and/or magnesium carbonates causing a residue on leaves or plugging nozzles are other concerns.

High bicarbonate levels can be neutralized by nitric, phosphoric, or sulphuric acid. Neutralizing 60 ppm or 1 milli-equivalent/liter of bicarbonate requires 7 liters of phosphoric acid (85%), 13.8 liters of nitric acid (37%), or 3 liters of sulphuric acid (93%) per 100,000 liters of water.

The choice of the acid depends on the amount of bicarbonate in solution, the requirement of phosphorus, nitrogen, and sulphate during the seedling stage, and the amount of these elements already present in the solution. **GG**

About the author: Dr. Theo Blom is research scientist, Horticultural Research Institute of Ontario, Vineland Station, ON L0R 2E0.