



THE ATMOSPHERIC RESERVOIR

Examining the Atmosphere and Atmospheric Resource Management

"Watering From The Skies"

By Mark D. Schneider

You've probably heard the adage that rain is more beneficial to your lawn, garden, and flowers than tap water is. Rainwater is a better source of nitrogen for vegetation and this is why it is preferred over tap water. Both rain and tap water help supply nitrogen to soils through a process called mineralization, which occurs when soil organic nitrogen is converted into mineral nitrogen through watering. However, rainwater also contains nitrogen in the form of nitrate, caused by lightning and electrification in the atmosphere. Air is composed of 78 percent nitrogen and 21 percent oxygen and these two elements become ionized and combine to form nitrate. This process is called nitrogen fixation.

There are often additives in public tap water that make it safer and healthier for us to drink. For example, chlorine is added to disinfect and fluoride can help form healthier teeth. Sodium may be added to soften water; but these additives in large enough quantities can actually hinder plant growth. Sodium in large amounts acts to disperse the soil, causing it to lose its structure and become unsupportive of plant growth. Private wells and some municipal tap water can be relatively high in natural salts, mainly calcium, magnesium or sodium - sulfate, carbonate or chloride. Frequent watering and evaporation of tap water



Photo Credit: Shannon Pifko

high in salts can cause salt buildup in the soil that prevents plants from imbibing or absorbing water. Soils with salt or sodium buildup from long-term tap water use or irrigation water oftentimes have to be treated in the field or replaced (repotted for house plants) in order for plants to thrive again.

Plants require soils rich in nitrogen to flourish and this can be accomplished both naturally through watering and artificially with fertilizers. Farmers know this well because their profession requires them to be part-time chemists who are constantly looking at the mineral composition of their fertilizers and soils and deciding what inputs are necessary for maximum, healthy yields each season.

As with any type of watering, nitrogen can be leached out of soil if rains are too heavy or too frequent, or if the soil is coarse. Heavy watering or rainfall pushes the nitrogen deeper into the ground. If the nitrate doesn't move too deep, many deep rooted crops will eventually tap into the nitrogen as their roots mature and grow long enough to reach it.

Many other factors determine plant growth besides the type and quantity of water that's received. These include the amount of light a plant receives, whether artificial or from the sun, the air temperatures during the growing season, the amount of humidity in the air (affecting the rate of transpiration), the carbon dioxide and oxygen present (for respiration and photosynthesis), and natural nutrients present in the soil, as well as insects, weeds and pathogens.

There's a fine balance between too much and too little watering and providing plants with the optimum nutrients for healthy growth. That's what makes a good gardener or farmer more distinguished.

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