

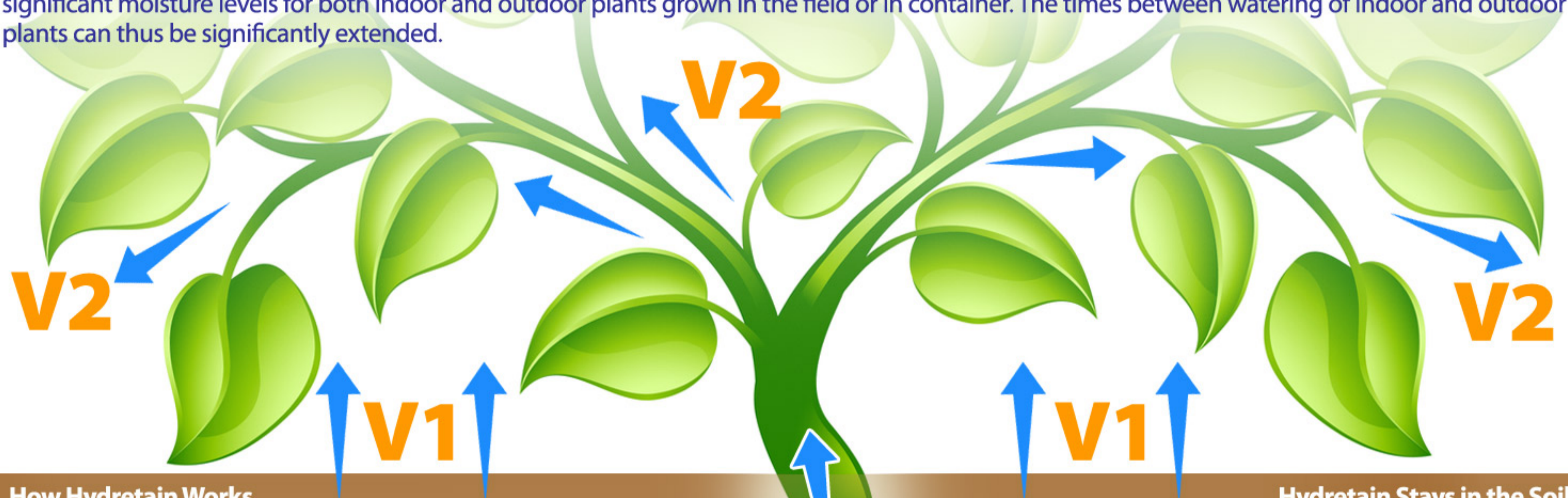
# How Hydretain® Works

## ROOT ZONE MOISTURE MANAGER

Hydretain is a unique concept in root zone moisture management that effectively reduces the overall watering requirements of plants, shrubs, trees, turf and agriculture by as much as 50% or more. Hydretain is not another wetting agent, surfactant or super absorbent polymer crystal. It is actually a liquid group of hygroscopic and humectant components that attract moisture like tiny "water magnets" forming microscopic droplets within the root zone. This process allows plants to utilize soil moisture which would otherwise be lost to evaporation.

### Material/Function

The Hydretain formula contains a proprietary blend of synergistic organic derivatives. In combination, these derivatives create a sub-surface film which attracts water molecules (hygroscopic) and stores moisture (humectant) as microscopic droplets on plant roots and soil particle surfaces. Hydretain continually attracts and holds water molecules from humidity within the soil air space, providing additional moisture in the root zone where it is needed most in the plant-soil system. The end result is increased effectiveness of watering, rainfall, dew and even humidity in retaining significant moisture levels for both indoor and outdoor plants grown in the field or in container. The times between watering of indoor and outdoor plants can thus be significantly extended.



### How Hydretain Works

We must first examine how Hydretain affects moisture movement and availability within the plant-soil system. Regardless of whether plants are grown in the ground or in containers, moisture is constantly being drawn up through the soil by capillary action and vaporized into the air (V1). Moisture is also extracted from the soil by plant roots, transported up the stem and transpired into the air through the leaf stomata (V2). Moisture loss from both the plant and the soil is accelerated by temperature, wind, and rate of plant growth.

### Hydretain Works Two Ways

First of all, Hydretain slows the evaporative loss of moisture from the soil by attracting and condensing moisture vapor (hygroscopic) and holding this moisture (humectant) within the Hydretain film. Second, as a result of reduced evaporation, the lateral movement of moisture into the vicinity of the root zone is improved. This moisture is then held within the Hydretain film, readily available to plant roots.

The water component of this film, which is in contact with the root cells, is absorbed into the plant through the normal process of osmosis, a process which occurs in living cells. With osmosis, water moves through cell membranes from a dilute solution into a concentrated one. Fluid in plant cells is normally more concentrated than in soil solutions surrounding them. Moisture tends to move from a relatively weak Hydretain solution through the semi-permeable membranes into the root cells.

### Hydretain Stays in the Soil

Because Hydretain is composed of large complex molecules it cannot pass through the plant cell membranes into the plant roots. However, water molecules, being much smaller, are able to move into the plant roots from the surrounding film of dilute Hydretain. As the water moves into the plant the Hydretain component remains in place continually seeking additional moisture.

### Hydretain Is Eco-Friendly

Hydretain is biodegradable and contains no phosphates, petrochemical derivatives or other toxic fractions that may cause groundwater or runoff contamination.

  
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