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The Language of the Date Palm



The date palm is a desert plant, which is a very efficient user of water. The leaves and other plant parts do not rapidly transpire water. This greatly influences the plant's ability to “pick up” nutrients from the soil and move them within the plant.

Roots need water in order to “pick up” nutrients from the soil. Since water is limited, the uptake of nutrients is limited. This is why irrigation is so important.

Nutrients are absorbed into the roots and move up the xylem tissue to the leaves that are transpiring the most water. This creates a pressure gradient for nutrient movement from the roots. Since the transpiration of water is low, the movement of nutrients is slow compared to non-desert plants.

High temperatures and low humidity are conducive to high evaporation levels of water. Although date palms resist the evaporation of water, under low moisture conditions, the addition of irrigation water will cause more evaporation (transpiration) of water. This increases both the uptake of nutrients and movement of nutrients in the tree.

Nutrients and water move to the crowns of the palms. From there, they are distributed to the various leaves (branches) that grow out of the crowns.

- The larger leaves (branches) receive more water and food.
- The smaller ones that are trying to grow must compete with the bigger ones.
- The flowers have a more difficult time, because their cover does not allow much water evaporation (transpiration).

Again, all water carrying nutrients, move from the roots into the crown and are then dispersed toward the plant parts that are transpiring water. This movement takes place in the xylem tissue (the water pipes).



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After the leaves receive the nutrients, they use them to make simple sugars (photosynthates). This occurs in each cell of a green leaf. The cell can then either:

- Use the sugar to manufacture all other plant metabolites (respiration).
- Transfer the sugar to other plant parts, through the phloem tissue (drainage pipes).

It is important to note that the sugars that are transported to other parts (roots, new woody tissue, fruit), and used by these cells to make metabolites. These cells cannot grow unless they receive sugar from the green leaves.

The green leaves transfer sugar and metabolites back to the crown. The crown then redistributes them to other parts of the plant. The crown is the reservoir for the accumulation of nutrients and water from the roots and sugar or metabolites from the leaves. The crown, thus, redistributes them to other plant parts. This is a unique feature of all plants that grow from a crown.

New growth on the palm originates from the crown. The crown forms buds. Some buds differentiate (wake up), but many do not (sleep). After the buds wake up, they decide whether to become vegetative parts or reproductive flower parts. Most early buds become vegetative buds. Later buds become flowering buds. The vegetative buds are needed to “feed” the flowering buds.

The flowering buds must be fed from the sugars and metabolites that accumulate in the crown.

The flowers differentiate into fruit lets. If they do not have proper nourishments, they will abort. The fruit lets then undergo cell division. If they do not have proper nourishment, they will either abort or become malformed. After cell division, the cells begin to size. Without proper nutrients, the cells do not properly size and the fruit will either abort or remain small.

The fruit further toward the end of the flower has a more difficult time during cell division and cell sizing. For this reason, the flowering bunch is normally cut $\frac{1}{3}$ to $\frac{1}{2}$ of the distance from the end.

Although the fruit lets may form (cell division) during the same short period of time, the sizing (cell sizing) occurs first on the fruit closest to the crown. The further the fruit let is toward the end of the flower, the later it begins to size. This is called sequential sizing.

The above sequences occur above ground. What happens below ground?

Roots grow most rapidly during the period where the crown is not putting out new vegetative buds or reproductive buds. Roots grow more rapidly when there is no fruit on the palms. Therefore, root growth is the greatest following harvest. Roots increase growth until the palm once again has active vegetative growth. Then, the root growth diminishes. It is in the most difficult period during fruiting (reproduction) period and does not begin until after harvest.

Root growth will determine the size and shape of the palms. Root growth will determine the amount of date yield. Root growth will determine the size and quality of the fruit. Root growth will determine the disease resistance of the palm.



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The yield of the following crop will be determined by the root growth following the harvest of the current crop. Why?

All of the above Language is controlled by the hormone balance in the palm. Roots produce a hormone called cytokinin. This hormone controls all other hormones in the palm. It is the proper hormone balance in the palm that determines:

- Number of buds that the crown forms
- Number of buds that are active (awake)
- Type of bud (vegetative or reproductive)
- The transfer of sugar and metabolites from the leaves to the crown
- The transfer of food from the crown to the fruit lets
- The number of fruit lets
- The size of the fruit
- Control of sequential sizing
- And many more bunches of fruit

Roots control the activity of the palm in much the same way as the man must control the activity of the family.

How can we tell if roots are actively controlling palm growth?

Look at the shape of the vegetative growth. If it is in the shape of a fan, the roots are in control. If the vegetative growth is more vertical, the roots are not in control.

- Too much nitrate will cause the roots to lose control. This is why Stoller recommends “Aqua Cal 5”.
- “Aqua Cal 5” also controls calcium, which helps regulate the activity of the various plant hormones and give the plant better “bones” and better quality fruit.
- “Aqua Cal 5” also contains natural growth substances that promotes greater and better root growth
- Stoller’s foliar program is designed to keep the proper balance between the vegetative growth and fruit growth. The foliar program is a “root helper”.

Unfortunately, there are many things that we still do not understand. It does, however, take time and effort to learn a language. We are now beginning to lean The Language of the Date Palms.



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Recommendations for the Use of Stoller Products

A. Non-Baring Trees (Age from 1 – 4 years):

- Apply 500 cc per tree of “Aqua Cal 5” every 2 – 4 weeks.
Band around the trunk of each tree or apply through drip irrigation.
- Foliar spray the whole tree every two months with the following mixture:
0.3% Solution of LOAD
0.3% Solution of GOLDEN HARVEST PLUS 5
0.4% Solution of SETT

Start the applications of the above program at any time onwards.

B. Mature Trees (Productive):

- Apply 500 cc per tree of “Aqua Cal 5” every 2 -4 weeks.
Band around the trunk of each tree or apply through drip irrigation.
- Apply the following mixture to the leaves flowers, fruiting branches and crown of each tree (not the entire tree) every 2 – 4 weeks.

Begin at flowering through harvest:

- 0.3% Solution of LOAD
- 0.05% Solution of STIMULATE
- 0.3% Solution of GOLDEN HARVEST PLUS 5
- 0.4% Solution of SETT

Stoller Middle East