

## ROOTS & NUTRIENTS

### ROOTS HAVE TWO MAIN FUNCTIONS:

- 1.They provide an anchor for the tree.
- 2.They absorb moisture and nutrients and translocate these to the top portion of the tree in the form of salts and minerals in solution.

Roots determine the direction down by a small marble-like ball of starch that rattles in the hollow chamber at the very tip of the root. This indicates the pull of gravity and the root pursues that direction. They continually cast off old cells and these act as a lubricant for the root passage. They give off a small amount of acid (mostly carbonic acid) that dissolves the necessary elements for the tree. Only the root hairs absorb nutrients. They are usually not more than two weeks old. All the other roots provide support and balance. Cutting the roots stimulates re-growth. Root pruning is good for trees. It keeps the root system young while the top ages.

### MACRO- AND MICRO-NUTRIENTS

Macro-nutrients: nitrogen (N) Potassium (K) Phosphorus (P) carbon, oxygen, hydrogen, calcium, sulfur, magnesium.

- Nitrogen promotes healthy foliage. Organic nitrogen is better for bonsai use, as it is slower-acting and is less prone to leaching.
- Phosphorus promotes healthy roots.
- Potassium acts as a catalyst for other elements to do their jobs. It plays a part in cell division, helps in the manufacture and movement of sugars and starches, and helps in good root production.

Micro-nutrients: Iron, boron, zinc, manganese, copper, molybdenum, cobalt, chlorine.

- These are required in extremely small amounts.