FERTILISING AND FEEDING:

Your Bonsai should be fed during the growing season. Evergreens can be feed throughout the year. Dilute the dosage by 50% of the recommended dosage and then double your feeding routine when using chemical fertilisers. Your routine should be weakly, weekly! Chemical fertilizers can lead to burning the trees. Chemical fertilisers given an almost instant reaction. When using organic fertilizers, follow the manufacturers recommendations. Organic fertilisers release chemical elements more slowly and will not burn your plants.

Water is not the sole nutrient needed by plants. All living plants needs three essential nutritional-elements in order to thrive: NITROGEN, PHOSPHORUS and POTASSIUM. (NPK).

Functions of these elements

Nitrogen (N): Nitrogen plays a key role in many metabolic reactions. Because nitrogen is contained in the chlorophyll molecule (green substance in plants). A deficiency of nitrogen will result in a yellowing condition of the plant.
Nitrogen builds the structure of your tree.

Phosphorus (P): Phosphorus has been described as ever-present in the plant, being involved in nearly all-metabolic processes. It plays a vital role in the life cycle of plants and is important for reproductive growth, promoting early maturity and fruit quality, as well as seed formation.

Potassium (K): Potassium plays an important role in the water relations in the plant. Adequate potassium causes cell walls to be thicker and provides more tissue stability, which normally improves resistance to lodging, pests and diseases. Fruits and vegetables grown with adequate potassium seem to have a longer shelf life in the grocery store.

Fertilisers
Fertilisers indicate the ratio between these elements (N:P:K) according to the specific needs for use:

NITROGEN, PHOSPHORUS and POTASSIUM.
Most commercial Fertilizers contain all three in various proportions, and at a variety of concentrations. If you look at the contents listed on fertilizer packs you will see the initials :
N (NITROGEN) P (PHOSPHORUS) K (POTASSIUM) followed by three numbers.
These numbers represent the ratio between the three nutrients, and the relative strength of the fertilizer.
The higher the number the stronger the concentration of the nutrient.
In most cases two numbers in brackets follow these numbers 2:3:2 (22), this number represent the percentage of active ingredients of the fertilizer, the balance is made up of non nutritional fillers.
2 parts Nitrogen
3 parts Phosphorus
2 parts Potassium
22% active ingredients (220g/kg - Active ingredient)
7 Total Parts(2+3+2)/220g = 31,4g/kg (Mass of one part) ie.
63g/kg Nitrogen = (31.4 x2)
94g/kg Phosphorus = (31.4 x3)
63q/kq Potassium = (31.4 x2)

Total 220g/kg active Ingredients

NPK 3:1:5 (15)
50g/kg Nitrogen
17g/kg Phosphorus
83q/kq Potassium.
150g/kg active Ingredients

NITROGEN (N)
Colorless, tasteless, odorless, gaseous element, that constitutes 78% of the atmosphere by volume.
5% of organic matter in soil is present as nitrogen. This is broken down by micro-organisms and the nitrogen can the be used by the plant. Plants take up nitrogen through their roots. Some plants such as Alder and Acacia can meet their need for nitrogen from the air, with the help of so called root nodule bacteria.
Nitrogen joins carbon, hydrogen and oxygen as a main constituent of the animal body, other than the skeleton.
Nitrogen is responsible for shoot development and foliage production, in short, for growth. Too little nitrogen will result in a plant that will not thrive, with small and possibly distorted yellow leaves and a “washed out” appearance. With no nitrogen at all, an established plant could be dead within a year, by contrast too much nitrogen will result in rapid growth with large leaves, plump shoots that are full of water and consequently very easy to snap.

PHOSPHORUS (P)
A solid non-metallic element of the nitrogen family is existing in at least two forms:
1. yellow poisonous, inflammable, and luminous.
2. red less poisonous and inflammable.

Phosphorus occurs naturally mainly in organic compounds such as protein and bones. The release in soils depends on decomposition of these organic compounds.
Essential for the development and proper functioning of roots.
Also encourages the fattening of woody trunks and branches, and helps to establish appropriate conditions for the production of foliage and flower buds, and to make nucleic acids. It also enhances the plant's resistance to stress and diseases. Weak growth with pale green leaves, and a low resistance to illness and frost could be the result of a lack of phosphorus. Phosphorus is taken up through the roots and its availability depends largely on the pH value of the soil. Minerals present in clay, which also absorbs phosphorus can reduce its availability to the plant.

POTASSIUM (K)
A silver-white soft, light, low-melting metallic element, abundant in nature especially combined in minerals.
Potassium is a highly reactive element that forms part of many mineral compounds but does not occur in pure form in nature and is not found in organic compounds. It controls most metabolic procedures in plants and plays an important role because of its osmotic effect. A catalyst and prime requirement, in chlorophyll construction. A governor for taking free nutrients from the air -carbon, hydrogen, oxygen. Needed so plants can make starches, sugars, proteins, vitamins, enzymes or cellulose. Promotes normal growth and muscle function, also a cell regulating element regulating osmotic pressure in cellular tissue and fluids. Potassium is the main agent for the development of fruit and flowers. By increasing the amounts of potassium in fruit bearing and flowering

bonsai, which fruit or flower poorly, will increase their performance the next spring. Potassium also helps hardening of late growth in preparation for winter. In non-fruit bearing or flowering trees, insufficient potassium results in winter die back. A few hands full of hard wood ash are an excellent source of cheap potassium.

CALCIUM MAGNESIUM and SULPHUR

Calcium and magnesium are considered as elements of secondary importance in the industry and marketing of the commercial fertilizers, but the truth is that for the soil and for plants calcium and magnesium are primary in importance both quantitatively and also for their bio-chemical significance.

A deeper look into every living body, including the human being, discovers the fact that nothing can live without calcium and magnesium. The skeletons of human beings and those of all fully developed animals are built of tri-calcium phosphate.

The immense world of microbes and all the bio-chemical processes require certain amounts of calcium and magnesium. There may not be a green plant alive without the action of magnesium, for magnesium controls the development and the biochemistry of the chlorophyll molecule. Subsequently, there is no photosynthesis, or any food for other forms of life without the work of magnesium. Every agricultural product contains certain amounts of calcium and magnesium, and logically a fertile and productive soil must contain calcium and magnesium. In fact, it holds very large amounts of both of these two elements. It has been proved that calcium is the most important element among all the plant food elements.

CALCIUM (LIME)

A silver white metallic element of the alkaline earth group occurring only in combination in the soil in carbonate, sulfate or phosphate. At the proper saturation improves soil texture, making phosphorus and micro-nutrients more available It improves the environment for microorganisms, helps plants form better root systems. Stems and leaves require it for efficient use of sunlight energy, water, carbon dioxide and nitrogen end mineral nutrients.

An important fertilizer element, it plays an important role in cell production and the growth of roots. It is absorbed through the roots. Lime helps to neutralize acid soil and has a beneficial effect on the structure of the soil, on the activity of microorganisms and on the resulting availability of other nutrients. Calcium deficiency is characterized by weak growth, a low resistance to illness or yellow shoots

MAGNESIUM

A silver-white, light malleable metallic element.

Occurs abundantly in nature as an alkaline. MgO used in fertilizers.

In soils Magnesium has 1.666 times as much exchange capacity as an equal amount of calcium. High magnesium and low calcium permits organic residue to decay into alcohol, a sterilant to bacteria. It should occupy between 10 and 20% of the soil's exchange capacity.

It aids in growth promotion.

SOME ASPECTS OF MAGNESIUM IN THE SOil:

* It is contained in minerals such as biotite, dolomite and chlorite.
* Deficiencies occur most often in coarse-textured and acid soils.
* It occurs as a cation (Mg ++)

SOME FUNCTIONS OF MAGNESIUM IN PLANT GROWTH ARE:
* A mineral constituent of chlorophyll.
* Actively involved in photosynthesis.
* Aids in phosphate metabolism.
* Activates several enzyme systems.
If a plant lacks magnesium its older leaves will turn yellow with the veins remaining green.

SULPHUR

A non metallic element that occurs either free, or combined especially in sulfides and sulfates.

Is a constituent of proteins and exists' in allotropic forms. It resembles oxygen, yet less active and more acidic. It is available in quantity in the air in the form of sulfur dioxide and is washed into soil by rain and it can be ignored in fertilizing.

TRACE ELEMENTS
ONLY SMALL QUANTITIES OF MINERALS ARE NEEDED BY THE PLANT.

CHLORINE
A halogen element that is isolated as a heavy greenish yellow gas of pungent odor.

Especially a part of the compound sodium chloride is regarded essential for the growth of some plants. Under some conditions, an excess of chlorine causes chlorite spots on tobacco leaves and other plants.

HYDROGEN
A nonmetallic element
The simplest and lightest of elements, colourless, odourless and highly flammable gas. It is the base for acidity in soil systems.

SODIUM
A silver white soft waxy element of the alkali metal group.
Occurs abundantly in nature in compound form. Very active as a cation and cell regulating element that governs osmotic pressure in cellular tissues and fluids.

MOLYBDENUM
A metallic element that resembles chromium and tungsten.
Essential for plants in trace amounts, 0.01 to 0.10 PPM. It governs microorganisms needed to inter relate. Molybdenum helps to control nitrogen metabolism. The yellowing and malformation of young leaves usually indicate a deficiency.

ZINC
A bluish white crystalline metallic element of low to intermediate hardness. Absolutely vital (along with molybdenum) to the life process of soil microorganisms, especially Azotobacter, a non-symbiotic nitrogen-fixing microorganism. Zinc controls the activities of enzymes and the development of hormones. It also plays a role-in photosynthesis.

SORON
A trivalent metalloid element found in nature only in combination.

Required for translocation of sugar. It regulates flowering and fruiting, cell division and cell wall formation, salt absorption, carbohydrate metabolism, water-use and nitrogen assimilation in plants.

IRON
A heavy malleable magnetic silver-white metallic element.
It is an indispensable carrier of oxygen, required in the production of chlorophyll and as an aid in the prevention of chlorosis. A difficult nutrient to supply to plants.

MANGANESE
A greyish white, hard and brittle metallic element.
Resembles iron and aids the oxide enzyme in carrying oxygen and enters into the oxidation and reduction reactions in plant life required for carbohydrate metabolism and seed formation. Deficiency in plants is indicated in brown spots appearing on older foliage.

COPPER
Reddish metal.
In agriculture, vitally important to root metabolism helps form compounds in proteins, amino acids and many organic compounds. A catalyst or part of enzyme systems. Helps produce dry matter via growth stimulation and prevents development of chlorosis, rosetting and die-back. A copper deficiency is visible by white tips on the leaves.

SILICA
A white non-metallic element
It is a proven fact that silica plays an important fertilizing role in the plant kingdom. Tests have shown an improvement in cultivation following the addition of silicates.
Silica also functions as a vital element in protecting plants against mold penetration, and it has been found to influence the use of other ingredients useful to plant metabolism. A rich supply of natural organic silicates can be found horsetail, spring horsetail, or scouring rush. This perennial grows wild in all temperature zones of our planet. Horsetail thrives on clay-like sandy soils. It occurs mainly in marsh lands but can be found in woods and forests, moist fields, meadows and along the sandy shores of creeks and streamlets. Some varieties have adapted to other environments, living along roadside and stony ground.