

Nutrient Removal Rates in Pounds per Acre – Mature Orchard						
	Yield – Tons / Acre	N	P ₂ O ₅	K ₂ O	Mg	S
Olives	9	130	31	157	18	15

Newly-planted or very young trees require approximately one-third that shown in the above table.

EFFICIENCY of applied fertilizer recovery by mature trees ranges from 60-80% of N: 5-25% of P₂O₅ (S + Humic Acid can improve P uptake): and 55-70% of K₂O.

Production depends upon supplying adequate nutrients or risk mining subsoils which is not sustainable for top yields or quality.

WATER can be the main limiting growth factor; however, a properly fertilized plant will use water more efficiently to produce higher yields per unit of water. **A balanced fertilizer program can produce 3-5 times more yield with each unit of water.**

SOIL TILTH -- (Condition/structure) affects water, air and root penetration for Maximum Economic Yields (MEY) and quality. Subsoil tilth (structure) is improved by biological activity when fed humic substances and energy (sugar / amines); And the use of soil inoculants for diversity to help feed plants by solubilizing Calcium, Sodium, and Magnesium and other nutrients to improve cat-ion exchange and leach harmful salts.

ORGANIC MATTER (humus slow release nitrogen) is the foundation of any soil fertility or plant nutrition program. TPSL® tests measure only the humic (well decomposed - available) portion. To build OM is a long-term process. Use manure, composts, crop residues and other humus products for fast results in the soil-building program. Supplemental products such as Humates, Organic Formulas, Ligno-sulfonates, soil inoculants, fish products, vegetable meals, etc. are beneficial.

SOIL INOCULANTS - Activators (in the absence of adequate soil humus or in sterile conditions) such as BIOLOGICAL SOIL INOCULANTS / COMPOST TEAS containing naturally occurring beneficial soil micro-organisms and/or enzymes, hormones, polymers, wetting agents, Carboxyls, enzymes, hormones, etc. can improve nutrient uptake and the soil's physical condition (tilth) for better plant performance, disease resistance, water use efficiency and salt leaching. Feeding microbes with humic substances, carbohydrates, and other organic materials aid soil tilth and releases soil nutrients while helping some bacteria fix N from the air. [A combination of products may be best for diversification. Follow product labels on your own test plots for the most effective products.]

USE MOLASSES (sugars) and/or amines (proteins) for energy sources to stimulate biological activity.

BALANCED NUTRITION is the next step: Inventory your long term in-depth Soil Nutrient Bank.

REPRESENTATIVE COMPOSITE SOIL SAMPLE - Be sure to sample top soil at 0-12" - take several uniform cores (slices) from several random areas, put in a clean container (***be sure to include crust from soil surface - discard dry mulch***), thoroughly mix; then discard foreign materials (plants, rocks, etc.) and only send in **at least** a half pint **but not over 1 pint** of soil that is a composite of several cores thoroughly mixed that are representative of the **major root zone** of your growing area or the problem spot being sampled. --- ***Also, furnish detailed history of soil treatments and crops on each area. If you see a difference (color-slope-texture-growth) it should test differently.*** Average test differences – not soil samples!!! See our **How To Take A Good Soil Sample** instruction sheet for full details.

SUBSOILS - While most plant roots feed in the 6 to 12" depth, the next 12 - 24" are also a major contributor. -- For the most accurate soil test recommendation, annually sample the topsoil (0-12") separately and then the next 12" increment of the subsoil. Subsoils when run with topsoils cost about 1/2 as much as topsoil. Subsoil tests evaluate sustainability (mining, or building) for long-term performance. --- Test Top and subsoil samples annually to determine if mining or building-up of subsoils is occurring. --- Test 3' and 4' depths at 3-6 year intervals to check on the deeper rebuilding progress. ***Do not mix samples from different depth intervals.***

CALCIUM is the most important mineral as a building block for healthy soils, plants and animals. Even acid-loving plants also need a supply. Olives love high Calcium soils for maximum production. This accounts for why trees can have alternate bearing years. TPSL®'s unique CO₂ extraction that mimics the plants' soil nutrients extraction method, plus the water soluble Ca (H₂O-Ca) is the best way to evaluate actual plant available Calcium. High Ca soils **OFTEN have low available (soluble) Ca**. Ca is also essential for biological activity, especially with legumes. Soluble Ca (H₂O) is also essential to leach harmful salts.

SOLUBIZE Ca and Mg to the available form with acidification from regular Sulfur use and/or biologically (feed microbes with humus products and molasses) more available (H₂O Ca) should be beneficial.

OTHER MAJOR MICRONUTRIENTS – Don't ignore Iron (Fe), Zinc (Zn), Manganese (Mn) or Boron (B) – all have significant functions in the tree to aid nutritional uptake and conversion – and to aid in disease and insect fighting.

SULFUR and BIOLOGICALS use regularly in fertilizers and irrigation water to increase soluble Calcium and Magnesium, thereby improving soil physical condition (tilth) to aid water and root penetration and the leaching of salts. Sulfur in alkaline soils can increase nutrient availability especially Phosphate and Micronutrients.

WEED CONTROL is critical in the production of Olives. Grasses are much better competitors for P, K, Ca and Mg and will rob the soil of nutrients required for optimal production. In addition, there is good evidence that plants volatilize excess Nitrogen through their leaves. Palmers Amaranth, Jimsonweed and Entireleaf Morning-glory volatilize 5 to 10 times more Nitrogen into the atmosphere. **But don't overlook a –**

GREEN MANURE / COVER CROP planted in the Fall. Ideally, this is a high-biomass mix including legumes that is rolled down in the Spring. This will add Organic Matter, reduce soil temperatures, suppress weeds and help the soil retain moisture. **Tree root flares must be exposed and kept clear of vegetation.**

ASK THE PLANT® Leaf Analysis can help confirm a visual symptom or identify a potential problem that is not yet showing visual symptoms. It is an essential tool for maximizing yield and quality. Results from leaf analysis are best used in a long term fertilizer program or to prevent a developing problem.

How To Do It –

Sample the most recently matured leaf, current-season shoots. Ideally, a sample should be taken from a uniform block of trees. This means that trees of different varieties or different ages, trees on different soil types, and trees under different irrigation systems should be sampled separately.

Samples should consist of a few leaves from as many trees as possible, selected at random from throughout the orchard. Avoid leaves that are abnormal in appearance or leaves with abnormal trees unless that is the problem to be solved. In that case, take two different samples one from abnormal trees and one from healthy trees.

Approximately 35 (large) to 50 (small) leaves are needed for one sample.

Only paper bags should be used. Samples should be taken from early growth to fruit development. Please submit samples along with a Plant Analysis Field Information and Submittal Form which can be obtained from our website www.TexasPlantAndSoilLab.com in the Plants section.

Most recently matured leaf, current-season shoots. Note lighter color. **Take these.**

Note darker older leaf. It will not present an accurate assay of nutrient utilization.



Samples can arrive in one day if sent by Fed-Ex, UPS, Lone Star Overnight, USPS Express, etc. Complete analysis takes 24 to 48 hours after received at the lab. TPSL® will e-mail you the report along with detailed recommendations.

A Natural/sustainable balanced Plant Nutrition Program is required for OPTIMUM PROFITS -

Don't guess about your inputs - use TPSL® Natural Soil Tests and **ASK THE PLANT® nutrition programs!!!**