OLIVE
CROP SOLUTIONS SHEET

Biorizon biotech

Olive Crop Cycle

The olive crop cycle begins with the budding of the buds in spring, after the winter dormancy. From these buds, new shoots and inflorescences develop. As the tree grows and develops, it goes through several key phenological stages, including:

- Flowering
- Fruit set
- Stone hardening
- Olive development and swelling
- Floral induction
- Veraison (color change).
- Ripening for harvest.

The duration and intensity of each stage vary significantly depending on the variety, climatic conditions, the previous year's harvest load, and cultivation practices.

Crop Characteristics

The olive tree is a perennial woody crop, characteristic of Mediterranean climates, adapted to summer drought, although production improves notably with supplemental irrigation. It prefers well-drained, sandy loam or clay loam soils, and tolerates a wide range of pH, although it prefers slightly alkaline conditions. The root system is strong and deep, but most active roots are found in the first 60-80 cm of soil. Temperature and water availability are crucial in stages such as flowering, fruit set, and fruit development. It produces small, whitish flowers grouped in inflorescences (racemes), and its foliage is persistent and grayish-green in color.

Main Phenological Stages

- Winter Dormancy (December-February): Minimum vegetative activity. The tree accumulates reserves.
- Budding (March-April): Wood and flower buds begin to develop. Growth of new shoots.
- Flowering (May-June): Opening of flowers. Pollination (mainly anemophilous).
- Fruit Set (June): Fertilization of flowers and drop of unfertilized ones. Beginning of fruit development.
- Stone Hardening (July-August): The olive stone lignifies. The fruit continues to grow slowly.
- Olive Development and Swelling (August-October): Rapid fruit growth and oil accumulation.
- Floral Induction (July-October): Internal change in olive buds that prepares them to transform into flower buds, which will later manifest as flowering and fruit production in the following season.
- Veraison (October-November): The olive changes color from green to purple/black. Maturation of aromatic compounds.
- Ripening and Harvest (November-February): The fruit reaches its optimal maturity for harvest, depending on its destination (oil or table) and variety.

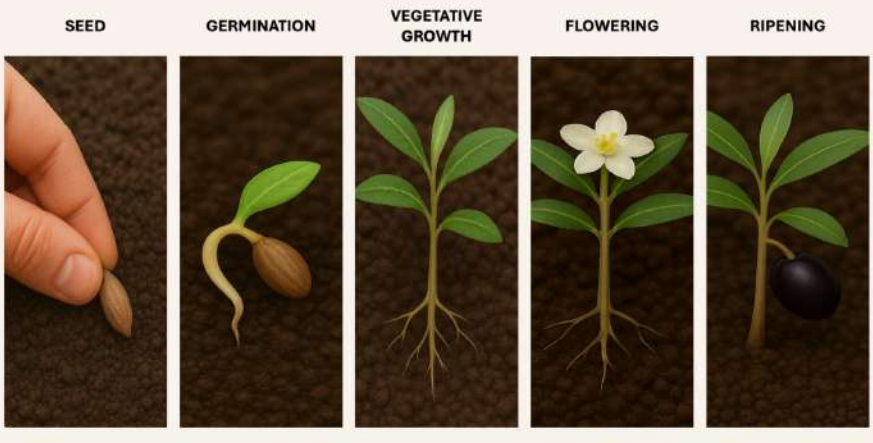
Picual Olive

Arbequina Olive

Hojiblanca Olive

Cornicabra Olive

GROWTH STAGES OF THE OLIVE TREE



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MAIN CROP PROBLEMS FOR OLIVE GROWERS

POOR FRUIT SET AND/OR EXCESSIVE DROP OF FLOWERS/YOUNG FRUITS

Poor fruit set or excessive drop of flowers and young fruits (Stage F and G) directly impacts the campaign's productive potential.

The main problems and causes include:

Adverse Climatic Factors:

Excessively high or low temperatures during flowering.
Strong, dry winds that dehydrate stigmas and pollen.
Persistent rains during flowering that hinder pollination.

Nutritional Imbalances:

Boron (B) Deficiency: Essential for pollen viability, pollen tube germination, and fruit set.
Zinc (Zn) Deficiency: Involved in auxin synthesis, important for floral development.
Low Calcium (Ca) levels can affect cell wall structure and fruit viability.
Excess or deficiency of Nitrogen (N) can cause excessive vegetative growth at the expense of flowering or general weakness.

Water Stress:

Both water deficit and excess before and during flowering can negatively affect the crop.

Pollination Problems:

Self-incompatible or partially self-incompatible varieties without sufficient presence of pollinators.
Low pollen viability.

Physiological and Management Aspects:

Excessive load from the previous year (alternate bearing).
Inadequate pruning.
Excessive competition between vegetative and reproductive organs.

Pests and Diseases:

Attacks by Prays (anthophagous generation) or Euzophera.
Diseases that weaken the tree (Peacock Spot, Verticillium Wilt).

Consequences:

- Drastic reduction in the number of fruits per tree.
- Significant decrease in final yield.
- High irregularity in annual production (alternate bearing).

BIORIZON SOLUTION FOR POOR FRUIT SET, CELL DIVISION, AND/OR EXCESSIVE SHEDDING OF FLOWERS/YOUNG FRUIT

BIORIZON has developed a solution based on all this nutritional and physiological knowledge, providing plants with essential nutrients, natural hormonal signaling, and the necessary biostimulation for this purpose.

BIORIZON COMPLEX foliar 2-3 L/ha when buds begin to swell and open to improve homogeneous flowering with high-quality flowers and pollen.

BIOFIX foliar 2-3 L/ha, one or two applications from the start of flowering (Stage B) to ensure high levels of Calcium and Boron in plant tissues.

BIOFAT foliar 2 L/ha at full bloom (Stage E-F), to induce the appropriate signaling for cell division; the greater the cell division we achieve during flowering and fruit set, the greater the potential for size and oil yield we will have for our olives.

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MAIN CROP PROBLEMS FOR OLIVE GROWERS

POOR VEGETATIVE DEVELOPMENT AND LACK OF VIGOR

Poor vegetative development, especially in young plantations or weakened trees, limits productive capacity and entry into production.

The main causes include:

Inadequate Soil Fertility:
Soils poor in organic matter and essential nutrients (N-P-K).
Extreme soil pH that limits nutrient availability.

Chronic Water Stress:
Insufficient irrigation or prolonged droughts.
Waterlogging that causes root asphyxia.

Root Problems:
Compacted soil that hinders root penetration.
Damage by nematodes or soil diseases (e.g., Verticillium, Armillaria).

Inadequate Management:
Excessive or incorrect pruning.
High competition with weeds.

Chronic Foliar Pests and Diseases:
Severe and repeated attacks by Repilo, Scale insects, etc., which reduce photosynthetic capacity.

Accentuated Alternate Bearing:
After a year of heavy load, the tree may show reduced vegetative development due to depletion of reserves.

Consequences:

- Delayed entry into production for young trees.
- Lower number of flower buds for future seasons.
- Reduction in photosynthetic capacity and, therefore, productive potential.
- Increased vulnerability to biotic and abiotic stress.

BIORIZON SOLUTION TO STIMULATE VEGETATIVE DEVELOPMENT

In order to help and support vegetative growth, we need to understand what is essential for this period of time. Plants will need hormonal balance to show their full genetic potential, but they will also need adequate climatic conditions, proper soil fertility (nutrient availability and microorganism activity), water availability, and protection against pests and diseases.

In accordance with this information, Biorizon Biotech recommends working in parallel with two strategies:

Root development for nutrient use efficiency and water use efficiency:

When irrigation is available, we suggest ROOTBEST applications every 15 days (5-10 L/ha); for the first two applications, we recommend a possible combination with BIOPOWER 0.5 L/ha as there is a strong synergy between both products.

When irrigation is not available, we suggest 2 applications of BIOPOWER foliar 1 L/ha.

Vegetative growth and development to increase photosynthesis:

Application of ALGAFERT via foliar 1 L/ha to balance the plant's hormonal system and supply high-value biostimulant molecules such as polyphenols, vitamins, amino acids, and polysaccharides. This application can be enhanced by adding 1 L/ha of PHOTOPOWER, thus ensuring stimulation of sugar production by enhancing photosynthesis.

These combined applications ensure better nutrient absorption and assimilation, strong root development, and vigorous vegetative growth, laying the foundation for good production.

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MAIN CROP PROBLEMS FOR OLIVE GROWERS

LOW OIL YIELD, SMALL CALIBER OLIVES, AND FLOWER INDUCTION FOR THE FOLLOWING CYCLE

Achieving a good oil yield and adequate commercial size are key to the profitability of the crop, especially if the destination is the oil mill or high-quality table olives.

The main causes include:

Varietal Factors:
Some varieties genetically have a lower potential for oil yield or caliber.
Deficient Nutrition in Key Stages:
Potassium (K): Fundamental for oil accumulation and sugar transport. Its deficiency during the swelling and ripening phase reduces oil yield and size.
Phosphorus (P): Important for energy metabolism and oil formation.
Nitrogen (N): Late excess can delay ripening and lipogenesis.
Water Stress:
Water deficit during the olive fruit-filling stage limits its size and oil accumulation.
Excessive Fruit Load (Alternate Bearing):
Many fruits compete for the same resources, resulting in smaller sizes and lower oil percentage per fruit.
Adverse Climatic Conditions During Ripening:
Excessively high temperatures or early frosts can affect lipogenesis.
Inadequate Pruning and Canopy Management:
Poor fruit illumination, hindering photosynthesis and assimilate production.
Pests and Diseases:
Damage by Olive Fly (Bactrocera oleae) or Glifodes that affect the pulp.
Diseases such as Anthracnose or severe Olive Leaf Spot that weaken the tree.
Inadequate Harvest Timing:
Harvesting too early or too late can affect oil yield and quality.

Consequences:

- Lower oil production per hectare.
- Lower commercial value of the harvest, both for oil and table olives.
- Reduction in profitability for the farmer.

BIORIZON SOLUTION TO INCREASE FAT YIELD, OLIVE FILLING, AND PROMOTE FLORAL INDUCTION FOR THE FOLLOWING YEAR

Increasing the weight and fat content of olives is a major challenge for producers. We need to obtain the maximum possible kilos per tree with optimal fat yield. The more efficient we are in this process, the greater the benefits farmers can achieve. In terms of nutrition, we must ensure that plants are fed with the necessary amount of calcium, boron, and potassium. We need to support photosynthesis during the filling period, as it is the source of carbohydrates needed to fill the olives.

Floral induction in olive trees is a physiological process that begins in the summer prior to flowering, between July and October. It involves an internal change in the olive buds that prepares them to transform into floral buds, which will later manifest as flowering and fruit production. During this period, it is of vital importance to increase reserves in buds and roots in the form of arginine and starch, as well as to avoid any adverse situation that may influence this induction and its subsequent differentiation.

BIORIZON has developed a solution based on all this nutritional and physiological knowledge, providing plants with both essential nutrients, natural hormonal signaling, and the necessary biostimulation for this purpose.

Foliar application:

BIORIZON CONTROL 3-5 L/ha to induce the appropriate signaling for the transfer of sugars from the leaves to the fruits. This product should be applied 30 days before harvest and will allow us to advance the achievement of the maximum fat content that our olive trees will be capable of obtaining.

KOLOR NEUTRO as a source of potassium, responsible for increasing carbohydrate production. This product is applied at 2 to 5 L/ha throughout the entire "filling" stage. It can be mixed with BIORIZON CONTROL.

Drip irrigation: (when possible or available)

PLENTY 5 l/ha every 15 days, from the beginning of the "filling" stage. This product will supply potassium without nitrates and will feed the roots to maintain their growth activity. This will support healthy aerial activity.

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MAIN CROP PROBLEMS FOR OLIVE GROWERS

DISEASE CONTROL (OLIVE LEAF SPOT, ANTHRACNOSE, TUBERCULOSIS) AND PESTS (FLY, PRAYS)

Olive groves are susceptible to various fungal and bacterial diseases, as well as attacks from multiple insect pests, which can considerably reduce production and quality, and even the survival of the tree.

The main causes and predisposing factors include:

Favorable Climatic Conditions:
Olive Leaf Spot (Spilocaea oleaginea): High humidity, persistent rain, mild temperatures.
Anthracnose (Colletotrichum spp.): High humidity and mild temperatures during veraison and ripening.
Tuberculosis (Pseudomonas savastanoi pv. savastanoi): Penetrates through wounds (pruning, hail, harvesting); humidity favors its spread.
Olive Fly (Bactrocera oleae): Mild temperatures and ambient humidity for adult activity and larval development.
Olive Moth (Prays oleae): Specific conditions for each of its three generations (leaf-feeding, flower-feeding, fruit-feeding).

Varietal Susceptibility:
Some varieties are more sensitive to certain diseases or pests.

Poor Cultural Practices:
Incorrect pruning that creates many wounds or very dense canopies.
Inadequate management of infected pruning debris.
Unbalanced fertilization (excess N can favor some diseases).
Lack of preventive treatments at key moments.

Presence of Inoculum or Pest Populations:
Infected harvest residues, nearby abandoned olive groves.
High pest populations in the previous season or in adjacent plots.

Consequences:

- **Olive Leaf Spot: Defoliation, tree weakening, reduced flowering and harvest.**
- **Anthracnose: Fruit drop and mummification, loss of oil quality (acidity, organoleptic defects).**
- **Tuberculosis: Formation of tumors on branches and trunks, weakening, difficulty in sap circulation, possible branch death.**
- **Olive Fly: Fruit drop, weight loss, increased oil acidity, depreciation of table olives.**
- **Olive Trees: Damage to leaves, flowers (crop loss), and fruits (premature drop).**

BIORIZON SOLUTION TO IMPROVE OLIVE TREE HEALTH AND ITS IMMUNE SYSTEM

BIORIZON has spent years developing a solution to this need over the past few years, and thanks to the properties of one of our microalgae hydrolysates, which contain significant amounts of defensive phytohormones such as salicylic acid, jasmonates, and natural defensive peptides, we can recommend strengthening the immune system of olive trees by applying:

ALGADEFENSE 1.5 L/ha every 2 weeks, either via foliar spray or drip irrigation. These treatments will help farmers reduce the presence of diseases in crops and, therefore, the need for chemical phytosanitary treatments.

CROP PROTECT 2.5 Kg/ha as a preventive or 5 Kg/ha as a curative foliar treatment against peacock spot, anthracnose, or tuberculosis.

CUPRACTIVE at 3 L/ha in foliar spray or irrigation. It enhances the effect of CROP PROTECT or other fungicides with which it is mixed.

These applications help reduce plant stress, strengthen their defense mechanisms, and can decrease the need for conventional phytosanitary treatments, contributing to more sustainable olive grove management.