Cultural practice of olive growing and its future

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Abstract

Olive belong to the order of Ligustrals, the Oleaceae family, and two sub species, Oleaster (wild olive tree) and Sativa (olive).Commercial olive belong to species Olea Europes. One of about 20 species of Olea. found in tropical and sub-tropical regions of the World. Only Olea Europaea produces edible fruit.

Varieties found in Pakistan are: Souri, Mordiolo, Rozzo-O-Frantoea, Morinello, Ascolano, Mission, Savillano, Namzanillo, Barouni, Syrian, Shimbalu, Cakir, Aysalik, Ammir, Erkenee, Memeli, Ammel, Manje, Walait and Dunda.Most varieties are self-sterile. Olive slow growing, over green, plant is sub-tropical. It can not stand extremes of sold or heat, but it found in temperate-hot climate and Mediterranean countries. Tree produces fruit after 6-10 years, It is grown at an elevation of 2,000 to 3,000 feet.

Tree life span is 50 years. In arid and coastal area it becomes an alternative bearing. The variety manzanilla large fruit with low growth habit variety. Mission have small fruit but high oil content with varieties Forestiera Neo-Mexicana are dwarf variety. Pakistan uses wild Olive (Olea cuspidata) as seedling and is grown 25-30 feet apart with inter feet. Some times it attain height of 40-60 feet. About 0.80 to 1.20 meter is an ideal height of the tree. The plant used as wind break and afforestation. In Pakistan it is grown in Kashmir, Fortsandeman, Peshwar, Swat, Rawalpindi, (Saran, Gari, chattar) Kheri, Murat (Cambellpur, Sekasar (Sargodha) and Rakh Ghonda (Jhelum district)

It is also grown in Syria, Greece, Egypt, Namabia, Ethopia. Olive grown in Algeria, Angola, Egypt, Libya, Morocco, South Afghanistan, china, Cyprus, Iran, Iraq, Jordan, Lebanonh, Turkey, Albania, France, Italy, Malta, Portugal, Spain, Yugoslavia and Australia. It also found in Asia, Europe and North Africa.

Normally 70-150 trees/hectare are grown. Olives can be presented in many styles like, whole, pitted, stuffed, halved, quartered slices, chopped or minced, live paste and olive salad.

Intoduction

Olive belong to the order of Ligustris, the Olacae family, and two subspecies, Oleaster (wild olive tree) and Sativa (olive). Commercial live belong to species Olea Europea. One of about 20 species of Olea is found in tropical and sub-tropical regions of the World. Only Olea Suropaea 1.produces edible fruit.

Climate

It needs mild climate with warm summer not exceeding 40 °C and cold winter not below 4 °C at night. Missions is more cold resistant than other varieties. Usually high humidity inhibits pollination. Winter chill is essential for flowering and fruiting. It could be grown in well drained perennial areas in Badin district if not water logged and soils are well drained. Sindh and Southern Punjab do not show good prospectus except under good management.

Soil

Olive trees adapt to a wide variety of soils with good drainage. It needs sandy soils. It can stand temperature up to 40C with enough soil moisture. High moisture content in the soil interferes with olive growth. Olive resistant to mild salinity. The spacing varies with the fertility of soil. It can grow from deep fertile soil to poor shallow soils. Best soil is calcareous, permeable loam or medium texture.

Varieties

Olive belong to species Olea Eurepea L. Two subspecies are: Olea Europea Oleaster and Olea Eurepea Sativa. Wild seedling called Oleasters.

Oil yielding varieties.

Amggdalifolaia (Greek), Arbequin cornicarba, Bianco, Caillet, Frontoi(Italian), Galega (Portugese), Moraiolo, Negrol, Nevadillo, Nevadillo Negro olivers, Pical (Spanish), Picholine, Morocaine (Moroccan), Salonenque (Franch), Saillerne, Verdeal (Portugese).

Pickling (or table) varieties.

a) Green pickling.

Manzanillo, Mission (American), Meski, Picholine (French), Zarazi

b) Black pickling variety

Volliotive (Greek)

Other varieties.

Argentate, Attica, Atrorubebns, Atrorubens, Agogia, Amellau, Atro rubebs, Attica, Amygdalolia, Agouromanacolia, Andramittni, Aglandeau, Ascolana, Ayvalik, Bouaquettier, Boultillan, Binncohilla, Biancuccia, Bianquette, Barouni, Bonita, Cavanillesii, Ceraticarpa, Cassaliva, correggiolo, Caniness, coratina, Carpellese, cerasuola, cucco, Correggiola, Daphnoelia, Empelree, Frantolo, Frantolio, Fiaschi, Galega, Gemilk, Gentile, Dilarino, Herrerae, Hojiblanca, Koroneiki, Kalamata, Koeria, KadeshLuques, Lucca, Leccino, Lechin, Leccino, Methonia, Mastoides, Mina, Manzanilla, Mission, Manzanillo, Mastoidis, Moraiolo, Meski, Memeckik Minerua, Ogliarola, Olivetta, Ogliarola, Ovalis, Olivastra di Montenero, Olivo Minuto, Ottobratico, Olice-di-Cerignola, Obliza, Oblitza, Pomiformis, Pisciottana, Pigale, Pendoullier, Pendolino, Picual, Picholine, Pollen, King, Rotondella, Rostrata, Racemosa, Regalis, Razzo, Rosciola, Rouget, Sanata, Agostino, Santa Caterina, Samertolla, Sigoise, Soury, Swan Hill, Taggiasco, Tarantina Tarascoa, Viridulla, Verdale, Vassiliki, Zutica.

Propagation.

Vegetative production based on a sexual techniques. Propagation done by ovule, Hardwood cutting or truncheon, suckers, leaf stem cuttings, grafting and micro propagation. Cuttings tooted by ; soft wood, hard wood and root cuttings, Ovuli and suckers. Budding methods are: patch or flute budding, ring or annular budding, T or shield budding. Grafting is done by : cleft graft, saw-kerf or notch graft, Cpei graft, side-grafting, whip and tongue grafting, root grafting.

Roots contain ovules, which are used for propagation 50% alcohol containing 4000 ppm of IBA gives better rooting. Pruning moderately and thinning of fruit change the pattern of alternate bearing. Pruning methods differ depending on the age of the orchard. Training my cause delay in fruit production. Thinning help in increasing fruit size.

Spacing

Close is spacing 15 X 15 feet or 195 plants/acre normal spacing is 15 X 20 feet or 145 plants/acre .Ridges are 20-30 inches high and 6-7 feet wide.

Fertilizer

Annual requirement of NPK are:

- Phosphate	20-60 kg	(40-130 IBS/acre)
- Potash	12-60 kg	(25-130 IBS/acre)
- Nitrogen	40-80 kg	(87-195 IBS/acre)

The physiological balance (ratio between foliar content expressed as percentage of any matter is N=60%, P_2O_5=10%, K_2O=30%.

Irrigation

Irrigation with maximum quantity of water tolerated by the soil, without causing leaching .In Mediterranean countries it is not irrigated but yield are depressed. Grown there on hilly areas do not mean its preference for these soils or aridity. In those conditions yields are affected. Irrigation methods are : flooding, furrow, sprinkler, drip or trickle irrigation. Micro irrigation is less than evaporation through the soil can make less effort for the plant to absorb the water. Micro-irrigation based on mini-sprinkler, micro-spatters, drippers and micro-tubes. Olive tree responds well to any amount of water best result achieved by rational applications.

Flower

It flowers May-June in Northern areas and November-December in Southern areas. They have thick, oily, plumply fleshed drupes and composite clusters of inflorescence. Olive produces a high percentage of imperfect flowers. Hydrogen Cyanamid used for initiation of flowers.

Harvesting

Fruit picked when its color change from deep green to straw or cherry red colour. The time of harvest depends upon the type of processing used. Olive are green at first, turn dark blue or purplish when ripe. Hard picking used for harvesting. Mechanized harvesting using sweeper and suction devices.

The bitter taste in olive is due to presence of Oleuropein, which is treated with Sodium or Potassium hydroxide. The bitter ester readily hydrolyzed with Sodium or Potassium hydroxide and fruit loses for its aroma and flavor. Green olives are processed in two principal ways: with fermentation and without fermentation. Untreated green olive in brine is preserved by natural fermentation. Crude olive-pomac oil obtained by treating the olive residue (Pamace) from previous pressing with solvent.

Olive oil is blend of refined and virgin olive oil also called pure olive oil. Virgin olive oil, extracted by thermal condition without deteriorating the oil. The descriptive terms of virgin oils are “Extra fine”. Ordinary oil is the oil obtained from virgin oil by refining method. Olive pomace refining consist of neutralization, declaration, deodorizing, winterization separating the oil and recovering the solvent During the preparation of green pickled olives it is necessary that :

- To control the concentration of the sodium hydroxide used for treating the olives to destroy the bitter glucoside.
- To control the concentration of slat used in the brine.
- To determine the acid production in the brines of the fermenting olives by nothing the progress of increase in titratable acidity and decrease in pH values.
- To determine fermentable compounds (sugar and mannitol)
- To recognise the various desirable bacterial to detect micro-organisms causing spoilage.

Yield.

Yield of 50-150 kg olive per tree are common in well maintained orchards with about 30-50 trees per acre. Since it yields about 155 oils, 0.5 to 1.0 tons of oil can expected per acre under good management.

Insects, pest and diseases.

Insects, pest and diseases are as under:

- Soothy mould (Fumago Vagens)
- Peacock spot (Cycioconium Oleaginum)
- Bacterial knot (Pseudomonas Savastroi)
- Olive beetel (Phloeotribux Olease)
- Olive moth (Pray Soleaellus)
- Olive fly (Dacus Oleae)
- Paylla (Euphyllura Olivine)
- Black olive scale (Saissetia Oleae)
- Thrips (Lwthrip Oleae)
- Olive knot (Pseudomonaw or Bacterium Savastanoi Smith)
- Sphaeropsis dalmatica.
- Gloesporium Olivarium.
- Cylindrosporum olivae.
- Verticillium Alboatrum.
- Rot fung.
- Olive scale (Aspidiotus hederae)
- Black scale (Saissetia oleae)
- Olive Moth (Prays Olear B)
- Olive Fly (Dacus Olear G)
- Olive scale (Saissetia Olear B)
- Thrips (Liothrips Olear)
- Olive pysllid (Euphyllur aolivin B.Glyphondes-Unionalis H,Scolytids (Pholeotribus Scarabeoides)
- Otiorrthynchus Weevil (Otiorrhynchus sp) and Euzophers pinguis Haw etc)
- Peacick spot (Cycloconium oleaginum c)
- Olive knot (Pseudomonas Savastanois)
- Soothy mould (Capnodium, cladosporium and Alternarnia)
- Verticillium Wilt (Verticillium Dahliae K1)
- Olive shield (Macrophoma Dalmatica Th)
- Soapy olive (Gloeosporium Olivarium A1)
- Physiological diseases: Gummosis, Necrosis of the fruit, short berries, softnose, split pit

Nutritional Value.

Nutritional value of olives are as under:

- Water	75%
- Protein	1%
- Fats	14%
- Total hydro-carbons	4% (fibre-0.0%) Ash – 6%
- Calories in 100 grams	135

Olive oil contains:

- 85% glycerides of oleic acid
- 6-9% glycerides of palmitic acid
- 4% glycerides of Linoleic acid small % of glycerides of Stearic acid.
- Saturated fatty acids
- Mono-saturated fatty acids
- Chlorophyll gives green color
- Carotene gives reddish pigment.
- Volatile aromatic components gives, odour and flavor
- Polyphenol is the part of flavor
- Tocopherols- Vitamin E (Elpha-tocopherol) gives antioxidant property.
- Sitosterol is major sterol
- No cholesterol

Olive oil and its uses

- Olive oil contains 3.5 ot 22% poly-unsaturated fatty acids, having essential fatty acids like linoleic and linolenic acid ratio.
- It posses beneficial properties like glycien structure
- It contain alpha-tocopehrol act as vitamin-E and Carotene as Pro-Vitamin A, show antioxidant activities.
- Due to Oleic acid control .it is best tolerated by stomach
- Olive is best in Hypercholorhydric gastitis and gatrodeodenal ulcers.
- Olive oil is helpful in chronic constipation.
- Olive oil inhibits hepatobiliary secretion during gallbalader emptying time.
- Cholelithiasis (biliary calculi) caused due to saturated fats and cholesterol increased bilary excretion of cholesterol and reduction in hepatic synthesis of cholesterol. Olive oil reduces the incidence of bilary calculi.
- Breast feeding provide 4-5% of their calories in the forms of polyunsaturated acids, low linoleic acid intake delay growth, produce skin, hepatic and metabolic disorder seed oils promote peroxidative phenomena .
- Olive produce lineic:linolenic ratio in balance state.
- Olive oil contains antioxidants Vitamin E which help in defense mechanism in old age.
- Skin lesion in old age are reduced by the use of olive oil.
- Olive oil used as medicine that cures illness like skin disorders, obesity, diabetes, multiple scleroses, high blood pressure, excessive bone growth, reduced aging process, reduced blood serum-cholesterol, heart and vascular diseases, lower gastric acidity, protecting against ulcer.
- Olive oil provides better digestibility and absorption but also show mild laxative effect.
- Olive oil is taken during growth and latter adult-hood avoid calcium loss
- Atherosclerosis prevention is to lower animal fats, replace with mono-unsaturated rich olive oil hope in disease prevention and olive oil consumption reduces the coronary infections.

Future Research

Future research is needed for table processing, following are few suggestions:

- Research required for fruit should be of good size and shape, good flesh to stone ratio, flesh should be delicate, flavor some and firm, skin should be fine, flesh should easily be separable from stone.
- To study the methods of sterilization or pasteurization, addition of preservatives and refrigeration.
- Preservation through natural fermentation in brine, by heat treatment or both.
- To study of unripe olive darkened by oxidation bitterness removed by alkaline lye, and heat sterilization process.
- To study black olive in brine loss firmness, lose glossy skin and surface depression can be controlled by dry salt treatment.

- To study the effect of use of additives in order to improve preparation keeping quality and color, normally ascorbic acid and its sodium and potassium salts. Lactic acid, citric acid, ascorbic acid, ferrous gluconate (Fe in the fruits) and sodium hydroxide.
- To study the effect of ferrous lactate (up to 0.15g/kg of Fe in the fruit) used for darkening the fruit.
- To preserve and pack fruit and table oil free from abnormal flavor and odorous, or right stage of ripeness, abnormal fermentation, uniform color.
- To study splitting of olive when placed in brine alkaline treatment and with or without vinegar.
- To study the physiological aspect influencing the level of production conservation of fruit and or paste of oil extraction.
- To study the biocenosis and control of certain pests.
- To study the specific cultivation methods, better drainage, new methods of pruning and thinning proper use of fertilizer.
- Research is needed to develop more resistant varieties, root stocks adapted to soil conditions and resistant to pests.
- Future research is needed to reduce the cost of harvest including uniformity of ripening and mechanization.

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