CITRUS CULTIVATION IN N.W.F.P

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Citrus fruits in all the shapes, sizes and colors are the most attractive, fragrant and appetizing besides having great nutritional values. They are one of the richest sources of vitamin C and contain 3-4% sugar and minerals such as calcium and magnesium in appreciable amounts, essential for proper health and vigor. These fruits are known to be the natives of Southeast Asia (Indonesia and China) but they are now extensively grown almost throughout the world under tropical and sub-tropical conditions where the soil and climatic regimes are quite favorable for their growth and yields. At the time of partition of the sub-continent Punjab and NWFP were the main citrus producing provinces with an area of 12000 hectares and annual production of about 480,000 tones. The share of NWFP was estimated as 2000 hectares with an annual production of 8000 tones. The main citrus fruits grown were sweet oranges followed by grape fruits, sweet limes and lemons. In the past, because of suitable soil and climatic conditions at varying elevations and attractive prices in the markets there had been greater focus on deciduous fruits. Nevertheless, area under citrus fruits has expanded to about 4500 hectares with a production of 40,000 tones. The main citrus growing areas in the province are:

1. Peshawar, Charsadda and Swabi Districts: Sweet oranges, Sweet lime Grape fruits.
2. Malakand and Dir Districts: Sweet oranges, Grapefruits Sweet limes
3. Haripur and Mansehra districts: Sweet oranges, Grapefruits, Sweet Limes, Lemons
4. Bannu and Dera Ismail Khan Districts: Sweet oranges, Grapefruits Sweet Limes and Lemons

Climate

Citrus cultivation is limited to the plains, foothill areas and valley surrounded by the hills creating peculiar microclimate with mild winters, such as in Dargai and Dir areas. Commercial plantations are found in areas where winter frosts are not serious problems. It is observed that limes and lemons are less tolerant to frosts followed by tangerines, grapefruits and sweet oranges. The other important climatic factor limiting citrus cultivation is the availability of water. In Barani areas where adequate rains are well distributed during the growing season, from 500 to 600mm selected citrus varieties are cultivated. In the areas where canal water or tube well water is available citrus varieties are grown on commercial scale. Excessive rains or irrigation during the flowering period causes shedding of flowers and the developing young fruits. A temperature range from 30° to 40°c is found good for citrus tree growth and fruit yields. Young plants need protection against frosts from end November to early February.

Soils

In NWFP citrus fruits are grown on a variety of soils. However, well drained loamy clay and sandy loam soils are good for better performance of the trees. Soils that are highly water- logged and heavily infested with salts are not fit for citrus cultivation. Similarly pure sandy and gravel soils are not good for commercial orchards. The pH value ranging from 5.5 to 6 is found most suitable for the citrus trees. The growers

also avoid moist and wet soils for large-scale commercial plantations.

Planting and Spacing

Planting is usually done during the spring and late summer season in September. Healthy and vigorous plants are selected for establishing profitable orchards. The pits are dug out at least one month in advance and are filled up with topsoil, silt and well rotten farm yard manure in 1:1:1 ratio. Planting is generally done in the morning time. Trees are spaced 6 to 7 meter apart depending on the variety and the fertility status of the soil.

Propagation

Most of the citrus varieties are propagated asexually. The standard method used is the 'T' or Shield budding. The climatic conditions, types of soil and the compatibility of the scion variety determine the choice of the rootstock. Rough lemon is no doubt a widely used rootstock in the world but Sour Orange (Citrus aurantium) is still being used as a rootstock as it is comparatively more tolerant to cold and bears fruits of better quality. The fruit has thin and smooth skin and is juicy in which the sugar and acidity are well blended. However the bud-take, success is low as compared to rough lemon. In Haripur and D I Khan rough lemon is preferred where the soils are light and winters are less severe. Budding operations are performed during the spring season or in September when the seedlings attain a thickness of pencil size and there is enough cell sap in the stem. Good nurserymen always try to take bud-wood from the healthy, vigorous and true to the type mother trees. They also maintain proper record of the citrus varieties in the nurseries. However there is no registration of the fruit nurseries in the province and so far no legal measures are applied for quality control of the plants and check the entry of unhealthy planting material from other parts of the countries. The budded plants are generally ready for transplanting after 8-12 months depending on the seasonal growth.

Irrigation

The citrus orchards are generally planted where canal or tube well water is available. In Barani area or in case of slopping hills, planting is done according to the patterns of rains. At least 500 to 600mm of rainfall is required during the vital growth period. Young plants are watered immediately after transplanting and thereafter on weekly basis. Full-grown trees are watered at 10-12 days interval during the summer and at 15 days interval during winter depending on the amount of rains received. Water is withheld during the flowering period as to avoid shedding of flowers and the young fruits. In young orchard irrigation channels are drawn to water the individual plant properly but when the trees attain height and vigor basin or flood system irrigation is followed. In the early years of the orchards leguminous fodder crops or vegetables are grown in between the tree lines for profit and maintaining fertility of the soil; Exhaustive crops like maize and tobacco have been reported to show negative affect on the health of the orchards. Over- wetting of the soil around the stem is also avoided as it encourages foot rot and other diseases.

Manures

Citrus trees need manures regularly in judicious amounts for better growth and quality yields. Under-nourished trees lack in proper health and vigor and are exposed to the attack of insects and diseases. Wise farmers apply farmyard manure during the winter season at least one month before flowering. It is applied

at the rate of 40-60 g per tree and is well mixed in the soil in root zone area around the trunk. With irrigation water and winter rains the food contained in the farmyard manure becomes available to the plants to spur growth in the spring season. Some farmers also practice green maturing. For this purpose berseem or shaftal crops (Leguminous Fodders) are grown which after taking 2-3 cuttings buried in the soils.

Nitrogenous fertilizers are also applied to supplement manures and for additional growth the amounts of fertilizers are regulated according to the age of the trees and applied in 2-3 equal dozes. First application is done before flowering and the remainders after fruit setting. The nitrogen requirements may vary from 125 grams to 500 grams per tree. It may be applied in the form of Urea or Ammonium sulphate.

Pruning

Pruning is an important practice in the citrus orchards. In the young plants pruning is done to develop a good framework and spread of the tree. However, pruning in the full-grown trees is restricted to the removal of diseased and dried branches and extra growth over crowding the top of the tree. Any growth coming out from the trunk below the bud union is removed in the beginning.

Harvesting

Citrus varieties budded on sour orange root stock start bearing fruit after 4-5 years of their transplanting and continue up to 40 years of age. However, citrus varieties rose on rough lemon rootstock starts bearing after three years and their economic bearing age is about 10 to 12 years. Picking is generally done with hand using ladders. Progressive farmers have started using scissors for picking fruit from the branches especially for elite markets. On an average a full-grown tree gives 500 to 700 fruits.

Varieties

Colonel Brown who established Agriculture Research Station at Tarnab (Peshawar) in 1909 also laid the foundation of citrus culture on modern lines. He collected citrus germplasm from the leading countries and after proper experimentation introduced the following varieties in the province.

Sweet Oranges:

1. Washington Naval: It bears large sized, seedless fruit. It is a shy bearer. Fruit ripens in December.
2. Mozambique: Fruit size is average. The shape is round or oboutate with a ring at the base. Its skin is thick and rough and the juice is white. The fruit ripens in middle of December.
3. Jaffa: Its fruit is of medium size and is round in shape and yellow in color. The juice is white and in abundance. It ripens in January.
4. Blood Red: The tree is large and healthy. Fruit is large to medium and shape is round to obouate. Juice color is blood red and it ripens at the end of January.
5. Ruby Red: Tree is medium and the fruit size is also medium. Its shape is oboutate to ellipsoid and the skin is smooth. Juice is abundant, red in color and rich in flavor. It ripens a bit later than Blood Red.
6. Valencia Late: Size is medium to large. It is yellow in color and the juice is white and in abundance. It ripens late in March and April. It is a good variety for making beverages.

Grape fruits:

The leading varieties are Duncan, Marsh Seedless and Foster

Sangtra (Tangirine):

Nagpuri and Betwal are the old varieties but at present these are not grown on commercial scale.

Lemon

The current varieties of Eureka lemons and Lisbon lemons are being replaced by the Chinese cultivars.

Limes

The old varieties are Kaghzi lime and Sweet lime. Sweet lime juice is becoming popular among the consumers.

Insects and Diseases

Citrus trees being ever green and widely cultivated under various types of soils and climatic condition are attacked by a number of insects and diseases causing serious damage to trees and the fruits. Some of the important pests and diseases inflicting heavy losses are mentioned as under:

Pests

1. Cutworm
2. Leaf miner
3. Citrus Psylla
4. Mealy bugs
5. Citrus leaf roller
6. Citrus black fly
7. Citrus scales

Diseases:

1. Citrus Canker
2. Wither tip
3. Foot -rot
4. Blight
5. Viruses

In order to obtain economic yields controlling of these pests and diseases is very essential. Prevention is always better than cure. Healthy and vigorous trees have resistance against such pests and diseases. Healthy orchard management practices greatly help in minimizing fruit losses. Experts are recommending integrated pest management practices and discouraging the use of pesticides as these poisonous chemicals pose great hazards to human health and environment.

Causes of Decline in Citrus Trees

The present citrus plantations are facing great decline. There are a number of reasons for this decline. Some of the important reasons are given below:

- Poor fertilizer management
- Lack of effective pest control
- Unhealthy root stocks already affected with viruses and diseases
- No pruning practices
- No selection of healthy bud wood.
- No registration of the fruit nurseries and quality control of the nursery plants. Lack of problem oriented research and extension support.

Marketing

Marketing is the weakest link in citrus production. No standard packing and grading practices are followed to catch good markets. Growers are at the mercy of middlemen or the contractors who buy the crops in advance at a very low price. Peshawar Valley, Mardan and Dir Districts produce sweet oranges of the best quality, which are preferred by the consumers in the country and as well as in the external markets. Citrus industry would receive great boost in NWFP if export trade is organized on scientific lines.