

INTEGRATED PRODUCTION STANDARDS

“SWAT VALLEY AMLOK”

PAKISTAN

1. CHOICE OF ENVIRONMENT AND GROWING SUITABILITY

The evaluation of the soil and climatic conditions of the cultivation area is of fundamental importance in reference to the requirements of the crop. The choice shall be particularly accurate in introducing new crops and/or varieties in the cultivated environment.

1.1 Soil

The persimmon adapts to different types of terrain: any terrain suitable for the cultivation of fruit trees, with a subacid or subalkaline pH, as long as it is not excessively sterile or dry, can successfully host a specialised system of this type of fruit. The best productive results are nonetheless obtained in a medium-mixed soil, with loose tendencies, which is constantly fresh, rather fertile and pH neutral. Negative effects in cultivation are due to an excess of Sodium (above 100 ppm), Boron (above 1 ppm) and Manganese (above 10 ppm).

1.2 Climatic requirements (critical conditions for the cultivation of Amlok)

The parameters that mainly condition cultivation are listed in the following table:

Climatic parameters	Critical conditions
Aeration	well aerated areas, especially as the fruits develop, before harvesting
Rainfall	Areas of optimum summer rainfall. low rainfall, not compensated by emergency water supplies, may make the cultivation anti-economic due to a smaller size fruit

2. CHOICE OF VARIETY AND PROPAGATION MATERIAL

2.1 Choice of varieties

The variety must be chosen by evaluating the specific climate and soil conditions in which we are working. Generally speaking, once the environmental suitability has been found, those cultivars that are more accepted by the market for the qualitative characters of the fruit are more likely to be chosen. The varieties and/or groups of varieties recommended for the "*Swat Valley Amlok*" are the common, seedless ones that are inedible upon picking and the *Tor Amlok* seeded variety that is edible upon picking, and has very small fruits that are used after sun-drying on the plant.

2.2 Selection of rootstock

The rootstock recommended is the *Diospyrus lotus*, which tolerates low temperatures and dry conditions, and is averagely sensitive to the bacterial tumour (*Agrobacterium tumefaciens*). The *Tor Amlok* variety is also used as a rootstock for the commercial common varieties.

2.3 Choice of breeding material

The propagation material must be of good agronomic and sanitary quality.

We generally recommend striplings that:

- grow straight and upright,
- are well rooted,
- are "fully welded" at the graft point,
- show no signs of dehydration,
- have no mechanical damage from being uprooted from the nursery,
- have no serious, unhealed wounds, caused by hailstones.

3. SYSTEMISING AND PREPARING SOIL FOR PLANTING

3.1 Works for the system

In the case of new plantings, the first operations to be performed, only if necessary, are clearing rocks and levelling. If levelling is performed, movement of the earth is limited to avoid compromising the fertility of the layer explored by the roots or the slope stability. If the levelling involves large amounts of the active soil layer, it is advisable to set aside the topsoil and then redistribute it onto the surface after the levelling.

In hilly areas, where there is a high risk of erosion, it is important to provide suitable systems depending on the type of soil management.

Slopes up to 10% must have a unified cross systemisation, which consists of having crosswise rows and performing the work along that direction. With gradients of 10-20%, operations must be performed

crosswise. When the slope is greater than 20%, it is advisable to systemise in *rittochino*, which consists of positioning the rows and carrying out cultivation operations according to the line of the maximum slope. In this case the no-till technique is appropriate and especially turfing.

The work on said system begins with digging the holes in correspondence to the points for setting the plants of the size of 0-1 x 0-1 m with a depth of 1.0 m. Then it is recommended to make a base fertilisation with seasoned manure. The hole is then covered by filling to the bottom with surface soil. The best time for performing the work is the summer or early fall, depending on the weather conditions.

It is preferable, when possible, to set out the plants in late autumn - early winter, because this reduces transplant stress. Spring planting, on the contrary, in the case of dry springs can compromise the grafts and emergency irrigation is required.

3.2 Systems and planting distances

In Square systems, the trees are distributed according to a geometrical arrangement to form rows parallel to each other and with areas between rows which allow the transit of people and machines.

The planting distances and forms of cultivation aim at obtaining fruits with high quality and high productive capacity of the orchard. In principle the forms must be chosen that allow maximum light penetration in all parts of the foliage and that facilitate all the cultivating operations (pruning, thinning, harvesting). The currently prevailing tendency is to obtain plants with higher density, with forms of cultivating that are freer, allowing a more rapid entry into production, but which provide a shorter production cycle. The planting system recommended for the persimmon in the Swat area are that in volume can be ascribed to the pyramid.

The recommended system distance is 6 metres between the rows and 6 between the plants.

4. MANAGEMENT OF THE TREE AND FRUITING

Where the breeding form used is the pyramid or vase, the culture pruning does not require particular precautions.

Production pruning must be carried out to ensure a balanced renewal of the vegetation so as to avoid production alternation and to ensure the even distribution of the fruits in the foliage, avoiding excessive weight on the secondary branches.

5. SOIL MANAGEMENT

Soil management and the related processing techniques are aimed at improving the conditions for crop adaptation to maximise the production results, control weeds, improve nutrient efficiency by reducing losses through leaching, runoff and evaporation, keep the land in good structural condition, prevent erosion and landslides and preserve the organic matter content and help rainwater and irrigation penetration.

In more fertile and damp terrains, we recommend you adopt a system of permanent grassing, controlled starting from the third year.

6. FERTILISATION

Pre-planting fertilising must be carried out by distributing organic matter with the aim of improving the physico-chemical and microbiological characteristics of the terrains. This operation, carried out first on the modified leader system, may interest the entire surface or be localised to near the future holes where the plants from the nursery are to be placed. It should be carried out before trenching and allows the amendments to be incorporated. Considering the reduced requirements of cultivation during the first years of the system and the washing away and insolubilisation processes that the fertilisers undertake, the use of mineral fertiliser based on nitrogen, and potassium in this phase should be avoided.

Before the plants are set out, they should not be given nitrogen fertiliser; at this stage instead it is necessary to focus on the enrichment of soil with organic matter by using, in the planting year, a green manure, or burial of seasoned manure in the hole dug at the time of planting. To determine more correctly the base fertilisation, a physical and chemical analysis of the soil should be made. For each homogenous plot, at least the following parameters should be determined: the structure, texture (sand, silt, clay), pH, total lime, active lime, total nitrogen, available phosphorus, exchangeable potassium, organic matter, exchangeable calcium, exchangeable magnesium, cation exchange capacity, and exchangeable sodium.

The production fertiliser must keep the nutrient availability in the soil proportional to the needs of the plant in the different phenological stages to achieve a balance between vegetative and productive growth. It must be made on the basis of removals, water availability and soil analysis.

Removals depend on the production, destination of the pruning residues and the overall management of the system, such as the presence or absence of turfing, operations of green manure, irrigation with groundwater etc.

During the production phase, we recommend the distribution of inorganic fertilisers based on nitrogen, phosphorus and potassium at the beginning of spring, 21 days before flowering.

Even in this case, nitrogen is the element to which the plant reacts the most; the more divided its use, the more efficient the plant's response; it is obligatory to use it every year, in divided average doses of 80 kg/ha. For phosphorus and potassium 120/200 kg/ha is recommended.

7. METHODOLOGY FOR EVALUATING IRRIGATION NEEDS

We still do not know the precise water requirements of the persimmon nor its cultivation coefficients (Kc) that would allow a maximum evaporation estimation (MEE) of the persimmon and therefore, considering that the cultivation is not particularly needy, we recommend irrigation interventions in the summer during the most critical moments until the fruit is ripe.

The irrigation method generally used in *Swat Valley* is the flood and basin surface method.

8. HARVEST

The fruit cannot be harvested when fully ripened.

For the common varieties, the best moment is chosen based exclusively on the changing colour of the peel.

Based on this, we can consider there to be three stages:

- green
- yellow
- orange

The fruit must be harvested when it is just changing colour (from yellow to orange), that is when the main colour of the peel has completely lost all the green of the chlorophyll to make way for that of the carotenoid pigments.

If the fruits are picked too early, when they are still in the first (green) phase, they will not reach the correct organoleptic characteristics or ripe colour and they cannot be preserved in the fridge.

It is not advised to pick the fruits too late, when they are already over-ripe, due to the delicateness of the flesh and especially because of the stalk that may damage the fruit by pricking the peel and causing the fruit to rot. In any case, the fruit is not edible at the moment of picking; it is necessary to wait for the sugars to transform in order to taste it.

The fruits are hand-picked and, bearing in mind that some fruit will be riper than others on the same plant, it is a good idea to harvest over several occasions (three or four).

The fruits must be removed with the calyx and placed in the harvest boxes trying to leave as little as possible of the (clean-cut) stalk of the fruit and taking care not to bruise or damage the fruit.

The product is placed in two- or three-level telescopic boxes, or in single layer "plateaux" or trays, to avoid damaging the fruit in the next ripening stage. The latter is chosen for an extra, first-class product.

Regarding the Tor Amlok variety, which is edible at the moment of picking, this fruit is ripe when its peel changes to a dark purple-black. To obtain the best possible quality and preservability, harvesting starts in November, only when the fruit has completely dried on the plant. Should the fruit accidentally fall from the plant it is dried in the sun.

The best moment is chosen based exclusively on whether the fruit falls from the plant when the branch is

shaken by hand. For fruits found on the higher branches, manual tools are used to knock them down.

The fruit can be eaten or dried from the moment of picking.

9. PHYTOSANITARY DEFENCE

Problem	Intervention criteria	Products recommended
Fruit fly <i>(bactrocera dorsalis</i> <i>bactrocera zonatus)</i>	<u>Chemical interventions:</u> take action in the presence of eggs. In the event of capture, check for prick points on the fruit. We recommend the use of yellow chromotropic traps (for example, Rebell) baited with Trimedlure	Etofenprox (maximum 2 interventions per year as necessary) Spinosad only to be used with specific, ready-to-use bait (maximum 5 applications per year)