

Olive Nursery Certification Guidelines

Guidelines for the Development of Germplasm
Units Pre-basic, Basic and Production of
Certified Olive Nursery Plants



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Ministry of National Food Security and Research
National Seed Development and Regulatory Authority
(NSDRA)





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**GUIDELINES FOR THE DEVELOPMENT OF THE GERMPLASM UNITS (SOURCE BLOCKS) AND
PRODUCTION & CERTIFICATION OF NURSERY PLANTS**

Flow Chart — Nursery Certification

1	Identify and define the source/cultivar (mother) plants from which propagation material will be taken. Cuttings should be obtained from a certified and registered Multiplication Block
2	At the time of collecting cuttings, visual checks must be carried out, and documentary records for further verification of the presence/absence of transmissible pests and diseases must be maintained. In case of doubt, subject plants to laboratory sanitary tests.
3	Cuttings should be taken from the middle part of one-year-old shoots (flexible semi-hardwood); length $\approx 7 - 10$ cm, and diameter of $\approx 0.4 - 0.7$ cm with 2–3 active nodes.
4	Check and maintain records of the quantities of usable propagation material (cuttings) that have been collected from each mother (source) plant. The nursery should maintain a map with complete traceability records of the source and origin of the cuttings from the respective multiplication block plants. Variety-wise detailed records and the success ratio of plant development from cutting must be documented.
5	Store the cuttings collected from mother plants in a cold and humid place to avoid dehydration during transport. Upon arrival at the nursery, after their preparation, immediately dip cuttings in rooting hormone (IBA or NAA 3000-4000 ppm) for a few seconds, then transfer to the sterilized mixture germination beds.
6	Place cuttings homogeneously in length with at least 2 inches distance between cuttings. Verify the health of the growing media (soil, mixture, etc) where the plants will be propagated and raised to avoid the occurrence of pests – nematodes, soil fungi. (The adoption of soil solarization is strongly recommended, as it is a simple method and without costs, which could be mandatory – in this case, very easy to check by the inspector)
7	Try to maintain ideal environmental conditions throughout the rooting (Temperature and Humidity)
8	Maintain and check the cuttings until rooting occurs (monitor root development and survival).
9	Sterilize tools, containers, and growing media before reuse by disinfecting with a 10% sodium hypochlorite solution.



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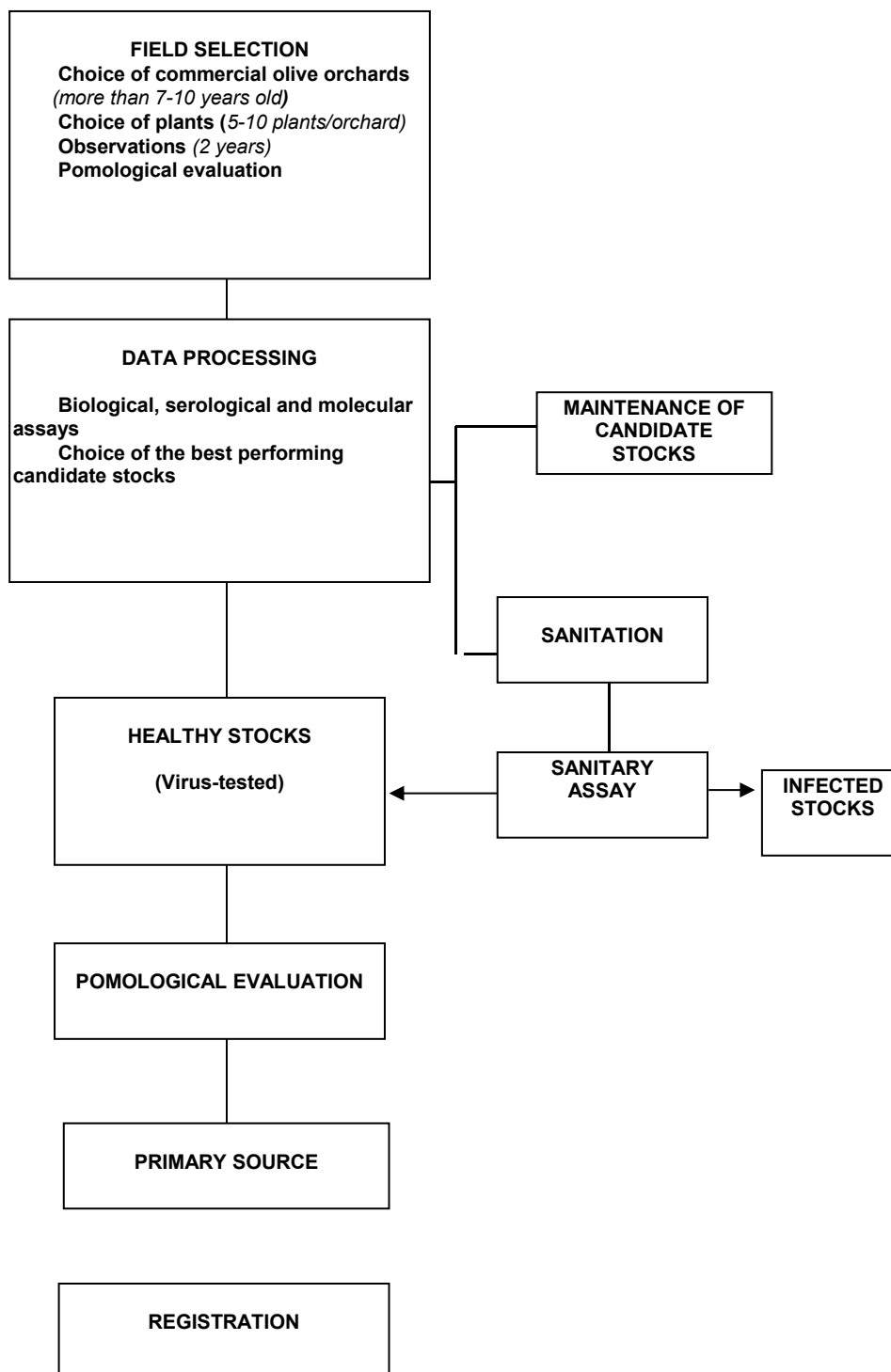
10	Carry out regular visual inspections for pests and diseases during the production cycle in the nursery (check plant condition, absence of defects/damage/disease).
11	Check minimum volume and characteristics of containers (e.g., presence of holes in polybags for drainage/rinsing not only in the bottom but also on the side).
12	- Nurseries should sell plants between 12 to 24 months old. - The nursery plant height, at the time of certification, should be from 50 cm to 75 cm. It must be grown in poly bags having at least a height of 20 – 25 cm, with a 10 – 15 cm diameter, and having side holes for proper drainage. - The nursery plant should be on a single stem. - The nursery plant should have a well-developed root system.
13	Label/qualify plants certifying that they come from a controlled supply chain (traceability). Each certified plant must carry a tag with: - Nursery name or & registration number. - Variety name & rootstock. - Certification number & lot number. - Grafting date & packing date. - Expiry (validity period). - FSCRD logo/seal.



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Flow Chart for Olive GPU Establishment
- Scheme for the production of the
«Primary Sources» (Candidate Pre-basic mother plants)



- Data sheets for the identification of the olive primary source (variety) are referred to the description reported in the official national Pakistani list of registered varieties. If needed, the



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Molecular Analysis can be carried out by several officially published methodologies with the following bibliographic references.

**GUIDELINES FOR IN VIVO GROWING AND PRODUCTION OF
“PRE-BASIC” PROPAGATING MATERIAL**

Facilities

The Conservation for the Pre-multiplication step shall be carried out in an insect-proof screenhouse.

The screenhouse size shall allow the proper development of plants proportioned to the container volume; moreover, the following requirements shall be fulfilled:

- a. Isolation of growing containers from the ground or the flooring by:
 - i. A suitably designed French drain, covered with fine gravel or any inert material providing for effective drainage;
 - ii. A layer of concrete or a different material. In such a case, containers, flats for seedling beds, and acclimation benches shall be placed on supports at least 20 cm high to provide isolation from the ground;
- b. A French drain, all around the screenhouse, at least 80 cm wide and at least 20 cm deeper than the inside flooring;
- c. Isolation from surface water flow through a kerb or a similar isolating structure, declared appropriate by the locally competent National Plant Protection Organization;
- d. Hard roof and walls with a double 20/10 mesh (20 wires/cm warp and 10 wires/cm weft) net and entrance with double-net walls and double door.
- e. If not available, in an open field free from nematodes, soil-borne pathogens, and waterlogging, must maintain 500 m isolation from any uncertified olive plant and other vegetation within 20 m.
- f. Maintain 3.0 m plant to plant and 5.0 m row to row distance

Growing and production

- a. The “Pre-basic” material shall be maintained and propagated in a screenhouse and grown in containers of appropriate volume;
- b. The soil or growing medium for containers, seedling beds, rooting and acclimation shall be found free from the nematodes *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum*, and from the fungus *Verticillium dahliae*; freedom from the above shall be substantiated by an official document;
- c. The containers and flats for rooting, acclimation, and seedling beds shall be kept at 20 cm at least off the ground;
- d. Before use, the containers and flats for rooting, acclimation, and seedling beds shall be disinfected with a 2% sodium hypochlorite solution;
- e. Implements shall be at all times disinfected with a 10% sodium hypochlorite solution between cuttings.



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GUIDELINES FOR IN VIVO GROWING AND PRODUCTION OF
“BASIC” PROPAGATING MATERIAL

Part I - Facilities

I.A Mother Plant Blocks

“Basic” Scion Mother Plant (ScMP) and Seed Mother Plant (SMP) blocks shall meet the following requirements:

- a. They shall be established on soils that respond to the normal agronomic and health requirements and found free from the nematode *Xiphinema diversicaudatum* and from the fungus *Verticillium dahliae*; freedom from the above shall be substantiated by an official document;
- b. They shall be established on soils on which none of the tree crops have been grown for at least 3 years;
- c. They shall be separated from neighbouring plots by a surrounding zone, at least 20 m wide, kept free from any vegetation; such a limit
 - i. Is increased to 30m when any tree crops are present;
 - ii. Is reduced to 10m when freedom from the nematode *Xiphinema diversicaudatum* is ascertained by the Regional Phytosanitary Service or in case protective barriers are created (e.g., ditches, furrows, etc.);
- d. They shall be isolated from surface water flow;
- e. Irrigation water shall be found free or cleaned up from harmful organisms in accordance with this technical requirement; freedom from the above shall be substantiated by an official document;
- f. The planting distance shall allow the normal cultural operations and the related checks;
- g. The plants shall be numbered on the spot in a progressive order and in an indelible fashion;
- h. In the plot, the rows shall be complete and distinct per plant accession; if different accessions are grown in the same row, they shall be separated by a double inter-space;
- i. Scion mother plants (ScMP) shall not be kept for more than 30 years since their establishment;
- j. Seed mother plants (SMP) shall not be kept for more than 40 years since their establishment;
- k. The blocks shall be kept under continuous surveillance to control pathogens, pests and weeds;
- l. Any delivery of material by the Pre-multiplication Centre (PC) shall be at all times recorded and immediately notified (by fax and/or email) to the locally competent National Plant Protection Organization and to the relevant Phytosanitary Service of the final user;
- m. Implements shall be at all times disinfected with a 10% sodium hypochlorite solution between cuttings.



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Part II- Production

“Basic” material in the increase blocks (grafted and self-rooted plants) shall be produced soil-less.

II.A. Seedling beds in flats

- a. Soil-less flats shall not be placed on the ground, but kept at least 10 cm at least off the ground;
- b. The growing medium shall be found free from the nematodes *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum* and from the fungus *Verticillium dahliae*; freedom from the above shall be substantiated by an official document;
- c. before use, the flats shall be disinfected with a 2% sodium hypochlorite solution.

II.B Grafting and Sapling Beds

- a. The area intended for the establishment of grafting and sapling beds shall be isolated from surface water flow and separated by a surrounding zone at least 2 m wide, kept free from any vegetation;
- b. The soil or growing medium for plants in containers shall be found free from the nematodes *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum* and from the fungus *Verticillium dahliae*; freedom from the above shall be substantiated by an official document;
- c. The growing containers, of appropriate volume, shall be isolated from the ground by ;
 - i. a layer of fine gravel or any inert material providing for effective drainage, at least 10 cm high; when mulching films are used, the minimum height of the French drain is reduced to 5 cm;
 - ii. a layer of concrete or a different material; in such a case, the containers shall be placed on supports at least 20 cm high;
- d. The plants shall be subdivided and numbered in homogeneous lots per accession, easily identifiable; the planting layout shall be reported on a map;
- e. Irrigation water shall be found free or cleaned up from harmful organisms in accordance with the technical requirements; freedom from the above shall be substantiated by an official document;
- f. Implements shall be at all times disinfected with a 10% sodium hypochlorite solution between cuttings.

II.C. Rooting and acclimatation structures

- a. Rooting and acclimatation structures shall be kept at least 20 cm at least off the ground or properly isolated;
- b. The growing medium for rooting shall be sterilised; the growing medium for acclimatation shall be found free from the nematodes *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum* and from the fungus *Verticillium dahliae*; freedom from the above shall be substantiated by an official document;
- c. Before use, the flats shall be disinfected with a 2% sodium hypochlorite solution.



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GUIDELINES FOR IN VIVO GROWING AND PRODUCTION
OF “CERTIFIED” PROPAGATING MATERIAL

Part I - Mother Plant Blocks (MPB)

“Certified” Scion Mother Plant (ScMP) and Seed Mother Plant (SMP) blocks shall meet the following requirements:

- a. They shall be established on soils that respond to the normal agronomic and health requirements and found free from the nematode *Xiphinema diversicaudatum* and from the fungus *Verticillium dahliae*; freedom from the above shall be substantiated by an official document;
- b. They shall be established on soils on which none of the tree crops have been grown for at least 3 years;
- c. They shall be isolated from surface water flow;
- d. Irrigation water shall be found free or cleaned up from harmful organisms in accordance with the technical requirements; to be substantiated by an official document;
- e. Plants shall be numbered on the spot in a progressive order and in an indelible manner;
- f. The rows shall be complete and distinct per plant accession; if different accessions are grown in the same row, they shall be separated by a double inter-space; the planting layout shall be reported on a map;
- g. They shall be separated from neighbouring plots by a surrounding zone, at least 20 m wide, kept free from any vegetation, and must be maintained 500 m isolation from any uncertified olive plant.
- h. Scion mother plants (ScMP) shall not be kept for more than 30 years since their establishment;
- i. Seed mother plants (SMP) shall not be kept for more than 40 years since their establishment;
- j. The blocks shall be kept under continuous surveillance to control pathogens, pests, and weeds;
- k. Tools shall be at all times disinfected with a 10% sodium hypochlorite solution during cuttings.

Part II- Nurseries

II.A. Seedling, Grafting, and Sapling beds in open field

- a. The soil or growing medium for the establishment of seedling, grafting, and sapling beds shall be free from the nematodes *Meloidogyne incognita*, *M. javanica*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum*, and from the fungus *Verticillium dahliae*; the freedom from the above pests and diseases shall be substantiated by an official document;
- b. The area intended for growing certified olive plants in open field (grafting and sapling beds) and for establishing seedling beds, shall be separated from neighbouring plots by a surrounding zone, at least 3m wide, and kept free from any vegetation; such a limit is increased to 15m when any tree crops are present;
- c. The plants shall be subdivided into homogeneous lots, easily identifiable, entirely and exclusively intended for growing olive plants; the planting layout shall be notified to the locally competent Authority;
- d. The area intended for growing plants shall be isolated from surface and subsurface water flow;



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- e. Irrigation water shall be free or cleaned up from harmful organisms in accordance with the technical requirements; freedom from the above shall be substantiated by an official document.

II.B. Soil-less Seedling, Grafting, and Sapling Beds

- a. The containers and flats for seed planting, rooting, and acclimatisation, and the area intended for growing certified soil-less plants shall be isolated from surface and subsurface water flow;
- b. The containers for seed planting, rooting, and acclimatisation shall not be placed on the ground but kept at least 15 cm off the ground;
- c. Before use, the containers and flats shall be disinfected with a 2% sodium hypochlorite solution;
- d. Plants shall be grown in containers of appropriate volume;
- e. The area intended for growing certified soil-less olive plants shall be separated by a surrounding zone at least 3 m wide, kept free from any vegetation;
- f. The growing containers shall be isolated from the ground by:
 - i. A layer of fine gravel at least 15 cm high, or 10 cm high when mulching films are used;
 - ii. A layer of concrete or a different material; in such a case, the containers shall be placed on supports at least 20 cm high;
- g. Containers can be placed on the ground provided that the soil is found free from the nematodes *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum*, and from the fungus *Verticillium dahliae*; the freedom from the above pests and diseases shall be substantiated by an official document;
- h. The soil or growing medium for the establishment of seedling beds, acclimatation, rooting, and growing shall be found free from the nematodes *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, *Pratylenchus vulnus*, *Xiphinema diversicaudatum* and from the fungus *Verticillium dahliae*; the freedom from the above pests and diseases shall be substantiated by an official document;
- i. The plants shall be subdivided into homogeneous lots, easily identifiable, entirely and exclusively intended for growing olive plants; the planting layout shall be notified to the locally competent Authority;
- j. Irrigation water shall be free or cleaned up from harmful organisms in accordance with the technical requirements; the freedom from the above pests and diseases shall be substantiated by an official document;
- k. Tools shall be at all times disinfected with a 10% sodium hypochlorite solution between cuttings.



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GUIDELINES For TRUENESS-TO-TYPE - CHECKS OR CLONAL SELECTION

The trueness-to-type certification is based on pomological and agronomic observations. Alternatively, molecular techniques can also be applied when the primary source brought into the national certification scheme is accompanied by appropriate molecular documentation.

Part I – On “Pre-basic” and “Basic” material

The trueness-to-type certification of olive cultivars and clones intended for fruit production can be issued provided that:

- i. At least one fruit-setting is observed, or else,
- ii. DNA analysis is performed through one or more techniques recognised as suitable, according to the instructions provided by the plant breeder at the registration of the primary source, capable of distinguishing the cultivar or the clone, depending on whether a variety or a new clone is to be registered.

If trueness-to-type is assessed by using a morphological key, in the first one-two blooming and fruit-setting years, at least two checks shall be performed and repeated annually on all the above material, during the growing cycle, in the following phenological stages: blooming and fruit harvesting.

Part II – On “Certified” Mother Plants

The trueness-to-type certification for all plants shall be issued by the competent Authority before collecting the certified material, provided that:

- i. At least one fruit-setting is checked, or else,
- ii. DNA analysis is performed through one or more techniques recognised as suitable, according to the instructions provided by the plant breeder at the registration of the primary source.

The Olive Certification and Nursery Guidelines have been developed in accordance with international NEPPPO (Near East Plant Protection Organization) standards and in adherence to the Pakistan Fruit Plant Nursery Certification Rules, 1998 (amended 2003), in consultation with the Italian OliveCulture Scaleup Project implemented by CIHEAM BARI, Italy, and extensive stakeholder consultations.

This issues with the approval of Chairperson NSDRA.

(Dr Nasim Begum)
Director Coord, NSDRA