MINISTERU GĦALL-AMBJENT, ŻVILUPP SOSTENIBBLI U TIBDIL FIL-KLIMA

SEGRETARJAT PARLAMENTARI GĦALL-BIEDJA, SAJD U DRITTIJIET TAL-ANNIMALI

MINISTRY FOR THE ENVIRONMENT, SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

PARLIAMENTARY SECRETARIAT FOR AGRICULTURE, FISHERIES AND ANIMAL RIGHTS

MALTA

Diviżjoni għar-Regolazzjoni Veterinarja u Saħħa tal-Pjanti

Direttorat għall-Ħarsien tal-Pjanti

Veterinary and Phytosanitary Regulation Division

Plant Protection Directorate

Guidelines for the Production *of* Seeds in Malta intended for Marketing

This document highlights the Administrative Procedures for the production and subsequent marketing of Seeds of *Agricultural Plants and Vegetables* (Annex 1) in Malta and also lays down a set of good seed production practices (Annex 2). For this reason, the document is divided into two parts, Part A and Part B, which deal with the two sections separately.

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Part A: *Administrative Process*

The Administrative Process can be subdivided into four steps:

1) Registration with the Plant Protection Directorate in the Malta Official Register;
2) Notification of entry;
3) Notification of seed production for future marketing; and
4) Seed production record keeping.

These steps are explained below:

1) Registration with the Plant Protection Directorate in the Malta Official Register

The registration with the Plant Protection Directorate is obligatory to ensure compliance of the activity. Registration is possible by filling the **MOR Registration Form**. The filled form should be sent to the Plant Biotechnology Centre, 110, Annibale Preca Street, Lija.

It is important to note that anyone involved in the activity is registered with the Plant Protection Directorate. This means that even individual farmers that are growing plants intended for seed production need to be registered with the Plant Protection Directorate.

Once an entity is registered, this will be liable to at least an annual inspection by the Surveillance and Enforcement Unit (SEU) within the Plant Protection Directorate. If the registered entity (activity) is found to be compliant under the requirements of the Plant Quarantine Act, 2001, where applicable, the SEU will issue a Plant Passport.

If difficulty is found in the filling up of the registration form, you can contact the Plant Protection Directorate on Freephone 80072310 and you will be referred to a Plant Protection Official for assistance.

2) Notification of Entry

If the seeds originate from countries other than Malta, appropriate notification forms need to be filled and submitted on plantquarantine@gov.mt to the SEUSeeds coming from an **EU** Member State need to be notified through the **Movement of Plants from the EU Form** whilst seed coming from **third countries** need to be notified through a **Third Country Notification Form**. Seeds of varieties imported from third countries whose collective weight of each variety is more than 2kg shall also fill the **Imports of seeds over 2kg from Third Countries Form** in addition to the Third County Notification Form.

The forms can be submitted by post to the Plant Biotechnology Centre, 110, Annibale Preca Street, Lija.

This is especially important as to ensure that varieties to be marketed are already registered and listed in the EU Common Catalogues of varieties of agricultural plants and vegetables.

3) Notification of Seed Production

Following the registration with the Plant Protection Directorate, the entity responsible for the Seed Production Activity will have to hand in to the SEU at the above mentioned address for every variety of seed that will be grown, **Form A - Notification of Production of Seeds**.

In the application form, it is important that each variety is identified with its real name which must be unique and also with the code allocated by the entity responsible for the production of seeds if applicable.

This will be used by the SEU to ensure that:

1) the varieties indicated in the form are registered in the EU Common Catalogue; and
2) that the Seed producers are registered with the Plant Protection Directorate.

This documentation, together with the Seed Production Record Sheet (referred to in point 4 below) is needed by the SEU for its annual inspection and for the issue of a supplier's document of in connection with Seed Certification.

4) Seed Production Record Keeping

At the end of production, i.e. when the seed is harvested and cleaned, the entity responsible for the production of seed shall hand in to the SEU the **Form B - Seed Production Record Sheet** at the above mentioned address.

It is important to note that this application is filled in with the same codes that were used in Form A - Notification of Production of Seeds.

One must keep in mind that apart from Form B, the following records are to be kept as a minimum:

- Annual Work Plan
- Records of Purchases
- Records of the storage or planting on the premises
- Records of plants under production
- Records of plants which were dispatched to others
- Record of all varieties of plants, flowers, seedlings & plant trees
- Record of Plant passports/suppliers' documents received & issued
- Records of pests & diseases
- Records kept for at least one year
- Documents/letters/previous inspection reports & related documents from the Plant Health Directorate being kept.

Such record sheets are to be kept for at least a year and are examined during the annual inspections carried out by the Plant Protection Directorate.

Part B: *Guidelines for the Production of Seeds in Malta*

The Second Part is a set of guidelines that are recommended by the Plant Protection Directorate for the production of seeds which emphasise on the following aspects:

- Outlining the process of Seed Processing
- Potential Seed Damage during Processing
- Safety Precautions during Processing
- Maintaining Identity during Processing
- Cleanliness and Disinfection

These are explained in more detail in Annex 2 - Good **Seed Production Practices**.

Apart from these guidelines, specific obligations for specific species of crops are listed below:

Tomato seeds	
Seed Extraction	Seed extraction should be obtained by means of an appropriate acid extraction method or an equivalent method approved in accordance with the procedure referred to in Article 18(2) of Council Directive 2000/29/EC and its amendments, as per point 27 of Section II of Part A of Schedule IV of S.L. 433.03 when originating in the EU and as per point 48 of Section I of Part A of Schedule IV of S.L. 433.03when originating from outside the EU.
Seed Treatment	Seeds of tomatoes moved into Malta need to undergo soaking in 1-3% Sodium hypochlorite solution for 5 minutes and rinsed 3 times with water.

Annex 1

Lists of Seeds of Agricultural Plants and Vegetables

1. Agricultural plants

I. Cereals

Table 1.1:

Latin Name	Common Name
Avena nuda L.	Small naked oat, Hulless oat
Avena sativa L. (includes *A. byzantina* K. Koch)	Oat and Red oat
Avena strigosa Schreb.	Black oat, Bristle oat
Hordeum vulgare L.	Barley
Phalaris canariensis L.	Canary grass
Secale cereale L.	Rye
Sorghum bicolor (L.) Moench	Sorghum
Sorghum sudanense (Piper) Stapf	Sudan grass
x Triticosecale Wittm.ex A. Camus	Hybrids resulting from the crossing of a species of the genus *Triticum* and a species of the genus *Secale*
Triticum aestivum L.	Wheat
Triticum durum Desf.	Durum wheat
Triticum spelta L.	Spelt wheat
Zea mays L. (partim) except *Zea mays* convar. *microsperma* Koern. and *Zea mays* convar. *saccharata* Koern.	Maize (except popcorn and sweet corn)
Sorghum bicolor (L.) Moench *x S. sudanense (Piper) Stapf*	Hybrid resulting from crossing of *Sorghum bicolor* and *Sorghum sudanase*

II. Fodder Plants

Table 1.2:

Latin Name	Common Name
Poaceae (Gramineae)	
Agrostis canina L.	Velvet bent
Agrostis capillaris L. (*ex tenuis*)	Brown top
Agrostis gigantea Roth.	Redtop
Agrostis stolonifera L.	Creeping bent
Cynodon dactylon (L.) Pers.	Bermuda grass
Festuca filiformis Pourr.	Fineleaved sheep's fescue
Festuca ovina L.	Sheep's fescue
Festuca pratensis Huds.	Meadow fescue
Festuca rubra L.	Red fescue
Festuca trachyphylla (Hack.) Krajina	Hard fescue
Lolium multiflorum Lam.	Italian ryegrass (incl. Westerworld ryegrass)
Lolium perenne L.	Perennial ryegrass
Poa pratensis L.	Smooth-stalked meadow grass
Fabaceae (Leguminosae)	
Biserrula pelecinus L.	Biserrula
Galega orientalis Lam.	Fodder galega
Hedysarum coronarium L.	Sulla
Lathyrus cicera L.	Chickling vetch/Dwarf chickling vetch
Medicago doliata Carmign.	Straight-spined medic
Medicago italica (Mill.) Fiori	Disc medic
Medicago littoralis Rohde ex Loisel.	Shore medic/Strand medic
Medicago murex Willd.	Sphere medic

Medicago polymorpha L.	Bur medic
Medicago rugosa Desr.	Wrinkled medic/Gama medic
Medicago sativa L.	Lucerne
Medicago scutellata (L.) Mill.	Snail medic/Shield medic
Medicago truncatula Gaertn.	Barrel medic
Ornithopus compressus L.	Yellow serradella
Ornithopus sativus Brot.	Serradella
Pisum sativum L. (partim)	Field pea
Trifolium alexandrinum L.	Berseem, Egyptian clover
Trifolium fragiferum L.	Strawberry clover
Trifolium glanduliferum Boiss.	Glandular clover
Trifolium hirtum All.	Rose clover
Trifolium isthmocarpum Brot.	Moroccan clover
Trifolium michelianum Savi	Balansa clover
Trifolium pratense L.	Red clover
Trifolium squarrosum L.	Squarrose clover
Trifolium subterraneum L.	Subterranean clover
Trifolium vesiculosum Savi	Arrow-leaf clover
Vicia benghalensis L.	Purple vetch
Vicia faba L.	Field bean
Vicia sativa L.	Common vetch

Other species of fodder plants

Table 1.3

Latin Name	**Common Name**
Brassica oleracea L. convar. *acephala* (DC) Alef. var. *medullosa* Thell. + var *varidis* L.	Fodder kale

Plantago lanceolata L.	Ribwort plantain

III. Potatoes

Table 1.4:

Latin Name	Common Name
Solanum tuberosum L.	Potato

2. Vegetables

Table 1.5:

Latin name	Common name
Allium cepa L. - Cepa Group - Aggregatum Group	 Onion Echalion Shallot
Allium fistulosum L.	Japanese bunching onion or Welsh onion
Allium porrum L.	Leek
Allium sativum L.	Garlic
Allium schoenoprasum L.	Chives
Anthriscus cerefolium (L.) Hoffm.	Chervil
Apium graveolens L.	Celery Celeriac
Asparagus officinalis L.	Asparagus
Beta vulgaris L.	Beetroot including Cheltenham beet Spinach beet or Chard
Brassica oleracea L.	Curly kale
	Cauliflower

	Sprouting broccoli or Calabrese
	Brussels sprouts
	Savoy cabbage
	White cabbage
	Red cabbage
	Kohlrabi
Brassica rapa L.	Chinese cabbage Turnip
Capsicum annuum L.	Chilli or Pepper
Cichorium endivia L.	Curled-leaved endive Plain-leaved endive
Cichorium intybus L.	Witloof chicory Large-leaved chicory or Italian chicory Industrial chicory
Citrullus lanatus (Thunb.) Matsum. et Nakai	Watermelon
Cucumis melo L.	Melon
Cucumis sativus L.	Cucumber Gherkin
Cucurbita maxima Duchesne	Gourd
Cucurbita pepo L.	Marrow or Courgette
Cynara cardunculus L.	Globe artichoke Cardoon
Daucus carota L.	Carrot Fodder carrot

Foeniculum vulgare Mill.	Fennel
Lactuca sativa L.	Lettuce
Petroselinum crispum (Mill.) Nyman ex A. W. Hill	Parsley
Phaseolus coccineus L.	Runner bean
Phaseolus vulgaris L.	Dwarf French bean Climbing French bean
Pisum sativum L. (partim)	Wrinkled pea Round pea Sugar pea
Raphanus sativus L.	Radish Black radish
Rheum rhabarbarum L.	Rhubarb
Scorzonera hispanica L.	Scorzonera or Black salsify
Solanum lycopersicum L.	Tomato
Solanum melongena L.	Aubergine or Egg plant
Spinacia oleracea L.	Spinach
Valerianella locusta (L.) Laterr.	Corn salad or Lamb's lettuce
Vicia faba L. (partim)	Broad bean
Zea mays L. (partim)	Sweet corn Popcorn

Annex 2

Good Seed Production Practices

Good Seed Production Practice	**1**	**Outlining the Process of Seed Processing**

The objective of fruit or seed processing is to achieve clean, pure seeds of high physiological quality (germinability) which can be stored and easily handled during succeeding processes, such as pre-treatment, transport and sowing.

Processing can be grouped into the following 7 procedures:

1) Pre-cleaning, for fruit or seed lots containing larger debris, leaves, twigs, empty fruit parts, etc.
2) Pre-curing, for fruits that must be after-ripened, or where rapid desiccation hampers extraction.
3) Extraction, for species where the fruits are collected but only the seeds (and occasionally part of the fruit) are stored and sown.
4) Dewinging, for fruits and seeds with wings. Also including removal of dry appendices like spines, arils and hairs.
5) Cleaning, for fruits or seeds with impurities like fruit parts, leaves, twigs, empty seeds, foreign seeds and chaff.
6) Grading for seed lots with large variation in seed size or weight.
7) Adjustment of moisture content for seeds which, after the other procedures, have a higher or lower moisture content than considered optimal for storage of the particular species for the expected storage period.

Seed processing normally follows this order, but certain steps may be irrelevant and hence omitted for particular species or seed lots.

Processing should, as far as possible, take place immediately after the fruits or seeds have been brought to the processing depot.

1) Pre-Cleaning

Pre-cleaning is the removal of larger matter such as leaves, twigs and empty fruits. It is usually done manually after arrival at the seed-processing depot. It may be undertaken during the same process as sorting according to maturity.

2) Pre-Curing

Pre-curing denotes the procedure during which fruits are kept moist for a prolonged period before extraction. This is done to promote after-ripening of immature fruits and ease extraction of seed where rapid desiccation may cause extraction problems, in extreme cases case-hardening.

The process of pre-curing is basically the same whether used for after-ripening or to ease extraction and consists of the following procedure:

- Separation of fruits in two or three maturity classes;

- Storing at ambient temperature at a ventilated place and high humidity stirring regularly to allow ventilation;
- Reducing moisture as the fruits approach mature colour;
- Concluding the process as the fruits attain mature colour.

3) Extraction

Extraction denotes the procedure of physically releasing and separating the seeds from their enclosing fruit structure in order to reduce bulk, ease handling and improve storability.

4) De-winging

De-winging, in a broad sense, is removal of any dry seed appendage, including wings, spines, hairs, and some aril types. Seed (or fruit) wings do not obstruct germination, but may be inconvenient in handling. Accordingly, the main purpose of de-winging is to reduce bulk and ease handling during storage, pre-treatment and sowing. In some instances wings, hairs or other appendices, which increase the surface area of the seed, tend to collect moisture and promote fungal attack.

5) Cleaning

After extraction and possible de-winging the seed lot typically consists of seeds mixed with inert matter such as twigs, leaf and fruit fragments, soil particles, empty and foreign seeds, dust, chaff and the like. The aim of seed cleaning is to eliminate all this foreign material to reduce bulk, improve storability and make seeds easier to handle during subsequent processes. The ideal cleaned seed lot consists of all viable seeds of the target species, and is free from any other matter. The degree to which this is achieved is called the purity, usually measured in percentage.

Type of cleaning machine must be chosen according to seed type and adjusted appropriately to each seed lot in order to operate efficiently. Cleaning machines generally include one or more of the following techniques:

- Sieving
- Indented Cylinder Cleaning
- Winnowing and Blowing
- Gravity Separation
- Friction Cleaning
- Floatation

6) Seed Grading

While the objective of seed cleaning is to improve purity by eliminating non-seed material and foreign seed from the seed lot, the purpose of grading is to improve the average physiological quality of the seed lot by removing seed of the same species with low quality. Such seed may be empty seed, immature seed, damaged or dead seed or seed developed after self-fertilization. In the latter case the removal also serves to improve the genetic quality of the seed lot. Sometimes a larger fraction of small yet viable seed is deliberately removed from the seed lot based on an assumed correlation between seed size and vigour.

Seed grading may in practice be an extension of the seed cleaning process because the small and light seeds are removed together with chaff and other impurities.

7) Adjusting Moisture Content for Storage

After having obtained clean pure seed the final processing procedure is to adjust moisture content for seed that is to be stored for any length of time. The appropriate moisture content varies with species and potential storage period.

Good Seed Production Practice	**2**	**Potential Seed Damage during Processing**

Seed processing aims to achieve a balance between maximising effectiveness (extraction, cleaning, protection against deterioration) and damage to the seeds. In practice, processing always implies a risk of damage or injury to some seeds. Damage may occur in various ways:

1) **Mechanical damage**

Usually on the seed-coats but occasionally on the embryos with well developed seed cotyledons. Generally, spherical seeds and small seeds tend to suffer less damage than elongated or irregularly shaped seeds.

2) **Heat damage**

Often occurring by exposure to high kiln temperature for extracting seeds from cones, or deliberate burning for removal of fruit or seed hairs. Fatal high temperature can also occur during fermentation of fruit pulp. Moist seeds are more prone to heat damage than dry seeds, and recalcitrant seeds are, accordingly, sensitive to heat damage.

3) **Chemical damage**

Sometimes occurring during separation by flotation in organic liquids. Other potential sources are fungicides.

4) **Water**

Prolonged submersion in water, e.g. to soften the fruit pulp may hamper respiration of the seeds. Prolonged soaking may also cause imbibitions and initiate germination in seeds with no dormancy.

The severity of the damage depends on extraction/handling procedure and of seed type:

1) The more fragile the seed, the more sensitive it is to damage. Seeds with thin seed-coats or large cotyledons without or with little enclosing endosperm are easily damaged by some processing methods.
2) The more frantic the process, the higher the potential damage. Threshing and beating e.g. of indehiscent pods imply a potential risk of breaking the embryo. Especially sensitive is the attachment site of the cotyledons to the embryonic axis (Moore 1972). Mild impact to seed-coats can have a beneficial influence on germination by breaking physical dormancy.

Good Seed Production Practice	**3**	**Safety Precautions during Processing**

Like seed collection, processing implies both general and specific safety hazards. Processing staff should be familiar with these potential risks and observe appropriate precautions.

Fire danger

Dry fruit parts, resin and dust released during processing of dry fruits can easily catch fire and therefore pose a fire hazard. Use of artificial heat or other electric appliances during extraction increases the danger. Dust may catch fire when coming into direct contact with glow wires or the like. Therefore, heat sources should be safely shielded and dust removed regularly during processing. Water and/or fire extinguishers should be readily available at the seed-processing unit.

Respiratory, eye and skin irritations

During processing, floral parts, fungal spores, dry pulp and other fine particles become suspended in the air and form what is commonly known as dust. Some species, e.g. acacias, are known to release especially large amount of dust when threshed.

Because dust is dry, it causes a general irritation of eyes, nose, and skin with resulting itchiness, coughing and sneezing. For most people this is merely annoying, but for some people some dust elements cause allergic reactions. Dust problems can be minimised by appropriate ventilation, possibly by outdoor handling. Extractors should be placed as close to the sources as possible eg. near threshing machines. Staff working with species or equipment with particular dust problems should be provided with dust masks and possibly also dust glasses.

Mechanical equipment

The risk of accidents with mechanical equipment such as threshers and grinders can be greatly reduced by safe construction and maintenance of the equipment and appropriate training and instruction of the operators. Potentially dangerous mechanical or electrical parts (rotating devices, cords, etc.) should be shielded with screens. Screens should be mounted in the front of inlets to eg. threshers and operators should observe a safe distance. Emergency switches should be placed near the place of operation so that machines can easily be stopped in case of an accident.

Poisonous fruit pulp

Some fruits may have poisonous pulp, fatal to humans and livestock. Removed pulp and water used for extraction must be discharged and disposed of safely.

Good Seed Production Practice	**4**	**Maintaining Identity during Processing**

During processing, the fruits and later the seeds pass through a number of processes, they are unloaded and loaded into different containers and processing equipment, and often handled by a number of people. The risk of losing or accidentally mixing labels are obviously high, especially when handling a number of minor samples of the same species eg. single tree collections or provenance collections. A system must be created to minimise the risk of losing seed identity. Handling of labels is, in many cases, as important as handling of the seed itself. Simple routine procedures are recommended. If some members of the staff are not able to read the labels, they should still be able to maintain the routines. Some points are summarised below:

1) Two labels should always follow the seed lot during collection. One is placed outside the container; one is put inside together with the seeds. The labels should be written with water-repellent ink, the labels should be resistant to some degree of moisture.
2) Labels that are no longer valid should be discarded to avoid later confusion eg. if new labels are written because the old ones become difficult to read, or if several seed lots are mixed.
3) When fruits or seeds are poured into eg. trays, depulping or cleaning machines where the label cannot be kept with the fruits or seeds, or where it would be easily lost by wetting or blowing away, the labels should be clipped or stuck to the processing equipment. Once the particular processing part has been concluded, the label is replaced together with the processed seeds.
4) Partly processed seeds are preferably put into the same containers again. After reduction of the major bulk (e.g. after extraction) fewer, smaller or different types of container may be used. The new containers must be labelled, and redundant labels discharged.
5) If part of the seed is fully processed and another part needs additional processing, the two parts must be separated and labelled individually eg. A, B, C,
6) Discharged labels should be torn or removed completely from the processing site (not just thrown on the floor) in order that they will not later be confused with valid labels.

A second point in maintaining identity relates to the risk of physically contaminating the seed lots. It is rarely possible to clean a seed lot for seeds of the same species, and separation of seeds of some species with very similar seeds may also be impossible. Therefore, contamination is often irreversible.

The chances of contamination during seed processing are many. For this, hygiene routine practices must be followed:

1) The same containers are used before and after part-processing.
2) Emptied containers are thoroughly cleaned before they are used for any other seed lot. Bags are turned inside out to be cleaned in stitching and corners.
3) Processing equipment and labels are thoroughly cleaned after each process. Brushing, the use of compressed air or strong water current is often necessary for appropriate cleaning.

Good Seed Production Practice	5	**Cleanliness and Disinfection**

Cleanliness and disinfection of all the equipments (machinery) and materials (plastic crates and tanks) coming in contact with the seeds is fundamental during the seed processing, most particular between batches of seeds. Disinfection should be done by washing with a 50% bleach solution in order to avoid any potential external contamination.

Ideally, plastic pallets are used to load the full plastic crates of plant material on them to be elevated from the floor and make sure that the processing area is cleared to enable unloading of the tomatoes directly from the van/truck on to the pallets.