


Disinfection guidelines for seeders and transplanters



Managing Risks of Seeders and Transplanters

Seeders are machines commonly used in the nursery industry for consistent and accurate distribution of seeds in a growing medium. Seeders offer the benefit of increased accuracy and reduced labour costs through automation compared to sowing by hand, as well as a reduction in seed wastage, making them ideal for sowing high volumes of seeds in a production nursery environment. Several types of seeders are used in production nursery environments including hand, drum, needle and vacuum seeders.

Hand Seeders



Hand vacuum seeder that incorporates use of an air puffer to pick up seeds. Image courtesy of Harris Seeds.

Hand seeders require manual operation by a human operator and vary in design and structure and are generally well suited for singulating fine seeds. Some hand vacuum seeders use an air puffer to create a vacuum that picks up seeds on a needle tip and releases them when the vacuum is removed. Vibrating hand seeders are battery operated and use vibration to direct seeds down a channel and singulate and deposit them into a seed tray. Hand dial seeders dispense seed through a hole and funnel into a seed tray; with different holes able to cater to different seed sizes. Several components are in direct contact with seeds including the tip, needle or channel used to filter the seeds.

Drum Seeders



Drum seeder. Image courtesy of Flier Systems.

Drum seeders operate using a rotating drum housing seed that uses vacuum and blowers to deposit seeds onto seed trays passed underneath on a conveyer belt. Drums may be changed when switching to another seed type. Drum seeders also allow sowing of multiple seeds per cell. Several components are in direct contact with seeds including the seed drum, inventory tray and other guards and surfaces.

Needle Seeders



Needle seeder. Image courtesy of Bouldin &

Needle seeders rely on the use of needles to deposit seeds onto seed trays. Different needle sizes accommodate varying sizes and shapes of seeds. Like vacuum seeders, needle seeders include a vacuum pump and air compressor. Several components are in direct contact with seeds including the seed inventory tray, needles, hoses as well as other guards and surfaces. Some needle seeders have an inbuilt cleaning function, however, this does not perform disinfection of the needles but rather clears any debris or obstructions.

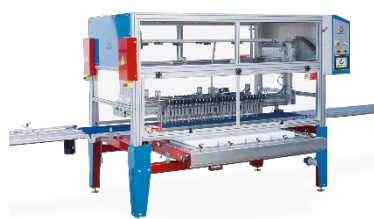
Vacuum Seeders



Vacuum seeder. Image courtesy of Proptec.

Vacuum seeders use air pressure generated from a vacuum pump air compressor to pick up seeds onto a set of needle tips by creating a vacuum between the seed and the needle tip. Seeds are then released and deposited onto a seed tray when the vacuum is removed; a process which may be regulated by the operator with the use of a foot pedal. Several components are in direct contact with seeds including the seed inventory tray and needles.

Transplanters



Transplanter Image courtesy of Urbinati Nursery Technology.

These machines use a system of conveyor belts and mechanical arms to perform mechanised transplantation of seedlings into pots and seed trays. Mechanical transplanters are best suited to processing seedlings of uniform size. Components including mechanical arms are often made of non-porous material such as stainless steel. As mechanical arms lift individual plants pots and seedlings, they can make direct contact with growing media and plants and therefore pose a potential risk of spreading contamination. Other components such as trays, tray feeders, drums, conveyor belts and surfaces may also come into contact with plant material and growing media.

Cleaning Seeders and Transplanters

As seeders make contact with each seed, ensuring each machine is cleaned and disinfected thoroughly helps prevent the spread of pests and disease. This should be done between each batch of seed to ensure minimisation of cross contamination between batches. Disinfection procedures are vital in helping to prevent the spread of pests and disease in professional production nurseries. Disinfecting is a process that kills pests and disease-causing bacteria, viruses fungi and other microorganisms that may be present on surfaces or objects such as components and surfaces of seeders and transplanters.

1 – DISASSEMBLE



Dismantle the seeder or transplanter as far as possible; ensuring attachments and covers are removed to allow access to internal spaces and components in contact with seed such as inventory trays.

2 – CLEAN & SCRUB



Clean each component to remove all signs of visible contamination including dirt, discarded seeds, growing media and plant residue. Ensure all components in contact with seed are cleaned including funnels, needles, drums and seed inventory trays etc. Remove all soil, plant material and debris using water or compressed air. Use a brush, water and detergent to scrub all surfaces. Dispose of all waste material appropriately.

3 – RINSE



Rinse all surfaces with clean water to remove any residual detergent that could reduce the effectiveness of disinfectant products used. Use low pressure to prevent any splashing onto adjacent work surfaces or materials.

4 – DISINFECT



Apply an appropriate disinfectant to surfaces (see Table 1). Remember to always follow product label and only use disinfectants that have an APVMA registration or permit. Dispose of disinfectant chemicals as per the product label.

Note: Porous surfaces require additional contact time for the disinfectant to be effective.

5 – DRY



Some disinfectants such as 70% methylated spirits/30% water solutions must be allowed to dry to be effective. If required, rinse any excess disinfectant chemical from the treated surface with clean water.

6 – CHECK & RECORD



Check all surfaces to ensure cleanliness and then record the details of the procedure to keep an up-to-date equipment cleaning record.



Image: Greenlife Industry Australia (GIA)

Transplanters enable accurate transplanting of plants such as seedlings but also pose a risk of contamination.

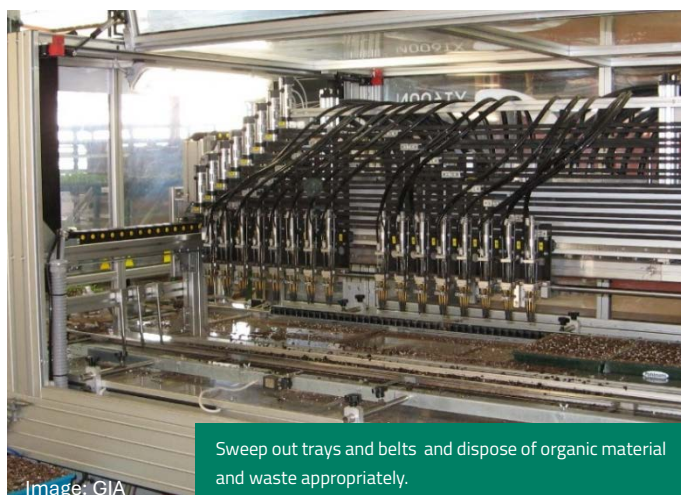


Image: GIA

Sweep out trays and belts and dispose of organic material and waste appropriately.



Image: GIA

You may wish to keep a checklist of machinery parts to be disinfected nearby to your washing/disinfection area.



If a suspect emergency or quarantine plant pest, disease or weed is found, isolate and secure the consignment and contact the **Exotic Plant Pest Hotline on 1800 084 881**.

Tips for Disinfecting Seeding Equipment

- ✓ When cleaning, dismantle seeding equipment as far as possible; ensuring attachments and covers are removed to allow access to internal spaces
- ✓ Keep an up-to-date equipment cleaning record
- ✓ Clean and remove any visible contamination including growing media and plant residues
- ✓ Ensure any surfaces to be disinfected are clear of visible signs of soil, manure, plant and animal residues
- ✓ Only use freshly prepared disinfectant solutions
- ✓ Ensure disinfectant products are allowed sufficient drying time
- ✓ Keep a checklist of machinery parts to be disinfected nearby along with any relevant Standard Operating Procedures (SOPs)
- ✓ Always follow product label safety and use directions on the product label and APVMA permit

General Tips

- ✓ Perform regular, hygienic removal of discarded plants, seeds and spilt growing media
- ✓ Source materials including seed, growing media and other inputs from approved suppliers who can supply and transport these materials free from plant pests and diseases
- ✓ Ensure biosecurity best practice and good hygiene are observed across the production nursery, including contamination on footwear by using designated footwear for certain areas, cleaning and disinfecting footwear, and/or installing footbaths at all entries to the production area
- ✓ Understand your high priority pests and diseases



Image: GIA

Australian Plant Production Standards (APPS)

The Australian Plant Production Standards (APPS) has developed best practice guidelines NIASA (Nursery Industry Accreditation Scheme Australia) for the production nursery industry. This national scheme recognises production nurseries which operate in accordance with a set a national 'best practice' guidelines. These best practices are based on industry research and validated by the BioSecure HACCP certification program. Businesses looking to become BioSecure HACCP certified must also be NIASA accredited. BioSecure HACCP provides a system of risk mitigation for pathways and activities that can limit entry of pests and disease into the production nursery. More information is available on the APPS website about NIASA (<https://nurseryproductionfms.com.au/niasa-accreditation/>) and the BioSecure HACCP certification program (<https://nurseryproductionfms.com.au/biosecure-haccp-certification/>).



Disinfectants for Seeding Equipment

Disinfectants are chemicals that inactivate or kill organisms such as fungi, bacteria and viruses. Table 1 provides a number of disinfectant products currently registered in Australia for general equipment and/or machinery by the Australian Pesticide and Veterinary Medicine Authority (APVMA). The APVMA is responsible for approving chemical disinfectants for retail sale in Australia and publishes information about available registered products on its PubCRIS database (<https://portal.apvma.gov.au/pubcris>) and permits database (<https://portal.apvma.gov.au/permits>). State and territory governments are responsible for regulating the use of these chemicals once purchased. It is important to use disinfectants that are registered for use in your state or territory and to follow the product label or APVMA permit directions for use. It is recommended to follow all safety instructions including the use of personal protective equipment. Greenlife Industry Australia applies for, maintains and provides access to all nursery production minor use permits (<https://nurseryproductionfms.com.au/pesticide-minor-use-permits/>).

Disinfectants for Seeding Equipment

Table 1. Some products currently registered for general equipment and/or machinery in an agricultural context by the APVMA as of September 2024.

Registered Product	APVMA Product # (Permit #)	Active Ingredient(s)	Seeding/ transplanting equipment	Seed trays	Notes
Bacrasan Phenolic Sanitiser	60300	CHLOROPHEN ORTHO BENZYL PARA CHLORO PHENOL ORTHOPHENYLPHENOL	✓		Suitable for use on knives, tools, machinery, benches, floors, walls and most other surfaces.
Bactex cf sanitiser	59643	BENZALKONIUM CHLORIDE	✓		Treatment of fungi and bacteria on farming equipment, vehicles, benches, floors, tables and walls. Safe for use on most surfaces including metal, stainless steel, plastic and glass.
Bioxv Broad Spectrum Concentrated Water Soluble Powder (Sp) Disinfectant	89005	POTASSIUM PEROXYMONOSULPHATE TRIPLE SALT SODIUM CHLORIDE SODIUM DODECYL BENZENE SULFONATE	✓		For disinfection of viruses, bacteria and fungi on agricultural machinery and facilities. Suitable for aerial misting and fogging, on porous and non-porous surfaces, wheel dips and water and irrigation systems (pipes and irrigation lines). Not suitable for ferrous metal or aluminium pipework.
Chemisan	93437	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	Broad spectrum sanitation and water treatment. Can be used on hands, equipment including pruning shears, on hard surfaces or for plant sanitation and post-harvest treatments (refer to product label).
Des-O-Germ	62317	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	May also be used for plant sanitation (refer to product label).
EuroChem Sanitex Horticultural Disinfectant	88875	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	Broad spectrum sanitation and water treatment product. Can be used on hands, equipment including pruning shears, on hard surfaces or for plant sanitation (refer to product label).
Hyperox Farm Disinfectant	61606	HYDROGEN PEROXIDE ACETIC ACID PERACETIC ACID	✓		Suitable for disinfection of pre-cleaned surfaces, difficult surfaces and thermal fogging.
Neogen Viroxide Super Broad Spectrum Disinfectant	90354	POTASSIUM PEROXOMONOSULFATE TRIPLE SALT SODIUM CHLORIDE SODIUM DODECYL BENZENE SULPHONATE SULFAMIC ACID	✓		Disinfectant cleanser for agricultural equipment and facilities. Suitable for both porous and non-porous surfaces.
Path-X	53331	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	For broad spectrum sanitation and water treatment against a range of fungal and bacterial pathogens. Can be used on hands, equipment including pruning shears, on hard surfaces or for plant sanitation (refer to product label).
QT-SAN Disinfectant	92751	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	Broad spectrum sanitation and water treatment product for use in agriculture and horticulture. Can be used on hands, equipment including pruning shears, on hard surfaces or for plant sanitation (refer to product label).
Quatrakill Sanitiser	59056	BENZALKONIUM CHLORIDE	✓		Suitable for disinfection of general farm equipment.
Sporekill Agricultural Disinfectant	51141 PER80699 & PER92498	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	Broad spectrum sanitation and water treatment against a range of fungi and bacteria. Suitable for use on hands, hard surfaces and for plant sanitation (refer to product label). Under APVMA Permit PER80699 , can be used to disinfect nursery growing surfaces and equipment including: growing beds, weed mats, steel, timber, plastic, fibreglass and fibre board, benches, tables, floors, sand beds, hard surfaces (including paths, storage bays, trolleys, and pallets), tools and equipment. Under APVMA Permit PER92498 , can be used for the control of fungal diseases in non-food nursery stock.
Steri-Max Biocide	59462	DIDECYL DIMETHYL AMMONIUM CHLORIDE	✓	✓	Broad spectrum sanitation and water treatment product for use in agriculture and horticulture. Can be used on hands, equipment including pruning shears, hard surfaces or for plant sanitation (refer to product label).
Viralfx The Broad Spectrum Virucidal, Bactericidal, Fungicidal Disinfectant and Cleaner	65691	POTASSIUM PEROXOMONOSULFATE TRIPLE SALT SODIUM CHLORIDE SODIUM DODECYL BENZENE SULFONATE	✓		Broad spectrum virucidal, bactericidal and fungicidal disinfectant. Also suitable for both porous and non-porous surfaces, aerial misting and fogging and vehicle wheel dips.
Virkon Aquatic Broad Spectrum Virucidal Bactericidal Fungicidal Disinfectant	68503	POTASSIUM PEROXYMONOSULFATE SODIUM CHLORIDE	✓		Suitable for cleaning and disinfecting of agricultural equipment and wheel dips.
Virkon H The Broad Spectrum Virucidal Bactericidal Fungicidal Disinfectant	89517	SODIUM DODECYL BENZENE SULFONATE POTASSIUM PEROXOMONOSULFATE TRIPLE SALT SODIUM CHLORIDE	✓		Suitable for use on both porous and non-porous surfaces, aerial misting and fogging and wheel dips. Effective in the control of viruses, bacteria and fungi in greenhouses and other horticultural settings prior to introduction or reintroduction of plants, seeds or soil.
Virkon Professional Tablets	92230	POTASSIUM PEROXOMONOSULFATE TRIPLE SALT SODIUM CHLORIDE	✓		Suitable for general disinfection of both porous and non-porous surfaces, benches, tables, walls and floors.
Virkon S Tablets Broad Spectrum Virucidal Bactericidal Fungicidal Disinfectant	68502	POTASSIUM PEROXYMONOSULFATE SODIUM CHLORIDE	✓		Suitable for general disinfecting of agricultural equipment and facilities. including porous and non-porous walls, floors, benches and tables.
Virkon S The Broad Spectrum Virucidal Bactericidal Fungicidal Disinfectant	48185	POTASSIUM PEROXOMONOSULFATE TRIPLE SALT SODIUM CHLORIDE SODIUM DODECYL BENZENE SULFONATE	✓		Suitable for aerial misting, fogging and wheel dips.
Virocid Broad Spectrum Disinfectant	86445	GLUTARALDEHYDE DIDECYLDIMETHYLAMMONIUMCHLORIDE ALKYLDIMETHYLBENZYLAMMONIUMCHLORIDE	✓	✓	Multipurpose disinfectant for animal housing, agricultural equipment and facilities.
YM-FAB NYLATE	47352	BROMOCHLORODIMETHYL HYDANTOIN	✓		Halogen based broad spectrum biocide. Suitable for tools, gloves, and bulk bins, as well as treatment of algae in irrigation lines.

Want to learn more?

General:

- Australian Plant Protection Standard (APPS) website
<http://nurseryproductionfms.com.au/>

Nursery Industry Accreditation Scheme Australia (NIASA) and BioSecure HACCP:

- Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice Guidelines:
<https://nurseryproductionfms.com.au/niasa-accreditation/>
- GIA BioSecure HACCP Guidelines 4th Edition 2019:
<https://nurseryproductionfms.com.au/biosecure-haccp-certification/>
- BioSecure HACCP Personal Disinfestation Procedures Video:
<https://www.youtube.com/watch?v=nWT-jl05ozw>

Disinfestation and Pest Management:

- Australian Plant Production Standard (APPS) Guidelines for 'Disinfestation of Nursery Equipment and Surfaces', Lex McMullin, Nursery & Garden Industry Queensland (2020):
<https://www.ngiq.asn.au/download/disinfestation-of-nursery-equipment-and-surfaces/>
- Preventing and managing root pathogens in nursery production:
<https://www.greenlifeindustry.com.au/communications-centre-content/media-releases-1/2022/root-pathogens-prevention-and-management-in-nursery-production>
- PestID Tool: <https://www.pestid.com.au/>
- APVMA: <https://www.apvma.gov.au/>

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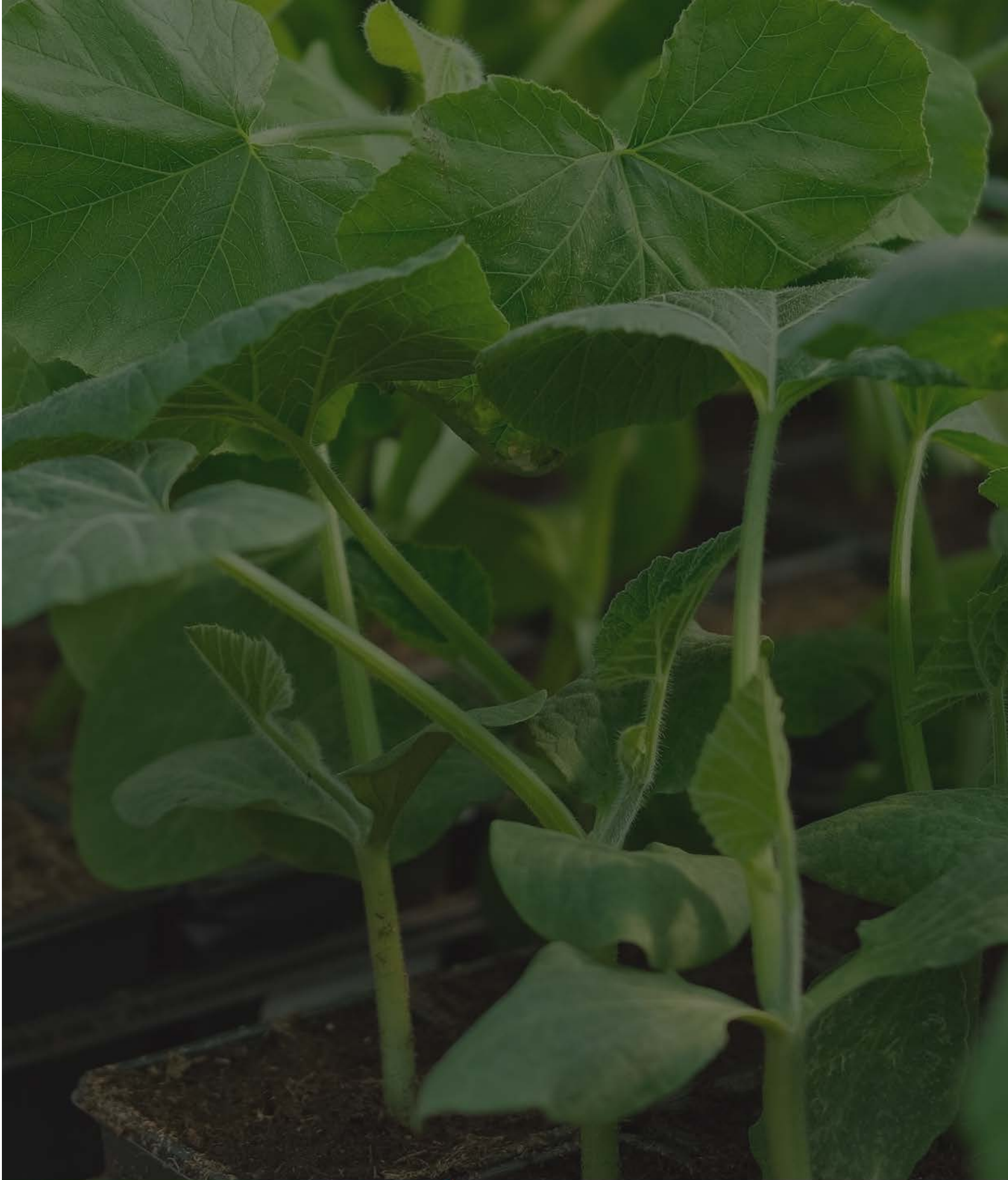
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Check www.apvma.gov.au and select product registrations listed in PUBCRIS for current information relating to product registration.





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