Australian Plant Production Standard (APPS)

Banana Nursery Stock Specification

Nursery production of high-quality banana planting material and establishing an industry specification is recognised within Australia as playing an important role in supporting the Australian banana production industry. Purchasers of banana planting material, and regulatory authorities, require assurance that plants purchased and moved between interstate and intrastate biosecurity zones meet an industry standard and that appropriate steps have been taken to minimise the risk of introduction of serious pathogens into the banana production environment.

The NIASA Banana Nursery Stock Specification is a prerequisite to being granted accreditation to the Quality Banana Approved Nursery (QBAN) Scheme, which has been recognised as the Australian banana industry's scheme to provide clean planting material to banana industry members. The scheme was previously administered by the Queensland Government and overseen by the Australian Banana Growers Council (ABGC). Administration and auditing of the technical aspects of banana nursery production, leading to QBAN accreditation, are now incorporated into the Nursery Industry Accreditation Scheme, Australia (NIASA) program. Banana best practice production requirements have been incorporated into the 8th edition of the NIASA Guidelines in the new Appendix 16.

Banana Nursery Stock Specification Accreditation:
The stamp of assurance that provides businesses with:

- A systematic approach for producing 'clean' banana planting material
- Consistent product quality meeting the industry standard
- Protection of the production environment from serious pests and pathogens
- Independent audits, guidance and technical support from GIA Auditors and Technical Officers

What is NIASA?
NIASA is the national nursery industry's Best Management Practice (BMP) program for production nurseries, growing media manufacturers and greenlife markets. It is supported by the NIASA BMP Guidelines and a Checklist incorporating more than 140 elements. Businesses may use the Guidelines as a reference or guidance document to improve their cropping systems without formal accreditation. HOWEVER, a business may also consider formal, annually externally audited, NIASA accreditation to demonstrate to customers that they meet industry best practice.

The Banana Nursery Stock Specification
The Banana Nursery Stock Specification (APPENDIX 16) in the 8th edition of the NIASA Guidelines provides specialist guidance to banana nursery production businesses and allows an interested business to become accredited for meeting banana nursery production standards.

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Australian Plant Production Standard (APPS)

Banana Nursery Stock Specification

The Australian Banana Growers' Council (ABGC) continues to support and promote the production and supply of quality banana plants though the revised QBAN program.

The NIASA accreditation arrangement allows for a business to be accredited in one or more activities associated with banana production, those being:

- PART A - Sourcing or collection of material for tissue culture initiation; and/or
- PART B - Tissue culture production requirements; and/or
- PART C - Banana nursery plant production requirements.

Requirements for QBAN accreditation:
The incorporation of these banana nursery stock specifications into the NIASA BMP Guidelines does not mean a business will automatically be granted QBAN accreditation upon compliance to these NIASA requirements. Achievement of QBAN accreditation requires a business to first attain compliance to the NIASA Guidelines and the Banana Nursery Stock Specification. A NIASA Banana Nursery Stock Specification accredited business can apply to ABGC for QBAN accreditation which will be awarded by ABGC if appropriate. To be eligible to apply to ABGC for QBAN accreditation, the business must:

• Implement the requirements specified within the NIASA Banana Nursery Stock Specification Appendix and other requirements of NIASA (e.g. production nursery requirements for businesses accredited under PART C) based on the scope of the activity or activities conducted (PART A and/or PART B and/or PART C); AND

• Be found at audit to have implemented mandatory procedures within Appendix 16 to a Satisfactory standard. ALL relevant auditable requirements within the Specification (see the audit checklist included within APPENDIX 16) must be found to have been implemented to at least a satisfactory standard for a business to be considered as eligible to be granted accreditation against the NIASA Banana Nursery Stock Specification.

Application and enquiries on QBAN Accreditation should be made to ABGC:
Further enquires on the QBAN program should be made to the ABGC. Phone: (07) 3278 4786 or send an email to info@abgc.org.au.

Application for NIASA Banana Nursery Stock Specification accreditation:
Complete and submit an application for NIASA accreditation form to GIA. Tick the appropriate checkboxes and complete the form in accordance with the instructions provided. To apply for NIASA, or for further enquiries on NIASA Banana Nursery Stock Specification accreditation please contact:

- email: biosecure@greenlifeindustry.com.au Phone: (02) 8861 5100

Greenlife Industry Australia

Phone (02) 8861 5100
Email biosecure@greenlifeindustry.com.au
Web https://www.greenlifeindustry.com.au/

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Extract from NIASA Best Management Practices Guidelines

A.16.2 PART A – Sourcing or collection of material for tissue culture initiation

Materials sourced for tissue culture initiation ***must*** be:

1. imported and cleared for import under an approved Australian Government biosecurity arrangement; **OR**

2. collected from mother plants in accordance with this PART A of this Appendix.

Further information

- International sources of banana propagation material require an import permit from the Australian Department of Agriculture and Water Resources (DAWR) and fulfilment of strict conditions of entry and post-entry quarantine as may be determined by DAWR, endorsed as a condition on the import permit.
- All banana plants imported into Australia ***must*** be grown under quarantine in a post entry quarantine facility and indexed free of any notifiable pest prior to release.

A.16.2.1 Proximity to known infestation

Materials ***must not*** be collected from a place located within a biosecurity zone where a Group 1 Virus is known to occur. Seek advice from your State or Territory Biosecurity agency on the Group 1 Virus status of your area.

See SCHEDULE 1: GROUP 1 AND GROUP 2 VIRUSES AND OTHER PATHOGENS for information on Group 1 viruses and other pathogens.

Further information

- Materials collected from areas where banana pathogens are known or suspected to be present pose a higher risk of the materials being rejected for, or during, tissue culture production under section A.16.3 PART B – Tissue culture production requirements of this Appendix.

IMPORTANT

- Movement of banana plant materials from or within an area that is infested with a regulated banana pest may be subject to movement restrictions. Material ***must*** not be moved without compliance to relevant biosecurity legislation **or** compliance to an approved BioSecure HACCP Entry Condition Compliance Procedure.

A.16.2.2 Biosecurity plan

It is recommended that the source property from where materials are to be collected holds and implements a relevant on-farm biosecurity plan for the prevention and control of pests of a biosecurity concern for banana crops.

Further Information

- Implementation of a relevant biosecurity plan for the prevention and control of biosecurity pests of banana crops at a place where source material is collected for initiation reduces the risk of material being rejected for, or during, tissue culture production under section A.16.3 PART B – Tissue culture production requirements of this Appendix.

- An example of a relevant biosecurity plan is the *Banana best management practices - On-farm biosecurity guide*, which is available for download as a Queensland Government publication.

A.16.2.3 Training in symptoms of banana pest and disease infestation

Persons collecting materials for tissue culture initiation ***must*** be trained or experienced in the identification of symptoms of biosecurity pests of banana crops (See SCHEDULE 1: GROUP 1 AND GROUP 2 VIRUSES AND OTHER PATHOGENS for information on Group 1 viruses and other pathogens). Businesses ***must*** maintain a register of Authorised Inspection Persons that includes the name of the inspection person and the details of relevant training of the person and/or experience that the person holds.

Further Information

- A Fact Sheet providing further information and images on Group 1 viruses and other pathogens that may be used for training purposes is available through the Nursery Production FMS (APPS) website at http://nurseryproductionfms.com.au/.
- Where an accredited business intends on moving banana plant material to meet a legislative biosecurity requirement for that material an online training and assessment course for that movement ***must*** be completed through the GIA's e-Learning website at https://ngia.talentlms.com/index.

A.16.2.4 Decontamination requirements for entry onto the mother plant source property

Decontamination involves the removal of all soil and plant debris, and the inactivation of the plant pests (insects or mites) or disease-causing organisms (bacteria, fungi, phytoplasmas and viruses).

Hygiene or decontamination procedures ***must*** be undertaken in order to minimise the risk of dispersing plant pests and diseases.

Footwear ***must*** be clean prior to entry to a property. On arrival at the site, collection staff may decontaminate their footwear by washing them in a footbath using a suitable disinfectant in accordance with the product label or permit directions.

Tools and equipment ***must*** also be cleaned and disinfected in accordance with the product label or permit directions prior to undertaking the collection.

Vehicles should be kept as clean as possible and free of dirt and organic material. Prior to entry and exit from a property, vehicles should be clean and/or decontaminated and not to be taken into a production area if it can be avoided. If there is a requirement for transport around the property the collector should either walk or use transport arranged with and provided by the grower.

Further Information

- A decontamination guide providing further information on techniques for protecting against transfer of Group 1 non-virus pathogens is available as a Queensland Government at https://publications.qld.gov.au/.

A.16.3 PART B – Tissue culture production requirements

This PART recognises that individual tissue culture facilities operate and manage operations based on their own individual experience and circumstances, and as a result it does not deal with commercial practices and tissue culture techniques. However it does specify the minimum requirements to be met to meet banana nursery stock specifications requirements.

A.16.3.1 Tissue culture facility design requirements

A tissue culture facility to be accredited under PART B of this Appendix ***must***:

- be designed and managed to prevent the introduction of contaminants and pest and disease agents into or out of the facility;
- be designed to prevent contamination of the plantlets and media within the facility and from outside of the facility;
- be constructed to contain a secure culture room;
- have recognised disinfection and sterilising methods and use tested / calibrated equipment;
- be physically secure to prevent unauthorised access;
- ensure that plants grown outside the building are not grown within 5 metres of air intake points; and
- ensure windows are closed to prevent insect, dust and spores entering laboratory, and any windows that can be opened are fitted with insect proof mesh.

A.16.3.2 Tissue culture facility process requirements

A tissue culture facility manager ***must*** be appointed. This person is responsible for implementation of the following requirements and compliance of employees to the requirements:

- Record keeping systems and laboratory quality management systems ***must*** be established and maintained.
- High standards of hygiene ***must*** be employed to prevent contamination and to minimise the risk of cross-contamination.
- Decontamination processes ***must*** be developed and implemented for employees and visitors that enter the laboratory after visiting areas where banana plants are grown.
- During the subculture process, sterile technique ***must*** be used. All equipment used in subculture ***must*** be sterilised between different culture containers and different source accessions.
- A process ***must*** be put in place to prevent clones being mixed or mislabelled.
- Only banana plant propagation material that has been collected in accordance with PART A ***must*** be initiated.
- Physical segregation, as well as segregation of subculture practices, ***must*** be enforced to prevent cross contamination between indexed with negative virus result and cultures awaiting virus indexing results.

- Fungicides, biocides and antibiotics ***must*** not be used in tissue culture media as a means of suppressing the growth of fungi and bacteria.
- Any tissue culture showing visual evidence of contamination with fungi ***must*** be destroyed by autoclaving.
- Excess banana propagation material and / or packing material ***must*** be disposed of by autoclaving or direct placement into bags into waste bins. No banana material is to be dumped in an exposed environment (see section A.16.3.9 Disposal of banana materials and failed cultures).
- Insect screens and air conditioning filters ***must*** be clean.

Further Information

- Implementation of laboratory accreditation management systems such as Good Laboratory Practice and National Association of Testing Authorities are desirable but not mandatory.

A.16.3.3 Material traceability

The tissue culture facility ***must*** have a tissue culture plantlet production recording system in place, which will allow all material to be identified accurately and traced back to the mother plant ID / clone number and traced forward to the recipient.

This can be achieved by identifying the materials throughout the process using a unique code issued by the laboratory internally, with this code written as a documented link on the completed *Certification of Banana Material for Tissue Culture Initiation Record* **OR** by directly identifying batches by the mother plant ID/ clone number allocated by a business accredited under PART A of this Appendix.

Where the tissue culture laboratory receives material that is imported and cleared for import under an approved Australian government biosecurity arrangement in accordance with A.16.2 PART A – Sourcing or collection of material for tissue culture initiation of this Appendix, the tissue culture facility *must* assign a unique clone number in accordance with section A.16.2.7 Assigning a unique mother plant ID/ clone number of this Appendix.

If a laboratory code/accession number is assigned by the facility it still ***must*** directly link back to the mother plant ID/ clone number allocated by a business accredited under PART A or allocated by the facility under this PART.

A.16.3.4 Receipt of propagation materials

Upon receipt of the propagation materials, facility staff ***must*** check the suitability of the materials ensuring that:

- both the outer and inner packaging is intact, ensuring leaf or propagation materials are not exposed;
- propagation materials are not covered with excessive dirt;
- the materials are accompanied by a completed Certification of Banana Material for Tissue Culture Initiation Record;
- mother plant ID/ clone number can be clearly identified; and

A.16.4 PART C – Banana nursery plant production requirements

A.16.4.1 Proximity to known infestation

The production nursery ***must not*** be located within a biosecurity zone where a Group 1 Virus is known to occur. Seek advice from your State or Territory Biosecurity agency on the Group 1 Virus status of your area.

See SCHEDULE 1: GROUP 1 AND GROUP 2 VIRUSES AND OTHER PATHOGENS for information on Group 1 viruses and other pathogens.

IMPORTANT

- Movement of banana plant materials from or within an area that is infested with a regulated banana pest may be subject to movement restrictions. Material ***must*** not be moved without compliance to relevant biosecurity regulations or compliance to an approved BioSecure HACCP Entry Condition Compliance Procedure.

A.16.4.2 Materials used in plant production

A.16.4.2.1 Tissue culture plantlets

Accredited source

The NIASA accredited nursery ***must*** only source and use tissue cultured banana plantlets supplied by a NIASA business accredited under PART B of this Appendix.

Records

The nursery production facility ***must*** hold and maintain evidence of accreditation of the business accredited under A.16.3 PART B – Tissue culture production requirements of this Appendix.

The nursery production facility ***must*** hold and maintain records of the origin and unique identification of each tissue culture plantlet provided for under A.16.3 PART B – Tissue culture production requirements of this Appendix.

A.16.4.2.2 Water

Water ***must*** be managed in accordance with requirements provided in NIASA section 1.1.1 Water.

A.16.4.2.3 Growing media/propagating media

Growing media ***must*** be free of soil. Growing media ***must*** be managed in accordance with requirements provided in NIASA section 1.1.2 Growing media/propagating media.

A.16.4.2.4 Labelling of plants and plantlets

Batches of plantlets and plants ***must*** be clearly labelled. The label ***must*** include a code that identifies and links the material to the propagation material record to allow tracing back to the mother plant (clone number) should propagated plants be found to be diseased.

Key requirements for Banana Production – Materials used in plant production

- The nursery production facility ***must*** hold and maintain records of each accredited supplier of material provided for under PART B of this Appendix.

- The nursery production facility ***must*** hold and maintain records of the origin of each tissue culture plant provided for under PART B of this Appendix.
- Water that is obtained from town supplies, bores free of surface run-off, or clean roof catchments does not require disinfestation.
- Other sources of irrigation water (creeks, dams, rivers etc.) ***must*** be disinfested using an approved NIASA disinfestation procedure.
- Subsequent storage of disinfested/clean water requires facilities and procedures to be established and implemented that do not allow for contamination by untreated water, soil, plant debris, dust and animal movement.
- The pH and EC (Electrical Conductivity) of all water sources ***must*** be checked and recorded at least once per month as even town water supplies can have variations in quality.
- Water from surface supplies, springs, effluents, or water testing positive for the presence of root-rot organisms ***must*** be disinfested using a NIASA approved method.
- Please also note audit requirements in APPENDIX 5 NIASA PRODUCTION NURSERY CHECKLIST SECTION 1: Water and irrigation.
- Growing media/propagating media that is sourced from a NIASA accredited growing media supplier does not require additional pathogen testing and treatment prior to use.
- Growing media/propagating media that is sourced from a non-NIASA accredited growing media supplier requires treatment, or pathogen testing and where pathogens are detected – treatment, prior to use.
- Growing media/propagating media prepared on-site which includes components that pose a risk of contamination, for example river sand, ***must*** be disinfested using an approved NIASA disinfestation procedure.
- Each batch of growing media ***must*** be tested for EC (Electrical Conductivity) and pH using suitable equipment. Adequate records of all growing media ***must*** be maintained, including pH and EC.
- Growing media/propagating media ***must*** be stored in a manner to prevent contamination prior to use.
- Please also note audit requirements in APPENDIX 5 NIASA PRODUCTION NURSERY CHECKLIST SECTION 2: Growing media.
- Each batch of plants ***must*** carry a label that identifies the origin of materials used for its propagation.

A.16.4.3 Decontamination and hygiene

For the control of plant pathogens, disinfestation and hygiene procedures are paramount in any production nursery.

Disinfestation, or sanitation, means removing contamination from potentially infested items. Chemical disinfectants or detergents and heat treatments are still the most reliable methods for the control of most plant pathogens.

SCHEDULE 2: EXAMPLE RECORD SHEETS

The following recording sheets are examples of how the mandatory record keeping for NIASA can be achieved.

- Banana Nursery Stock Specification Certification of Banana Material for Tissue Culture Initiation Record.
- Banana Nursery Stock Specification Crop Monitoring Record.

There is no requirement to use these sheets but they indicate the information that ***must*** be kept in accordance with the NIASA Banana Nursery Stock Specifications Appendix.

Records ***must*** be made available to the Auditor when requested.

Banana Nursery Stock Specification
Certification of Banana Plant Material for Tissue Culture Initiation

Accredited Collection Business name (PART A): Bells and Suckers Pty Ltd — NIASA Business Number: **Q28**

Mother Plant Source Material Site Address: 123 Banana Plant Road, Mission Beach, QLD 4852

Authorised Inspection Person / collector name: John Collector — Inspection/Collection Date: 6/3/19

Accredited Tissue Culture Lab Business name (PART B): Best Banana Tissue Culture Pty Ltd — NIASA Business Number: **Q63**

By completing this record, the accredited business acknowledges that each mother plant and each banana plant located within 15 metres of that plant has been inspected by an Authorised Inspection Person and found free of symptoms of Schedule 1 Group 1 and 2 viruses and other pathogens.

Collection details - (NOTE - Leaf samples despatched for indexing ***must*** be marked with the corresponding Mother Plant ID number and be accompanied by a copy of this record m)

Mother Plant ID /clone number (The business's unique sequential ID number)	**GPS Coordinates**	**Cultivar/Variety**	**Type of Material collected**	**Number**	**Comments**	**BioSecure HACCP Biosecurity Certificate Number** (If applicable)	**T/C lab code**
Q28-137	-17.941596, 146.056166	Williams	Suckers	3	Trial plot/ Block 3	N/A	Q28-137

Indexing lab use only

Mother Plant ID /clone number ➲										
Results of virus testing ➲										

BBTV	Other	Other	Other	Name of authorised person	Signature	Date
						/ /

Banana Nursery Stock Specification
Crop Monitoring Record

Business name: **Best Bananas Nursery Production Pty Ltd**

Business address: **123 Banana Production Road, Mission Beach, QLD 4852** Authorised Inspection Person (name): Don Monitor Date: 24/9/19

Crop area monitored (Site Plan reference – e.g. Shadehouse 1)	Crops monitored (e.g. Bench 3)	Plants inspected (e.g. 35 plants)	Pest/diseases detected? (record NO or describe)		Comments / actions (Include sample numbers if applicable)
			Insects/pests	Diseases/disorders/off-types	
Shade house 2	Q28-137	35	Nil	Nil	Nil
Shade house 2	Q28-138	35	Mites (low prevalence)	2 inferior plants / stunted	Treat with miticide. Rogue inferior plants.

CHECKLIST: Banana Nursery Stock Specification – PART A

SOURCING OR COLLECTION OF MATERIAL FOR TISSUE CULTURE INITIATION

Applicable to businesses seeking Banana Nursery Stock Specification accreditation for supply of source materials to a tissue culture facility accredited under PART B of this Appendix.

Source of material *(Tick which box applies)*	Tick	Action
Approved and cleared import released from quarantine		The business is an accredited post entry quarantine facility for the material.
Does not collect material from mother plants		No further action under this PART

Comments:

MOTHER BLOCK INSPECTION

	Needs Attention	Being Upgraded	Satisfactory	Complies Fully	Doesn't Apply
Material is not collected from a biosecurity zone where Group 1 Viruses are known to be present					
Persons inspecting/collecting material from a mother block are trained in identifying symptoms of Group 1 and Group 2 Viruses and other pathogens					
Footwear and tools are cleaned or disinfected prior to entry to the mother block					
Prior to collection of material from a mother plant, the mother plant and all banana plants within 15 metres of the mother plant are inspected for symptoms of Group 1 and Group 2 Viruses and other pathogens with no symptoms detected					
The business maintains a register of Authorised Inspection Persons that includes the names of trained persons and the details of their training and experience					

Comments: