Tropical banana information kit—update

Reprint – information current in 1999

REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website www.deedi.qld.gov.au

This publication has been reprinted as a digital book without any changes to the content published in 1999. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Chemical recommendations—check with an agronomist or Infopest www.infopest.qld.gov.au
- Financial information—costs and returns listed in this publication are out of date. Please contact an adviser or industry body to assist with identifying more current figures.
- Varieties—new varieties are likely to be available and some older varieties may no longer be recommended. Check with an agronomist, call the Business Information Centre on 13 25 23, visit our website www.deedi.qld.gov.au or contact the industry body.
- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

This publication was last revised in 1999. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.

This information has been made available to assist users to identify issues involved in the production of tropical banana. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.

Queensland Government

Tropical Banana Information Kit Annual Update 1998/99

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Introduction

Welcome to the 1998/99 edition of the *Agrilink Tropical Banana Information Kit Annual Update*. This is a special service provided to registered purchasers of the *Agrilink Tropical Banana Information Kit* published in 1998.

This 1999 update provides you with any significant changes to the content of the Agrilink information kit since it was published. It does this by giving you a broad overview of the changes in each section, and then providing the specific changes page by page.

Thank you for being an Agrilink customer. We look forward to continuing to serve you with quality information products.

Contents

Before you START

Overview of the 1998 and 1999 seasons

Production of tropical bananas in north Queensland in 1998 was 30% higher than during 1997. The total north Queensland production in 1998 was 15.9 million cartons or about 200 000 tonnes. During 1998 monthly production was more than 1 million cartons each month, the first time this has happened. This increased production in 1998 depressed average market prices, with average carton price dropping from $16.26 in 1997 to $11.95 in 1998.

Tropical Cyclone Rona in February 1999 inflicted major damage on the Innisfail and Tully growing regions. Heavy rains, flooding and severe wind damage associated with the cyclone resulted in significant production losses and poor quality fruit. Production in 1999 was about 12 million cartons (156 000 tonnes) as Rona destroyed about 30% of the north Queensland crop. Final production figures will be published in the June 2000 issue of *Bananatopics* newsletter.

The 1998–99 grower census figures show 566 growers in north Queensland with a total of 8200 ha under Cavendish and 240 ha planted to other varieties. This is a slight decrease from 1998 when there were 575 growers with nearly 8500 ha of crop.

Specific updates

Industry regulations (page 5)

New banana regulations were enacted in 1999, resulting in several changes to the requirements for banana growers. Another recent regulatory change for fruit and vegetable industries is the move by the Queensland government to remove all statutory levies. The implications of the new levy system and the banana regulations are outlined on page 14 of this update.

Industry developments (page 5)

Quality assurance is becoming a compulsory requirement for banana growers. Many agents and retailers now require growers to demonstrate their compliance with quality assurance and food safety guidelines. Several systems are used in fruit and vegetable industries but the choice of system depends on what best suits your needs and your customers' requirements. An outline of the components of a quality system, together with a description of some of the systems in use, is on page 24 of this update.

Production costs and the capital you need (page 6)

There is no recent study of production costs or capital costs for banana production. You can expect that some costs have risen while others have fallen since the analysis was done in 1998. It is a good idea to do a cash flow analysis for your circumstances before deciding to invest in banana production.

Common QUESTIONS

Overview

The main changes to *Common questions* are related to changes in legislation and regulatory requirements. Some additional questions related to chemical use and quality standards have been raised since the *Agrilink Tropical Banana Information Kit* was published.

Where can I get planting material? (page 2)

Before planting any bananas growers must obtain an 'Inspector's Approval to Move and Plant Bananas'. Information on planting material suppliers can be obtained from inspectors when you apply for the approval. The approval is available from banana inspectors based at DPI offices in South Johnstone, Cairns and Nambour.

Do I need a permit to grow bananas? (page 3)

All commercial growers require an 'Inspector's Approval to Move and Plant Bananas'.

Home gardeners do not need an inspector's approval to grow up to 10 banana plants on their property. Those 10 plants must not have more than 30 stems in total.

The variety you may grow in a residential block is also restricted. Only the varieties listed below are permitted.

Location	Permitted plants
Far northern, northern buffer, northern and the southern buffer quarantine areas	Plants listed in schedule 3 of the regulations: Blue Java, Bluggoe, Ducasse, Goldfinger (FHIA 01), FHIA 02, Goly Goly Pot Pot, Kluai Namwa Khom (Dwarf Ducasse) Pisang Ceylan (Mysore type), Sh 3436, Simoi, Tu-8, War War and Yangambi Km5.
Special and southern pest quarantine areas	Blue Java, Bluggoe, Ducasse, Goldfinger (FHIA 01),Kluai Namwa Khom (Dwarf Ducasse), Lady Finger and Pisang Ceylan (Mysore type).

When do I plant bananas? (page 4)

Bananas can be planted anytime between June and November rather than just from May to June and August to October as stated in the kit.

What irrigation systems should I use? (page 6)

Although solid set sprinklers are still common, under-tree minisprinkler systems are increasing rapidly in popularity.

I want to sell bananas to Western Australia. What do I do? (page 8)

Bananas sent to Western Australia must either be treated for fruit fly or meet the maturity and skin condition requirements that ensure freedom from fruit fly infestation. The treatments include postharvest chemical dips or sprays. Bananas that are hard green and have unbroken skin are also

considered free of fruit fly. Bananas to Western Australia must also be certified to be free of European red mite. As this pest is only known to occur in the Granite Belt region of Queensland, most tropical banana growers can obtain a property freedom certificate to allow them to send fruit to Western Australia. Spiraling whitefly is another pest that occurs in Cape York Peninsula and in Cairns City and is now confirmed from Babinda, Innisfail, Kurrimine Beach, Tully and Cardwell.

What quarantine regulations govern bananas? (page 9)

The quarantine regulations that apply depend on the origin of the bananas and where you are sending your fruit. These regulations can change so it is a good idea to check on the latest regulations at your nearest DPI office or from the DPI Call Centre on 13 25 23.

Do I need quality assurance (QA) and at what level?

Buyers are now demanding some level of quality assurance (QA) in fresh food marketing and all growers will need some form of QA. Different levels of QA are required depending on where you intend to market your fruit. Several QA systems are being promoted within the industry but the choice depends on what best suits your needs and your purchasers' requirements. For further information contact the quality assurance group at DPI's Queensland Horticulture Institute on (07) 3896 9867.

How do I get spray accreditation?

Spray accreditation can be obtained by attending a course provided by an accredited ChemCert Australia trainer. In Queensland the certificate is known as ChemCert Training Queensland Certificate of Agricultural Chemical Application. At present, no other certification is recognised by the National Registration Authority (NRA).

State-based ChemCert committees are responsible for delivering training in each state. Contact details for ChemCert in Queensland and the national office are on page 34 of this update.

Do I need training in the safe use of chemicals?

In some states you cannot buy chemicals unless you have a current spray accreditation or have suitable authorisation. An authorised person is one who is certified by ChemCert Australia or whose business is selling or supplying agricultural chemical products, or who is a state licensed spray contractor. Currently, by law in Queensland, you only need training in safe use of chemicals if you are a contractor spraying on other people's land or you want to buy or use restricted chemicals such as endosulfan.

However, most customers now see it as highly desirable for their growers to be able to demonstrate safe, responsible use of chemicals. One of the best ways to demonstrate this is to obtain ChemCert accreditation. Remember spray accreditations must be renewed every five years.

How should I store my chemicals?

The DPI booklet *Farm chemical storage guide* (Q199064) is designed to provide growers with a user-friendly, accurate guide to what is required by law and to comply with safety standards acceptable in today's workplace. The advice given reflects closely the Australian Standards AS 2507, AS 1940 and AS/NZS 4452, as well as the Workplace Health and Safety publication *Code of practice for the storage and handling of chemicals at a rural workplace*. It covers location, construction, management of stock, planning for emergencies and waste disposal.

Further information on correct use of chemicals is covered in the ChemCert chemical user course. Employees of farm chemical resellers with ChemCert accreditations are also a useful source of information.

The booklet, *Farm chemical storage guide* is available from Eric Coleman at DPI's Gatton Research Station Ph: (07) 5466 2216.

Do I need to keep a diary of spraying records?

At present the only records legally required are those kept by chemical resellers to record S7 sales and those required for the usage of endosulfan. However, properly kept records of chemical applications are critical documentation to prove your chemical application practices. Many produce buyers and retailers now expect their suppliers to keep detailed spray records and will require evidence that you are doing so. You should record: what crop was sprayed and the area; what was applied; how much per 100 L and how much spray volume (L/area); what pest or disease was targeted; what application method was used and by whom; and when the application took place.

Growing THE CROP

Overview

This section updates changes to growing the crop relating to regulatory requirements, weed control, eradication of bananas and disease control.

Specific updates

Planting material (page 11)

Regulatory requirements

The planting and movement of banana plants is now controlled by the Plant Protection (Banana Pest Quarantine) Regulation 1999, which is subordinate legislation under the Plant Protection Act 1989. Under this regulation growers must obtain an 'Inspector's Approval to Move and Plant Bananas' before planting any banana plants.

The previous system of field accreditation of planting material sources no longer exists. The field planting material supply will be approved when the inspector's approval to plant is given. The planting material supply must be free of notifiable pests and diseases. These are banana bacterial wilt *(Ralstonia solanacearum)*, banana blood disease *(Ralstonia* spp.*)*, banana bugtok disease *(Ralstonia solanacearum)*, banana moko disease *(Ralstonia solanacearum)*, banana black Sigatoka *(Mycosphaerella fijiensis)*, banana Panama *(Fusarium oxysporum* f.sp *cubense)*, banana bract mosaic virus, banana bunchy top virus and pest banana plants.

Quality Banana Approved Nursery (QBAN)—field (page 15)

There is no longer a QBAN field inspection system operating for banana planting material. Field planting material supplies are approved when the grower applies for the approval to plant.

Weed control (page 20)

There are several changes to the herbicides registered for weed control in tropical bananas listed in Table 1.

Arsenic is no longer registered for use in bananas.

2,2 DPA sodium is now available as Propon. Altapon is no longer registered.

Several new Diuron products are now registered. They include Di-on, Diurmax and Zee-uron. Diugranz is no longer registered.

Many other glyphosate-based herbicide products are now registered for bananas. They include Glycel, Glyfos, Ken-up, Harpoon, Weedmaster, Ranger, Ricochet, Sanos, Squadron, Summit, Pacer and Touchdown.

Haloxyfop r-methyl ester is now available in the registered products Typhoon, Verdict and Appeal.

Paraquat is also registered for bananas as Spraytop, Boa and Sprayquat.

A new herbicide pendimethalin, trade names Stomp and Ipimethalin, is registered for the control of grasses and some broadleaf weeds. It has a pre-emergent action.

Diseases (page 23)

Rust is becoming an increasingly common leaf disease problem, particularly in the Innisfail area. Control of leaf rust relies on thorough (excellent) spray coverage with protectant fungicides like mancozeb, and regular deleafing to remove disease inoculum. Practices that improve air movement in the canopy and reduce humidity and leaf wetness will assist in reducing disease severity. Affected growers should consider reducing plant densities in future plantings to assist with air movement and spray coverage.

Eradication of plants (page 27)

When pushing over plants the best system is to knock all of the plants over in the same direction and the run the discs over the plants for the first time in the opposite direction so that the discs pass over the crowns before chopping the corms. With this method the corms are more firmly anchored on the ground and the discs are less likely to slip as they chop the corms.

Packing (page 30)

In Figure 16 on page 31, the bottom layers are stacked in a column arrangement directly on top of each other, which improves load bearing by the carton corner posts. The middle and upper layers are stacked in a pinwheel fashion to aid stability.

Key ISSUES

Overview

The main change that growers should note is the changes to the *Key issue* on legislation in banana production. A new section on understanding and choosing a quality assurance system has been added and new research on biodegradation of nematicides is included with new recommendations on chemical rotations.

Specific updates

Legislation in banana growing (page 8)

There have been changes to the legislation covering banana growing. A new regulation, the Plant Protection (Banana Pest Quarantine) Regulation 1999, has been enacted by Parliament. Copies of the regulation can be obtained from the Internet web site of the Office of the Queensland Parliamentary Counsel at http://www.legislation.qld.gov.au/LEGISLTN/SLS/1999/99SL310.pdf The main points in the legislation that banana growers need to know are:

- The name of the 'planting permit' has been changed. It is now referred to as an 'Inspector's Approval to Move and Plant Bananas'.
- All plantings of bananas must have an 'Inspector's Approval to Move and Plant Bananas'. This includes growers who want to expand their plantation with their own planting material. Growers should apply for this approval before starting to plant. The approval is still free and it will be given if the source plants are known to be free of any notifiable pest or disease. The movement of planting material is covered by a policy developed by the DPI, the Banana Industry Protection Board (BIPB), NSW Agriculture and the Banana Industry Council (BIC). Planting material may only be taken from a property more than 1 km from a known Panama-infected site.
- An inspector's approval must be obtained to move soil that has been in contact with bananas.
- All races of banana Panama disease are now included as a notifiable pest. Other notifiable pests include banana bacterial wilt, banana blood disease, banana bugtok disease, banana moko disease, banana black Sigatoka, banana bract mosaic virus, and banana bunchy top virus. Pest banana plants, which include any plants of the genera *Musa* or *Ensete* other than a plant that produces edible fruit or an indigenous plant that is not a volunteer plant, are also notifiable.
- Leaf speckle is now included as a prescribed pest together with leaf spot. Growers will need to keep both diseases under control or risk the issue of an advice or an order to control the disease.
- Weeds within 2 m of a banana plant should be less than 60 cm high to allow easy inspection and clear identification of disease symptoms on banana plants.

- Residential plantations are allowed without an inspector's approval but only a maximum of 10 banana plants with a maximum of 30 stems can be grown. The variety that can be grown is also restricted. Refer to the list of permitted varieties in *Common questions* on page 7 of this update.

Levies (page 8)

The Queensland government has removed legislation that allows the compulsory collection of statutory levies. This includes the statutory levy of the Banana Industry Protection Board (BIPB).

Industry representatives have discussed options for replacement funding. The compulsory Queensland Fruit and Vegetable Growers (QFVG) membership levy will remain in place for the next two years. For this time the industry has decided to increase the compulsory QFVG banana levy to include a component to support the ongoing activities of the BIPB.

The QFVG banana membership levies in January 2000 were set at:

General levy	4.5 cents per carton
Promotions levy	15.0 cents per carton
Research and development	2.0 cents per carton
Particular levy (market representation)	1.0 cents per carton (Qld, NSW, Vic only)
Particular levy (BIPB)	4.0 cents per carton
Total levy	26.5 cents per carton

Quarantine (page 9)

There have been no major changes to quarantine areas. The maps in this update outline the different quarantine areas more clearly than the maps (Figure 6) in the kit. Note that the restriction on growing bananas on holdings of less than 1000 sq m has been altered to the restriction on residential plantings mentioned previously.

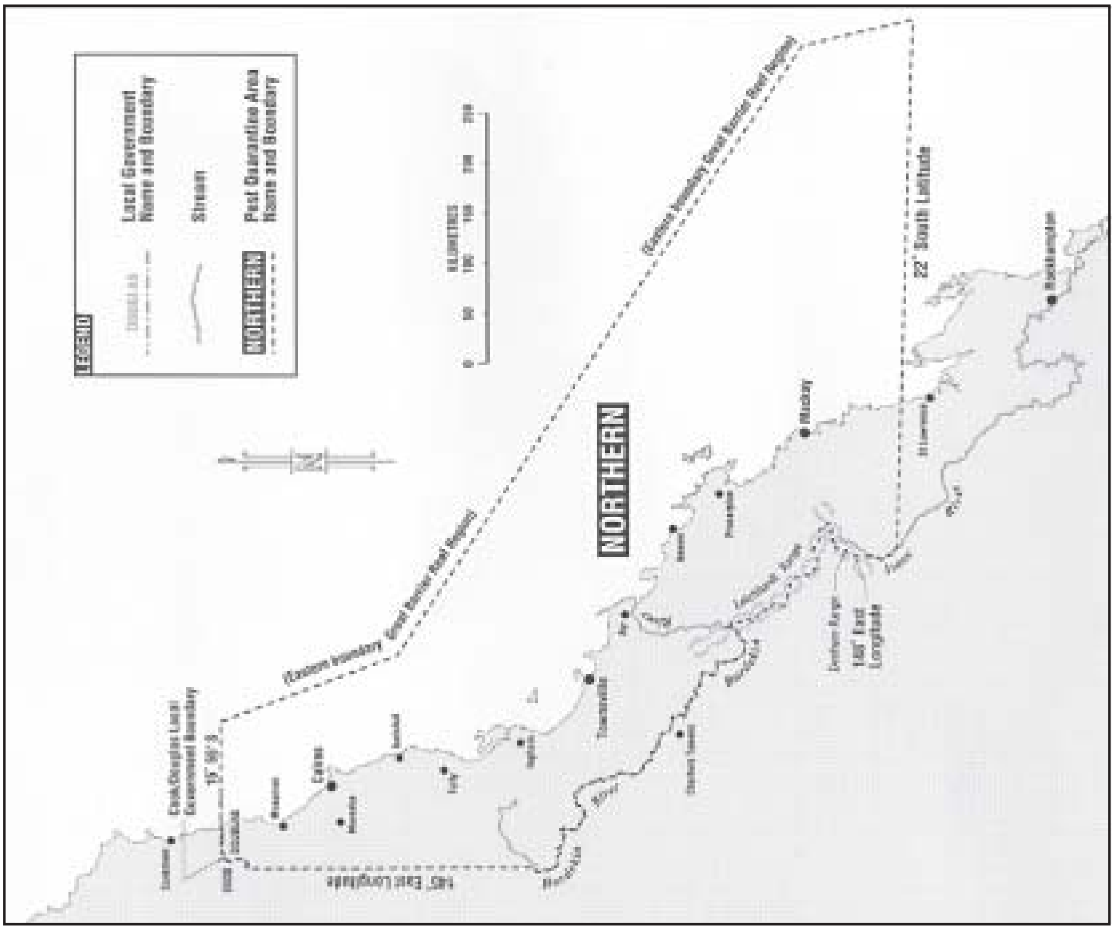
Notifiable and gazetted pests (page 10)

The number of insects, diseases and other pests that are notifiable pests under the act has increased.

The notifiable pests and diseases are:

- banana bacterial wilt *(Ralstonia solanacearum)*
- banana blood disease *(Ralstonia* spp.*)*
- banana bugtok disease *(Ralstonia solanacearum)*
- banana moko disease *(Ralstonia solanacearum)*
- banana black Sigatoka *(Mycosphaerella fijiensis)*
- banana Panama *(Fusarium oxysporum* f.sp *cubense)*
- banana bract mosaic virus
- banana bunchy top virus
- pest banana plants. (Any plants of the genera *Musa* or *Ensete* other than a plant that produces edible fruit or an indigenous plant that is not a volunteer plant.)

The requirement to notify an inspector within 24 hours if the presence of a notifiable pest or disease is suspected remains in place. Any plants within 20 m of the place where any of these pests or diseases are found must be destroyed, the area fenced off and a cover crop planted unless instructed otherwise by an inspector. Pest banana plants may still be grown under strict conditions set out in an inspector's approval.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Local Government Name and Boundary
Stream
Pest Quarantine Area Name and Boundary
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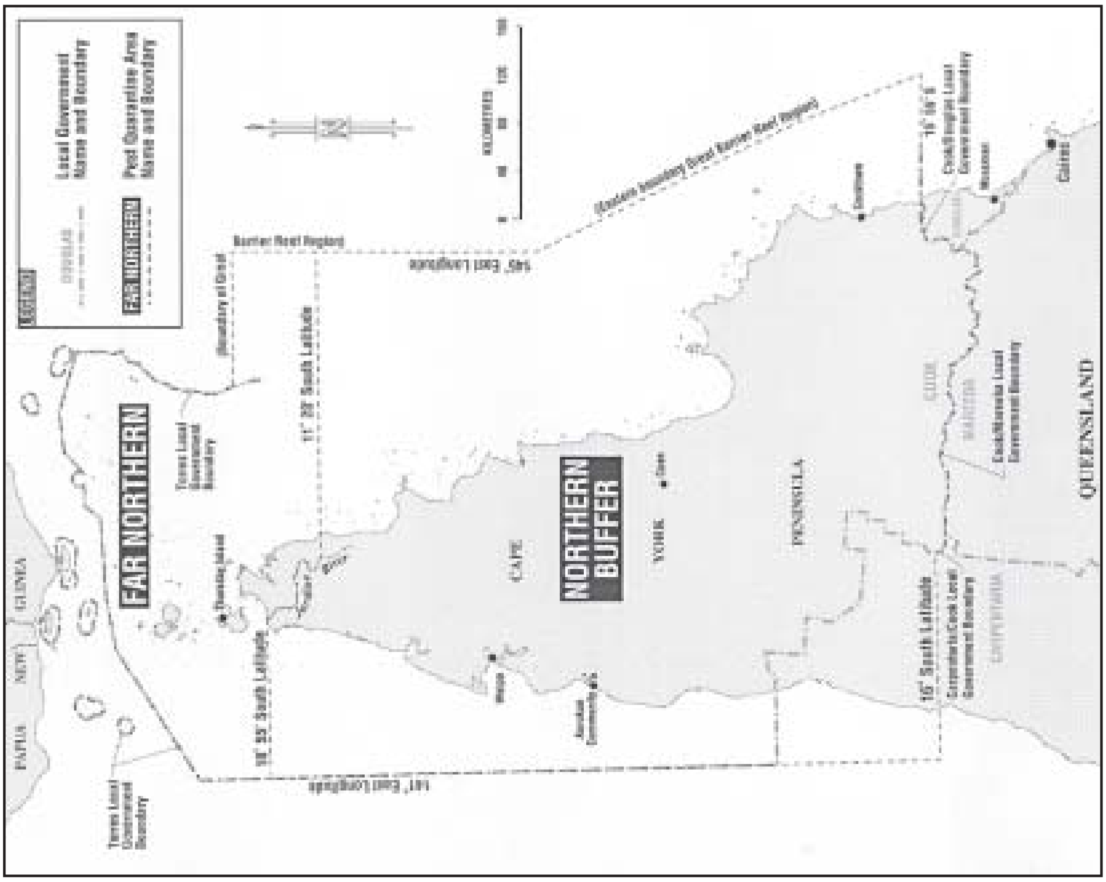
KILOMETRES
(Eastern boundary Great Barrier Reef Region)
22° South Latitude
145° East Longitude
Cairns
Townsville
Mackay
Rockhampton


LEGEND
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Pest Quarantine Area Name and Boundary
FAR NORTHERN
NORTHERN BUFFER
CAPE
YORK
PENINSULA
QUEENSLAND
PAPUA
NEW
GUINEA
Barrier Reef Region)
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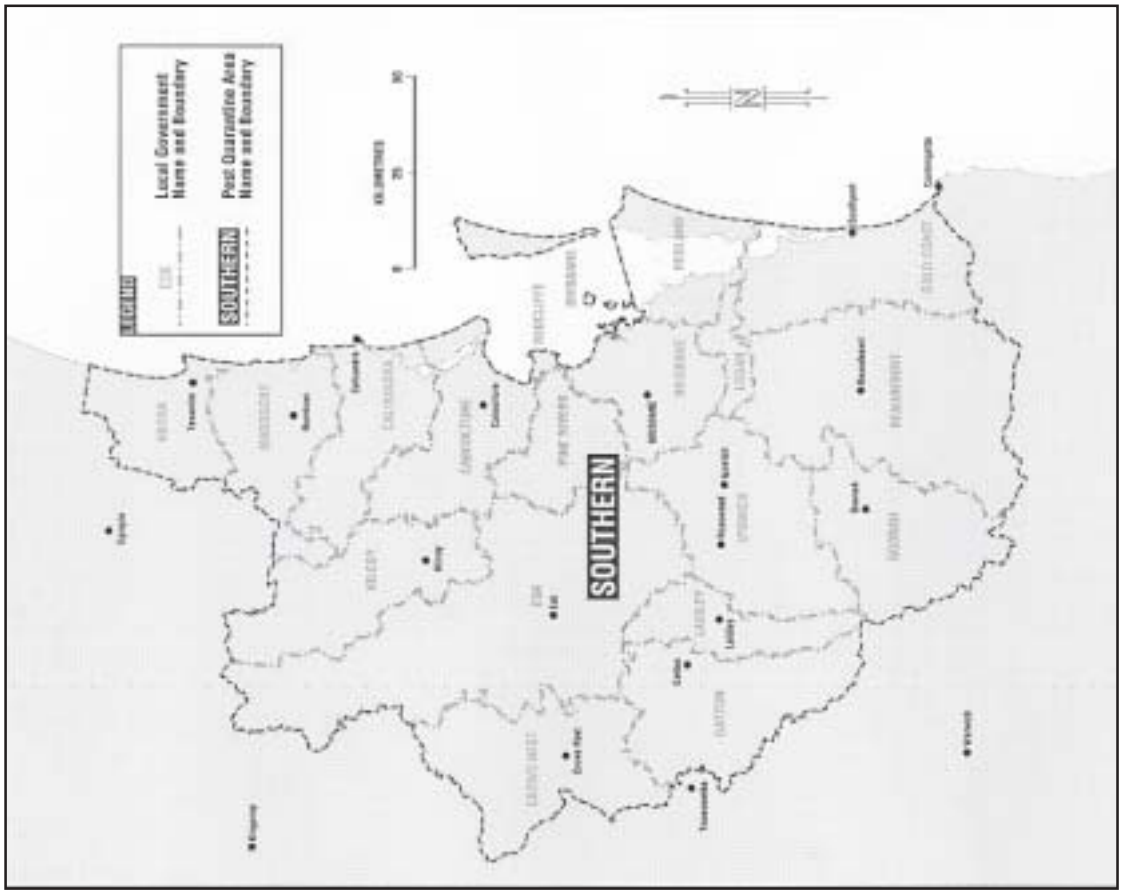
11° 20' South Latitude
10° 35' South Latitude
16° South Latitude
(Eastern boundary Great Barrier Reef Region)
Cairns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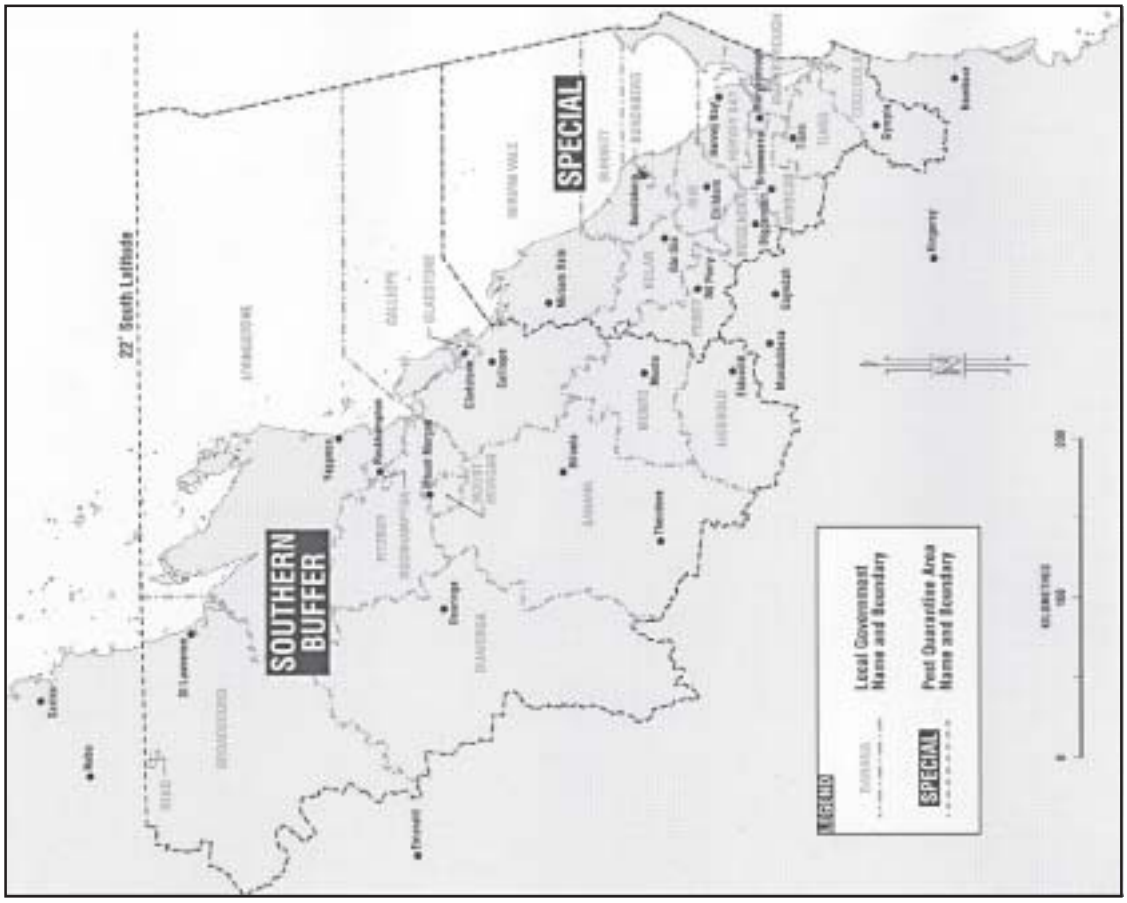

SPECIAL
SOUTHERN BUFFER
22° South Latitude
Local Government Name and Boundary
Pest Quarantine Area Name and Boundary
N

Leaf spot (page 10)

Both leaf spot or yellow Sigatoka *(Mycosphaerella musicola)* and leaf speckle *(Mycosphaerella musae, Veronaea musae* and *Perconiella musae* are now gazetted pests that must be controlled at low levels by growers.

Economics of banana production (page 12)

In the tables on page 13 showing the gross margin sensitivity analysis, the heading should read 'Plant crop' not 'Plant crop/ha'.

Crop scheduling (page 15)

In the paragraph titled 'How do I schedule my crop', water stress is listed as one method to obtain a more uniform crop. Water stress is not a suitable tool to use in crop scheduling and the reference should be deleted.

Varieties (page 25)

In the variety colour supplement the area of Lady finger should be about 70 ha in north Queensland.

Goldfinger is also known as SH-3481 not SH- 3482.

Sucrier is also known as Senorita.

Irrigation (page 36)

The field of irrigation monitoring is growing rapidly and several new irrigation monitoring devices are available.

Gopher® soil moisture profiler

The Gopher® soil moisture profiler developed and manufactured by Soil Moisture Technology Pty Ltd measures the dielectric constant of the soil to determine its moisture content.

As the soil's water content increases, so does the soil's dielectric constant. Dissolved salts do not significantly affect this reading, which means that fertiliser applications or irrigation water quality do not alter the soil moisture estimates.

Results are presented in millimetres of precipitation required to bring the soil water content up to field capacity and irrigation watering time is then easy to calculate. Data are displayed as readily available soil water, water deficit and total soil water over the nominated root zone depth. These figures are calculated in the field as the profile is recorded.

Soil capacitance probes (page 39)

Several systems using similar technology to the Enviroscan® system are now available. A hand-held portable data logger, Diviner 2000®, has been developed which accesses the same tube and uses the same soil moisture sensing technology as the Enviroscan®.

AGRILINK® is an irrigation consultancy that supplies a continuous monitoring capacitance system. This system incorporates a radio device that allows data to be downloaded to a remote site without the need for extensive cabling. This company also supplies a weather monitoring device that can send environmental data including rainfall, maximum and minimum temperatures, and leaf wetness ratings to a remote station through a telephone connection.

Managing nematodes in bananas (page 44)

Recent research on the biodegradation of nematicides has shown that it is a significant problem. Rotation of nematicides can help overcome biodegradation problems because micro-organisms responsible for biodegradation of one nematicide will not degrade another nematicide with a different active ingredient. While the number of microbes that degrade the first nematicide are declining in the soil, the second nematicide remains active in the soil.

Chemical rotations

Nematicides should be rotated to reduce the potential of enhanced biodegradation. Try to avoid using the same nematicide within a year of each application. The nematicide rotation schedule for bananas in north Queensland (Table 9 in this update) is a guide to which nematicide to apply and what year to apply it.

The least water soluble nematicides, Rugby, Counter and Hunter, are applied during the wetter months and the more systemic and soluble nematicides, Nemacur and Vydate, are applied in the drier months. No nematicides are recommended for March because of the potential for very heavy rainfall, which may leach or wash them away.

Hints

- When establishing a banana block it is important that your source of planting material is nematode-free.
- Avoid the overuse of nematicides.
- Rotate nematicides and avoid using the same nematicide within one year of the previous application.
- Use the chemical best suited to the time of year.
- It is best to apply nematicides before light rain or to use irrigation to assist with incorporation into the soil. Heavy rainfall may wash the application away.

Table xxx. *Suggested nematicide application schedule for bananas in north Queensland*

Nematicide	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nemacur	✘	✘	✘	✘	✘	✔	✔	✔	✔	✔	✔	✘
Vydate	✘	✘	✘	✘	✘	✔	✔	✔	✔	✔	✔	✘
Rugby	✔	✔	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔
Counter, Hunter, Terbuforce	✔	✔	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔

✘ Not recommended ✔ Recommended

Fallows and rotations (page 47)

The recommendation for length of fallow has changed to one year rather than six months to ensure that no volunteer bananas and few nematodes survive.

Table 9 has been rewritten to show resistance to burrowing nematodes as a percentage level to allow the crops to be compared for their effectiveness as a fallow crop. Crops with a resistance better than 95% are suitable for use in a banana fallow.

Table 9. Percentage resistance of some crops to burrowing nematode

Cultivar	% resistance
Sugarcane cv. Q124	100
Sugarcane cv. Q135	100
Paspalum wettsteinii	100
Sugarcane cv. Q96	100
Brassica cv. Hyola 42	100
Canola	100
Mustard	100
Bonar rape	100
Jarra grass	97
Sugarcane cv. Q117	97
Rhodes grass cv. Callide	96
Sugarcane cv. Q158	94
Rhodes grass cv. Nemkat	92
Green panic	90
Competidor bahia	81
Sugarcane cv. 127	81
Brachiaria humidicola	78
Sorghum cv. Hunnicut	64
Sorghum cv. Lush	55
Sorghum cv. Asgrow	47
Sorghum cv. Super Dan	47
Sorghum cv. Betta Dan	38
Sorghum cv. G93A010	35
Sorghum cv. YSG33	31
Molasses grass	25
Banana cv. Williams	0
Sorghum cv. 27900	0
Sorghum cv. LB905	0

Leaf spot diseases (page 49)

In 1998 two trials tested the level of ascospore survival under several conditions. These trials found that infected leaves hanging in the canopy can continue to eject ascospores for at least 20 weeks. After deleafing, however, the leaf tissue on the ground can only eject ascospores for four to eight weeks. This highlights the importance of a regular deleafing program. Deleafing can be expected to reduce the quantity of ascospore production by 85%.

Organic banana production (page 55)

Bacillus thuringiensis insecticides mentioned in the kit, are only permitted for use on bananas grown under organic certification.

Workplace health and safety (page 63)

The following notes were provided by Leonie Davis of Workplace Health and Safety, Innisfail

A recent survey of work related injury in the banana and papaya industries in the Johnstone Shire found that the injury rate had fallen significantly from 57.5 per 100 farms in 1993 to 27.3 per 100

farms in 1998. This reduction was consistent with the decrease in workers compensation claims reported.

However, the provision of Roll Over Protection Structures (ROPS) on tractors had increased by only 2.3% over the same five-year period to 61.9% There are still too many unprotected hours of tractor operations by both employees and family members. The outcome of a tractor roll over is usually serious injury or death.

Managers should note that the rural industry is not exempt from any of the advisory standards that cover workplace health and safety.

When an accident occurs remember that all serious bodily injuries and all work caused illnesses must be reported to Workplace Health and Safety within 24 hours. They are reported on Form 7, 'A Record of Injury, Illness and Occurrences under the Workplace Health and Safety Act 1989'.

Mechanisation (page 68)

The following notes clarify or add to the information provided in this section of the kit:

Harvesting *(page 70)*

- Rather than using a pair of workers to harvest it is most likely that there will be a crew of workers working in pairs.
- Mechanical bunch harvesters have been successfully tested in the industry, with little adoption yet.
- When transporting bunches both the self-propelled and roll-on–roll-off versions of the A-frame trailer are commonly used.
- In the shed design, consideration should be given to the design of waste disposal systems that are integrated with the handling system to maximise worker efficiency.
- For staff working directly in the packing shed, productivity can vary from about 105 to 170 cartons per person per day, or 13.1 to 21.3 cartons per person per hour.

Dehanding *(page 75)*

- Depending on the process and technology of the packing shed, dehanders may also cluster, sort and grade the banana hands. The dehander may also detach and dispose the bunch stalk from the gantry/ bunchline after dehanding.

Desapping and sorting *(page 76)*

- Sorting involves inspection of hands and removal of defective fruit. Reject fruit may be placed in a bin thrown into a trailer or preferably put on an auxiliary waste conveyor. Workers assigned specifically to sorting may be used in sheds encompassing all but the smallest outputs. However, dedicated sorters are more commonly employed in sheds using trough and belt systems and typically these sheds have medium to high outputs. Sheds in which only packing wheels are used rarely employ dedicated sorters since it is physically difficult to incorporate them into the system.

***Packing** (page 77)*

- Typically packers pack hands or clusters into fibreboard cartons, 13 kg nett minimum. The packer has to position an empty carton, insert a plastic liner, pack bananas, insert a plastic slip sheet/s and complete packing the carton. Packers may also need to sort and reject defective fruit and split some hands for proper fit and weight adjustment.
- Packing is the most labour intensive activity in packing sheds. In most sheds packers are usually dedicated operators and other shed operations are geared so that packers are not delayed.

Quarantine (page 81)

New descriptions for banana Panama disease, spiraling whitefly and banana pest plants are included in the section on quarantine threats from other areas of mainland Australia. In the section on threats from overseas, the listing has been expanded to include blood disease and bugtok, as well as a new section on banana bract mosaic disease

Threats from other areas of mainland Australia

Banana Panama disease

Cause

The disease banana Panama is caused by several strains of the fungus *Fusarium oxysporum* f.sp *cubense*.

Current location

Three main strains of banana Panama occur in Australia. Race 1 affects Lady Finger, Ducasse, Sugar and several other varieties (but not the Cavendish types). The disease occurs sporadically throughout Queensland. Race 4 Subtropical affects many farms in south-east Queensland and several in the Bundaberg area. It has not been detected in north Queensland. Race 4 Tropical has not been detected in Queensland, but has affected several properties in the Darwin area of the Northern Territory.

Significance

Banana Panama disease is a notifiable pest under the Plant Protection Act 1989.

The disease causes yellowing, wilting and death of plants. Once infected, the site cannot be cleared of the disease because spores remain viable in the soil for many years. The disease is spread in infected soil, water and planting material.

Control

There is no cure for the disease.

Spiraling whitefly

Current location

As of May 2000, spiraling whitefly was also present in urban areas of Cairns and Townsville and the towns of Mossman, Port Douglas, Gordonvale and Babinda, Innisfail, Kurrimine Beach, Tully and Cardwell.

Control

A small parasitic wasp, *Encarsia* sp., has been introduced into Australia and will be useful in an integrated pest management program.

Pest banana plants

What are they?

A pest banana is any plant of the *Musa* or *Ensete* genus other than:

- a plant which produces edible fruit
- an indigenous plant that is not a volunteer plant.

These plants include several ornamental species with decorative floral bracts. The fruits contain seeds that have the potential to spread rapidly and harbour pests and diseases that may infect the edible varieties.

An inspector's approval to grow these plants may be given only for scientific or educational purposes, and only after appropriate conditions are in place to avoid spread of the plant's seeds.

Significance

A pest banana plant is a notifiable pest under the Plant Protection Act 1989.

Seeded bananas produce large numbers of viable seeds, which may be carried considerable distances by animals after being eaten, then deposited in faeces. These plants have a high potential to become weeds, pose a serious environmental hazard and have the potential to harbour a wide range of diseases that affect edible bananas. There is a real risk of establishment in isolated areas where eradication would be impossible.

Threats from outside the Australian mainland

Banana blood disease

Cause

Banana blood disease is caused by the bacterium *Ralstonia* sp., which is closely related to the bacteria that cause banana moko disease and banana bugtok disease. Symptoms of yellowing of the leaves, wilting and death of plants are somewhat similar to those for banana Panama and banana moko disease. Cut surfaces of the pseudostem and bunch generally produce a red-brown ooze, hence the name. This ooze is often obvious from male florets and bracts after dehiscence.

Current location

Banana blood disease is found in many areas of Indonesia. It has recently been detected in Irian Jaya.

Significance

Banana blood disease is a notifiable pest under the Plant Protection Act 1989.

This is a soil-borne disease transmitted through planting material, tools which have come into contact with infected sap and contaminated soil. It is thought that insects, which have come into contact with infected sap, may also transmit the disease.

Control

There is no practical cure for banana blood disease.

Banana bugtok disease

Cause

Banana bugtok disease is caused by the bacterium *Ralstonia solanacearum*. Closely related strains of this bacterium cause banana moko disease and banana blood disease. The most obvious symptom of the disease is discolouration of the fruit pulp. The degree of discolouration varies with the severity of the infection. Bracts from the male inflorescence may remain attached if the bell is not removed. There is generally some discolouration of the vascular bundles of the pseudostem when cut. This may extend into the corm.

Current location

Banana bugtok disease is currently known to occur in the Philippines.

Significance

Banana bugtok disease is a notifiable pest under the Plant Protection Act 1989.

The main mode of transmission of banana bugtok disease appears to be insects that visit infected flowers. There is some evidence to suggest that spread of the disease can be limited by early bagging of the inflorescence. The disease has not been thoroughly studied, so hygiene procedures as applied for banana Panama, banana moko disease and banana blood disease should be applied.

Control

There is no cure for this disease.

Banana moko disease

Cause

Banana moko disease is caused by the bacterium *Ralstonia solanacearum*. Symptoms are somewhat similar to banana Panama disease and banana blood disease.

Current location

Banana moko disease appears to have originated in Central and South America where the disease is widespread. It is also found in India, throughout South-East Asia and the Philippines.

Banana bract mosaic

Cause

Banana bract mosaic disease is caused by the banana bract mosaic virus (BBrMV). The most distinctive symptom is a reddish-brown mosaic pattern on the bracts of the inflorescence. There may also be mosaic and long spindle-shaped lesions on the pseudostem and petiole, and chlorotic lesions may be present on the leaves and bunch stalk. Not all infected plants show these symptoms. Banana bract mosaic is transmitted in infected planting material and by various aphid species.

Current location

This disease is currently known to occur in India, Sri Lanka, Vietnam, the Philippines and Western Samoa.

Significance

Banana bract mosaic is a notifiable pest under the Plant Protection Act 1989.

The virus weakens the plant and reduces yield, with losses of up to 40% being reported.

Control

There is no cure for infected plants.

A new key issue

Quality management

Supermarkets, market agents and processors are now requesting that their suppliers have quality management accreditation. Australia is also developing national arrangements for safe and hygienic production of food. National legislation and food safety standards have been designed to ensure that safe practices are used at all stages of the food supply chain. Food businesses from primary producers to retailers will have to meet the requirements of these new standards. The standards are risk-based, meaning that businesses with higher food safety risks will have to take more precautions when developing their quality management systems than businesses with lower food safety risks.

The newest HACCP based food safety program, Freshcare, will be launched nationally in July 2000. It has been developed by a national team and will be audited by an independent audit group, AUS-QUAL

For information about the Freshcare audit contact Blair Davies at AUS-QUAL on 1800 630 890.

An understanding of the principles of quality management will help producers to decide what type of quality system they need to implement to meet their customers' requirements. This new section outlines the principles of quality management and describes the systems that growers can use.

What is quality management

Quality has been described as the fitness for purpose of a product. It implies a predictable degree of uniformity and dependability. But quality goes beyond just the product; it also includes services such as packing true-to-label and delivering on time. In short, quality includes all those points that satisfy your customers.

Quality management, then, is the way you run your business to satisfy customers. This means that growers are constantly engaged in quality management, perhaps even without being aware of it.

In the past, the suitability of the product for its intended market was determined by what is called 'end point inspection'—inspection at the market level. This system has several important flaws.

- It is expensive to reject product at this late point in its cycle.
- It is difficult to predict product performance during the rest of the marketing process when its past history is unknown.
- It is often driven more by tradition than by real market needs.

The objective of modern quality management is to build quality right through the production and marketing process so that there is little or no need for rejections late in the chain. This system also provides customers with documented evidence that the product they are buying will meet their needs.

As such, quality management is a marketing tool to achieve repeat sales, as well as a productivity improvement tool to identify problem areas, prevent mistakes and reduce wastage. It also helps growers access markets with quarantine and other barriers to normal entry and promotes greater trust and cooperation throughout the marketing chain.

What makes up a quality management system?

A quality management system consists of the following parts, which are common to all growing and packing businesses.

Product specifications

Product specifications describe the features of the product for sale so that there is no confusion for either customer or staff. Many customers, for example Woolworths, are developing product specifications for their suppliers.

Product identification and traceability

Product identification and traceability is the method used to trace product from its point of origin in the field, through the packing shed to the customer. It also enables trace-back from the customer to the product's point of origin. A traceability code could be a 'packed on date' but many packers prefer a code that only they can interpret. Letters of the alphabet can be printed on the carton, and circled for different days, planting blocks, etc. This gives the grower the ability to trace-back from individual cartons to the field. Computer-aided equipment that prints a code on each carton is also available

Control of production processes

Control of production processes involves planning the production process and doing it correctly. This includes:

Monitoring products, processes and services. Checks to ensure that product meets specifications, and processes and services have been done correctly.

People (managers and staff). Motivated and well-trained managers and staff are critical to the success of a business.

Customers and suppliers. Developing relationships with customers for mutual benefit and working with suppliers to ensure raw materials, for example cartons or chemicals, are satisfactory

Documentation. Describes the documents that are used to support a quality management system. Includes manuals, records, checklists, procedures, work instructions, job descriptions and training guides.

Reviewing and improving the system. Developing a process to regularly review operations and plan and implement improvements.

Core principles of quality management

- The customer defines quality, not the grower.
- Quality management has to be planned, organised and managed, it does not happen by itself.
- Problems are identified at the earliest possible point, not at the end point.
- Everyone in the business, including workers, is responsible for quality management; it is not just the responsibility of management.

To implement an effective quality management system, growers will need commitment, good planning, staff involvement and well-organised documents (including records and product specifications).

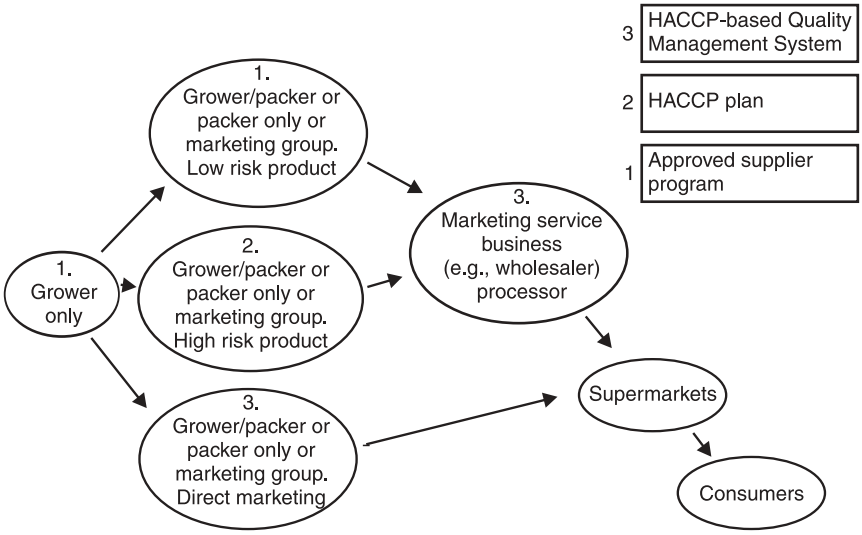
What level of quality management do you need?

The three broad levels of quality management practices being requested by customers are:

- Approved Supplier Program
- Hazard Analysis and Critical Control Point (HACCP) Plan
- HACCP-based quality management standard or code.

The level of quality management you need to implement will depend on the marketing arrangements and the potential risk of the product causing a food safety problem.

If your product is supplied directly or indirectly to a supermarket, the minimum level of quality management needed by different businesses in your supply chain is shown in the figure.
Some food service businesses, such as fast food outlets, are requesting an HACCP plan or specific quality management practices under an Approved Supplier Program.
Exporters will require some level of quality management, depending on their customers.



Minimum levels of quality management required for businesses to supply supermarkets

The three levels of quality management

Approved Supplier Program

An Approved Supplier Program involves suppliers carrying out agreed practices that will provide assurance to customers that the product is safe to eat and of acceptable quality. Suppliers will need to keep sufficient records to demonstrate that the practices are a part of everyday operations. The customer or someone on behalf of the customer will periodically check that suppliers are carrying out the agreed practices.

Direct suppliers to supermarkets need to develop approved supplier arrangements with their grower suppliers. This could include:

- wholesalers or processors who supply direct to a supermarket
- packers who supply direct to a supermarket

- marketing groups who supply direct to a supermarket. The marketing operation within the group would need to have an HACCP-based quality management standard or code (level 3) and have approved supplier arrangements with their growers.

Further information about specific practices and documents that may be included in an Approved Supplier Program is contained in the publication *Developing an Approved Supplier Program for fresh produce—a guide for customers and suppliers.* This publication is available from DPI, 80 Meiers Road, Indooroopilly, Qld 4068. Ph: (07) 3896 9865; Fax: (07) 3896 9446.

HACCP plans

HACCP is an internationally recognised method to identify, evaluate and control hazards (things that can go wrong) to food products. HACCP was originally developed to provide assurance that food was safe to eat, but it is now being used to ensure that customer quality requirements are met.

HACCP is being requested of some growers who supply products that are perceived to have a high risk of causing food safety problems or where the next business in the supply chain demands it. HACCP relies on prevention to control potential problems. Potential hazards are assessed for significance and control measures are established to eliminate, prevent or reduce the hazard to an acceptable level.

Typical food safety hazards include excessive chemical residues, microbes causing sickness, and physical contaminants (glass, sticks) that may lodge in product.

Some independent auditing companies will certify HACCP plans according to the Codex Alimentarius Commission guidelines.

HACCP-based quality management standard or code

The quality management standards or codes incorporating HACCP that are relevant to the horticultural industry are:

- ISO 9002 plus HACCP
- SQF 2000^{CM}, SQF 1000^{CM}
- HACCP 9000
- Supermarket quality management standards
- Freshcare.

HACCP-based quality management standards or codes are required where growers or packhouses directly supply supermarket chains or where the next business in the supply chain demands this requirement. Check with each supermarket to see what standards or codes they will accept.

For Freshcare, SQF 2000^{CM}, SQF 1000^{CM}, ISO 9002 and HACCP 9000, an accredited independent company conducts audits to certify that the business meets the quality system standard.

For supermarket quality management standards, the supermarket, or an independent company on their behalf, does the auditing.

ISO 9002

ISO 9002 is the international standard for quality management systems and the system on which most others are based. It was developed originally for manufacturing companies and is now used by many industries. It consists of 20 elements covering all aspects of producing products and servicing customers. Supermarkets are requiring their direct suppliers to include HACCP in their ISO 9002 systems.

SQF 2000^{CM} and SQF 1000^{CM} quality codes

The SQF 2000^{CM} and SQF 1000^{CM} quality codes were developed by Western Australia's AGWEST Trade and Development specifically for small businesses in the food industry. They are recognised in Australia and in some Asian countries. The codes have specific requirements that must be addressed to achieve certification. The codes include HACCP, which provides assurance that the product is safe and meets customer and legislative requirements. To achieve certification, a registered, skilled HACCP practitioner must develop, validate and verify the HACCP plan.

HACCP 9000

HACCP 9000 is a quality management standard incorporating ISO 9002 and HACCP.

Supermarket quality management standards

An example of supermarket quality standards is the Vendor Quality Management Standard developed by Woolworths Australia for their direct suppliers. It is aimed at food safety and quality requirements and is an HACCP-based quality management standard.

Problem SOLVER

Specific updates

There have been no changes to the *Problem solver.*

Contacts & REFERENCES

Specific updates

Banana grower associations (page 3)

Kim McMeeken is no longer the industry development officer and the position is vacant. The address and phone numbers are the same but the e-mail address is: abgc@abgc.org.au

Organic grower associations (page 4)

National Association for Sustainable Agriculture (NASAA) has a new e-mail address: enquiries@nasaa.com.au

QBAN registered nurseries (page 4)

Safculture no longer supplies tissue cultured banana plants.

Planting material suppliers (page 5)

Due to changes in legislation planting material suppliers are no longer registered. You will still need to contact DPI plant health inspectors for approval to use a planting material supplier.

Plant soil and water testing laboratories (page 5)

Pivot Agriculture Laboratories
cnr South Road and Wilson Avenue
WERRIBEE VIC 3030
Ph: (03) 9974 0099; Fax: (03) 9974 0699
Web: www.pivot.com.au
Brisbane
Ph: (07) 3260 2866; Fax: (07) 3260 2678

Business planning advice—Queensland Government

Department of Tourism, Small Business & Industry
PO Box 3036
TOOWOOMBA QLD 4350
Ph: (07) 4639 3600; Fax: (07) 4638 2139

Department of Economic Development & Trade
Investment Office
100 George Street
BRISBANE QLD 4000
Ph: (07) 3224 4224; Fax: (07) 3229 7348

General consultancy services (page 10)

Scientific Advisory Services mobile phone number should be 0417 644 660.

Suppliers of other specialised services (page 10)

Contract packing

Chiquita now operates two contract packing sheds.

Chiquita Central Packhouse, Innisfail
Upper Daradgee Road
PO Box 1130
INNISFAIL QLD 4860
Ph. (07) 4063 3929

Chiquita Central Packhouse
Davidson Road
Echo Creek
Davidson Road via Euramo
PO Box 442
TULLY QLD 4854

Suppliers of field and packing shed equipment

IBS Engineering Supplies Pty Ltd has moved to 163 Edith Street, Innisfail and has e-mail: bill@ibseng.com.au
The other contact details remain the same.

Refrigerated transport services (pages 11 to 13)

QRX Produce Innisfail and Freshmark now both operate from the Station Street depot in Innisfail.

The Freshmark depot at Rial Siding in Tully has closed.

QRX Produce Mareeba is now trading as CLC Produce. The mobile number has changed to 0417 238 678 but the other numbers stay the same. E-mail address is: clcproduce@ledanet.com.au
Refrigerated Roadways are no longer operating.

Market information (page 13)

Ausmarket Consultants

The Ausmarket Consultants group offers historic and current fruit and vegetable market price information, market intelligence, outturn reporting and product assessment. Participants in the network operate separate businesses within Australia's major markets. The Ausmarket Consultants name covers activities where two or more of the group members combine resources to provide services that extend beyond their individual areas of operation. Contact details can be found on their web site:

www.users.bigpond.com/Ausmarket

Individual members of the network are:

Adelaide

Adelaide Market Services
Bill Bishop
PO Box 6014, Halifax Street
ADELAIDE SA 5000
Ph: (08) 8232 5555; Fax: (08) 8232 1311;
Mobile: 0419 868 265

Brisbane

Market Information Services
Trevor Brewer
D Block Brisbane Market
PO Box 229
BRISBANE MARKETS QLD 4106
Ph: (07) 3379 4576; Fax: (07) 3379 4103;
Mobile: 0417 712 427
Infocall: 1902 262 580 ($2.50 per minute, covers Adelaide, Brisbane, Sydney and Melbourne)
E-mail: Ausmarket@bigpond.com

Melbourne

DataFresh Melbourne Market Reporting Service
John Popilieff
Box 170 Melbourne Markets
FOOTSCRAY VIC 3011
Ph: (03) 9689 3444; Fax: (03) 9689 3411;
Mobile: 0411 117 578
E-mail: info@datafresh.com.au

Sydney

Control Quality Services
Chris Cope
PO Box 350
FRENCHS FOREST NSW 2086
Ph: (02) 9746 3437; Fax: (02) 9746 1075;
Mobile: 0416 108 639
E-mail: cqs@accsoft.com.au

Other market price information sources

Perth

Perth Market Reporting Service
Perth Market Authority
Mail Point 1
280 Bannister Road
CANNING VALE WA 6155
Ph: (08) 9455 2900; Fax: (08) 9455 2902
Market reports: 1900 983 304 (recording); 75c per minute
E-mail: market@tpgi.com.au

Sydney

Flemington Market Reporting Services
Northern B Block Warehouse
PO Box 1
FLEMINGTON MARKETS NSW 2129
Ph: (02) 9764 3516; Fax: (02) 9763 1773
Market reports: 1900 123 038 (recording); 75c per minute
Dial-a-fax: 1900 123 039 ($2 per fax)

Payment problem contacts

If you have a disagreement over payment for produce or want a list of registered farm produce commercial sellers, the following contacts should be helpful.

Adelaide

South Australian Chamber of Fruit & Vegetables
c/- Adelaide Produce Markets Ltd
Ph: (08) 8349 4528; Fax: (08) 8349 5922

Brisbane

Farm Produce Commercial Sellers
Deputy Registrar
Ph: (07) 3239 3233; Fax: (07) 3239 3379
E-mail: janetzn@dpi.qld.gov.au

Sydney

Prompt Pay
Freecall; 1800 247 787;
Fax: (02) 9764 2776

Melbourne

Farmpay
Freecall: 1800 060 321;

Info Fax: 1800 678 062

Perth

Chamber of Fruit & Vegetable Industries
Robert Naudi
Ph: (08) 9455 2742; Fax: (08) 9455 4923

Wholesaler information

Contact the appropriate number below for information about farm produce commercial wholesalers in the markets.

Adelaide

Adelaide Produce Markets Ltd
Diagonal Road
POORAKA SA 5095
Ph: (08) 8349 4493; Fax: (08) 8349 6574

Brisbane

Market Line
Freecall: 1800 631 002
Web: www.brisbanemarket.com.au

Melbourne

Victorian Chamber of Fresh Produce Wholesalers Inc.
PO Box 113
542 Footscray Road
FOOTSCRAY VIC 3011
Ph: (03) 9689 3233; Fax: (03) 9689 9223
E-mail: info@mma.vic.gov.au

Perth

Perth Market Authority
Mail Point 1
280 Bannister Road
CANNING VALE WA 6155
Ph: (08) 9455 2900; Fax: (08) 9455 2902

Sydney

Sydney Markets Ltd
PO Box 2
SYDNEY MARKETS NSW 2129
Ph: (02) 9325 6200; Fax: (02) 9325 6288
E-mail: sydma@sydneymarkets.com.au
Web: www.sydneymarkets.com.au

Adelaide

Adelaide Produce Market Ltd
Diagonal Road
POORAKA SA 5095
Ph: (08) 8349 4493; Fax: (08) 8359 6574

Brisbane

Brisbane Market Authority
PO Box 8
BRISBANE MARKET QLD 4106
Ph: (07) 3379 1062; Fax: (07) 3379 4903

Brisbane

Lockett Marketing Australia Pty Ltd
PO Box 644
ARCHERFIELD QLD 4108
Ph: (07) 3274 3355; Fax: (07) 3275 2100

Melbourne

Melbourne Markets
Market Box 1
542 Footscray Road
FOOTSCRAY VIC 3011
Ph: (03) 9258 6100; Fax: (07) 9687 7714

Sydney

Sydney Market Authority
PO Box 2
FLEMINGTON MARKETS NSW 2129
Ph: (02) 9325 6200; Fax: (02) 9325 6288

ChemCert information

For training in chemical applications, contact this address to find your nearest accredited trainer.

ChemCert Training Queensland
PO Box 17
GRANGE QLD 4051
Ph: (07) 3352 5033; Fax: (07) 3352 5042
E-mail: chemscert@powerup.com.au
Contact: Wendy Brownscombe
Contact details for ChemCert nationally are available from Sylvia King on
(02) 6933 2177 or e-mail:
sking@csu.edu.au

Interstate movement provisions

Requirements for interstate movement change rapidly; to allow you to get the latest information we have included the contacts for each state below.

Australian Capital Territory

Quarantine & Inspection Officer
Environment ACT
PO Box 1038
TUGGERANONG ACT 2901
Ph: (02) 6207 2265; (02) 6207 2268

New South Wales

Regulatory Operations Coordinator (Plants)
Locked Bag 21
ORANGE NSW 2800
Ph: (02) 6391 3583; Fax: (02) 6361 9976

Northern Territory

Senior Adviser, Plants
NT Quarantine & Inspection Branch
GPO Box 2268
DARWIN NT 0801
Ph: (08) 8981 8733; Fax: (08) 8941 0223

Queensland

Senior Operational Support Officer
Department of Primary Industries
GPO Box 46
BRISBANE QLD 4001
Ph: (07) 3239 3330; Fax: (07) 3211 3293

South Australia

Program Leader—State Quarantine Inspection Service
46 Prospect Road
PROSPECT SA 5082
Ph: (08) 8269 4500; Fax: (08) 8344 6033

Tasmania

Quarantine Officer
Quarantine Centre
PO Box 347
NORTH HOBART TAS 7022
Ph: (03) 6233 3036; Fax: 6234 6785

Victoria

Supervisor, Plant Standards
Plant Standards Centre
Box 126
FOOTSCRAY VIC 3011
Ph: (03) 9687 5627: Fax: (03) 9687 6746

Western Australia

Senior Inspector
Western Australian Quarantine & Inspection Service
280 Bannister Road
CANNING VALE WA 6155
Ph: (08) 9311 5333; Fax: (08) 9455 3052

DPI information sources—pesticides and spraying

Infopest—pest management system on CD-ROM

This DPI product is available from:
Infopest Marketing Manager
DPI Animal & Plant Health Services
GPO Box 46
BRISBANE QLD 4001
Ph: (07) 3239 3967; Fax: (07) 3211 3293
E-mail: infopest@dpi.qld.gov.au
Web: www.dpi.qld.gov.au/aphs/infopest

Other government/industry information

Consumer Affairs Queensland

Consumer Affairs officers manage the Trade Measurement Act 1990 and can provide current information on marking packages and the requirements of ensuring correct weight in all packages. You can locate your nearest office or obtain information by contacting them on Ph: (07) 3836 0411; Fax: (07) 3836 0424.

Office of Fair Trading

Packers can avoid fines under the Trade Measurement Act 1990 by ensuring correct weight and labelling whenever packing fruit and vegetables for sale. Ring the trade measurement section of the Office of Fair Trading on (07) 3836 0411 for guidelines for the packing of fruit and vegetables.

Agricultural booksellers (page 18)

Some bookshops now have e-mail addresses and/or web sites. Two government bookshops are included in this list.

D & A Information Services
Web: www.dadirect.com.au

DPI Publications
GPO Box 46
BRISBANE QLD 4001
Ph: 1800 816 541; Fax: (07) 3239 6509
E-mail: books@dpi.qld.gov.au
Web: www.dpi.qld.gov.au/catalogue

Johima Books
27 Hassall Street
PO Box 4048
Parramatta NSW 2150
Ph: (02) 9687 1922; Fax: (02) 9687 1027
E-mail: nat@johima.com.au
Web: www. johima.com.au

Landlinks Press
PO Box 1139
COLLINGWOOD VIC 3066
Freecall: 1800 645 051; Ph: (03) 9662 7666
Fax: (03) 9662 7555
E-mail: sales@publish.csiro.au
Web: www.publish.csiro.au

Morescope Publishing
50 Carters Road
PORT HUON TAS 7116
Ph: (03) 6297 1777; Fax: (03) 6297 1144

NSW Agriculture
Publications Sales Unit
Locked Bag 21
ORANGE NSW 2800
Ph: (02) 6391 3433
Orders: Freecall 1800 028 374; Fax: 1800 642 065

Articles brochures and other items (page 25)

The Horticultural Research and Development Corporation has a new web site and a new e-mail address:

E-mail: hrdc@hrdc.gov.au
Web: www.horticulture.com.au

New posters available

New pest and disease management posters are available. Ring the Centre for Wet Tropics Agriculture at South Johnstone on (07) 4064 3911 to find out what is available.

Books on diseases, pests and disorders

Diseases of banana, abaca and enset, Jones, D.R. ed. (2000), CABI publications, Wallingford, UK.

Banana streak disease, an illustrated field guide, Daniells, J.W., Thomas, J.E. & Geering, A.D.W. (1999), Department of Primary Industries, Queensland. QI99018.

Banana offtypes, an illustrated guide, Daniells, J.W., Smith, M.K. & Hamill, S.D. (1999), Department of Primary Industries, Queensland. QI99019.

Problem solver
HANDY GUIDE

Note the following changes to the pest and disease chemical control registrations for bananas. This information is taken from the DPI *Infopest* database updated on 5 March 2000.

Diseases handy guide

Chemical	Controls	Trade names	WHP (days)
		ADD A NEW CHEMICAL REGISTRATION	
Difenoconazole	Black Sigatoka, rust, cordana leaf spot, leaf spot (yellow Sigatoka), leaf speckle	Score	1
		ADD TRADE NAMES	
Propiconazole	Black Sigatoka, cordana leaf spot, leaf speckle, leaf spot (yellow Sigatoka)	Aurora 250EC	1
Tebuconazole	Black Sigatoka, leaf speckle, leaf spot (yellow Sigatoka)	Folicur 250EW	1
Chlorothalonil	Leaf speckle, leaf spot (yellow Sigatoka)	Bravo 720, Bravo W750, Checkout 500SC, Elect 500, Elect 750, Echo 500SC, Echo 750	1
Copper oxychloride	Leaf speckle, leaf spot (yellow Sigatoka)	Copperoxy DF, Copperoxy 500WP, Coppox	1
Copper hydroxide	Leaf spot (yellow Sigatoka)	Blue Barrier, Copper hydroxide 500 WP, Coppit OH, Coppit OH DF, Blue-Side, Champion WP, Copper hydroxide SC	1
Petroleum spray oil	Black Sigatoka, cordana leaf spot, fruit speckle, leaf speckle, leaf spot (yellow Sigatoka)	Fuchs spray oil, Minder spray oil, Citrole all purpose oil, Summer spray oil, Vicol summer oil, Shell summer, spray oil, Sinclairs summer spray oil. Always check the label registration for oils.	N/A
Carbendazim	Anthracnose, crown rot	Carbendazim 500	N/A
Thiobendazole	Anthracnose, crown rot	Tecto Flowable	**N/A**
		DELETE TRADE NAMES	
Copper oxychloride		Vincop, Copper oxychloride 50% DF	
Carbendazim		Spin	

Pests handy guide

Chemical	Controls	Trade names	WHP (days)
		DELETE CHEMICAL REGISTRATION	
Monocrotophos		Azodrin 400, Monocron 400	
		ADD CHEMICAL REGISTRATION	
Acephate	Scab moth, banana flower thrips, banana rust thrips	Lancer 750DF, Orthene XTRA	N/A
Rotenone	Scab moth, banana flower thrips, banana scab moth, sugar cane bud moth, passionvine mite or russet mite	NRA permit for the use of this chemical	7
		ADD TRADE NAMES	
Bt (k)	Scab moth	NRA permit for organic production in Qld only	N/A
Dicofol	Banana spider mite, two-spotted mite	Kelthane MF	7
Endosulfan	Banana fruit caterpillar, banana-spotting bug, fruitspotting bug	Only the Farmoz and Nufarm products are registered for bananas	14
Chlorpyrifos	Banana weevil borer, caterpillar, cluster caterpillar, flower thrips, scab moth	Bar 500EC, Chlorpyrimax 500, Optem EC 500, Cyren 500 WP, Strike out 250 WP, Kensban 500 EC, Lorsban 750 WG, Protector 500 EC	14
		DELETE TRADE NAMES	
Ethoprophos		Mocap. The registration is still current but this product is no longer available	
Terbufos		Counter 150G	

These are all the changed items that we are aware of. If there are any additional changes, please contact our Customer Service officer on 1800 677 640 or send fax details to (07) 5444 9694.

You can also e-mail us on: agrilink@dpi.qld.gov.au

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