Developing improved strawberry germplasm management and runner quality

Peter Rigden
The Department of Agriculture, Fisheries and Forestry, Qld

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DEVELOPING IMPROVED STRAWBERRY GERMPLASM MANAGEMENT AND RUNNER QUALITY

Peter R. Rigden *et al*

AgriScience Queensland, Department of Agriculture Fisheries and Forestry, (DAFF)

Project Steering Committee members inspecting the nucleus plant collection at Redlands Research Facility in May 2011. From the left they are Roger Broadley, Bill Sharpe (filling in for Rick Twist), Ian Mungall, Merv Schiffke, Wally Sweet, Ray Daniels and Ingrid Oates (glasshouse assistant). Not in the picture are Rick Twist and Peter Rigden.

BS09024

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The purpose of this report is to describe the activities and outcomes associated with the strawberry germplasm management project called “Developing improved strawberry germplasm management and runner quality”.

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31 May 2014

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Media Summary

Profitability in the Queensland strawberry industry depends heavily on growers planting high quality, minimal disease strawberry runners. Historically strawberry runners have been produced in dedicated commercially operated field nurseries by multiplying plants over two growing seasons starting from minimal pest and disease status foundation plants.

Foundation plants were produced through a process involving tissue culture from nucleus plants held in a high health status glasshouse facility at the Department of Agriculture Fisheries and Forestry (DAFF) Redlands Research Facility. Typically around 10,000 foundation plants were grown from tissue culture each year and supplied to the runner nurseries to meet an annual demand by the Queensland strawberry industry of around 20 to 25 million runners.

In 2010, the overseas licensors of some of the main commercial varieties grown in Queensland, indicated that they considered propagation of plants from tissue culture carried a significant risk of introducing off-type plants into the runner production system and directed their licensees to move to a wholly vegetative propagation system by 2014. In conjunction with the transition to vegetative propagation methods, it was considered timely to review and update the runner scheme and should suitable options be available, transfer the responsibility for the maintenance of germplasm and production of foundation plants into the hands of industry.

A Project Steering Committee was convened in early 2011 consisting of three fruit growers, two runner growers and two DAFF representatives. They undertook to explore the possible transition of minimal pest and disease status plant production based on vegetative propagation to a commercial entity, whilst retaining exacting standards and reliable plant production methods that could be incorporated into a new approved runner scheme.

Vegetative methods of producing minimal pest and disease status F1 foundation and F2 foundation increase plants from nucleus plants in sterile soilless potting media were developed, and tested as an alternative to the labour intensive and expensive tissue culture of foundation plants.

In future, F1 plants will be produced by Crop Health Services (Crop Hygiene- Biosecurity Services) in Victoria, under direct contract to runner growers and the runner growers will use these plants to propagate the F2 plants in their own insect proof screen house facilities.

A new runner scheme, the Australian Strawberry Runner Accreditation Scheme (ASRAS), developed by the Project Steering Committee will be administered by a new public company limited by guarantee. The company is called the Australian Strawberry Runner Accreditation Authority Limited (ASRAA), which will have a Board consisting of an independent chair and equal numbers of fruit and runner growers.

Note that ASRAA's function is solely to oversee the production of accredited approved strawberry runners. It is not be involved in any commercial activities, and does not hold any variety licences. The new, improved ASRAS rules provide guidelines for the production of accredited runners and are now available to the runner growers.

Technical Summary

Project funds provided throughout 2011, 2012 and 2013 for the continuation of the production of tissue cultured foundation plants in a high health status facility and which were tested for freedom from certain pests and diseases. Activities (at DAFF's Redlands Research Facility unless otherwise stated) included:

- Maintenance of a tissue cultured genebank at the DAFF's Redlands and Maroochy Research Facilities.
- Introduction of new varieties and breeding lines from the northern node of the Australian breeding program (based at the Maroochy Research Facility) to a low health glasshouse for later transfer to a high health glasshouse via tissue culture.
- Provision of tissue culture facilities and expertise for the production of germplasm.
- Transfer by tissue culture of new material into a high health glasshouse facility.
- Maintenance of nucleus plant collections in a high health glasshouse facility.
- Tissue culture production of quality foundation plants to meet industry requirements. This involved initiation into tissue culture, multiplication of plants in tissue culture and the transfer of the multiplied tissue culture plants to cells containing soil less media for supply to the runner growers.
- Provision of pest and disease and monitoring and testing. This included regular biological indexing of nucleus plant collections to check for freedom from virus infection and testing nucleus and foundation plants to confirm freedom from colletotrichum and nematodes.
- DNA sample analysis to verify variety of the nucleus collection plants and the foundation plants supplied to runner growers.

Typically approximately 10,000 foundation plants were grown from tissue culture each year and supplied to the runner nurseries, where they were multiplied up over two growing seasons to meet an annual demand by the Queensland strawberry industry of around 20 to 25 million runners.

In 2010, the overseas licensors of two of the three mainstream varieties grown in Queensland indicated that the then current practice of producing foundation plants from multiplied tissue culture initiations was not acceptable. In their view it carried an unacceptable long term risk for the introduction of off-types into the runner production system. Accordingly they directed their licensees to move to a wholly vegetative propagation system over a three year period by 2014.

A vegetative propagation system also minimises the risk of off-types arising during the runner production process. Any off-types that occur in F1 foundation plants become obvious during the production of F2 foundation increase plants and can be culled. In addition, small scale fruiting trials of F2 foundation increase plants in fruit growing areas can be used to identify off-types and poor performing clones, these plants can then be removed from the approved runner production system. This in turn reduces on-farm plant performance issues for fruit growers.

A Project Steering Committee consisting of three fruit growers, two runner growers and two DAFF staff was convened in March 2011 to consider options for the development of a new improved runner scheme, based on vegetative propagation techniques, for the Queensland industry and to oversee the transition to a new scheme.

The Project Steering Committee also examined the possibility of transferring responsibility for the maintenance of the nucleus plants and the production of foundation plants from DAFF to industry.

The change to a new propagation system for strawberry germplasm provided a timely opportunity to review, update and improve the existing Queensland Strawberry Growers Association (QSGA) approved runner scheme rules.

Vegetative methods of producing minimal and pest disease status* F1 foundation plants from nucleus plants in sterile potting media were developed, to replace the labour intensive and expensive tissue culture of foundation plants.

After detailed consideration of several options, it was decided by the Project Steering Committee that from 2014 onward Crop Health Services (Crop Hygiene – Biosecurity Services) in Victoria, under direct contract to the runner growers, will maintain nucleus plant collections and produce F1 foundation plants for supply to the runner growers, who will then propagate the foundation plants. In the latter stages of the project, two Queensland runner growers have each successfully established screen houses in which they will, under the new scheme, propagate their own F2 foundation increase plants in fruit bins containing a soilless media from F1 plants.

A new approved runner scheme the Australian Strawberry Runner Accreditation Scheme (ASRAS) was developed by the Project Steering Committee and this will be administered by a new public company limited by guarantee called the Australian Strawberry Runner Accreditation Authority Limited (ASRAA). The Project Steering Committee with the assistance of Clarke Kann Lawyers oversaw the development of ASRAA's constitution which was registered with the Australian Securities and Investment Commission on the 19th March 2014.

ASRAA's function is solely to oversee the production of accredited approved strawberry runners, it will not be involved in any commercial activities.

Under its constitution the ASRAA Board consists of an independent chair and equal numbers of fruit and runner growers. It is expected that the ASRAA will continue to develop ASRAS into the future to meet the developing requirements of industry.

Members of the Project Steering Committee addressed fruit growers at the Queensland Strawberry Growers Association's (QSGA) Annual General Meeting on the 4th February 2014. Their presentation gave an overview of the project, outlined the reasons why a new runner scheme is required, explained the long and due diligence process the committee undertook to develop the new scheme and informed the growers of the key features of the ASRAS and ASRAA. The presentation was well received by the growers attending the meeting.

* *The phrase "minimal and pest disease status" indicates that the plants are produced in high health status glasshouses or screenhouses where every precaution is taken to ensure that pest and diseases are eliminated from the growing environment and that plants are kept as free as possible of pest and disease infections.*

Introduction

The Queensland strawberry industry contributes approx. $180 to $200 million per annum to the Queensland economy, and is the second largest fruit industry in Queensland. The industry is very reliant on planting approved runners produced by several approved runner growers in Australia. While crop ratooning occurs, the provision of new planting material (runners) each year is by far the most common current method of crop production in Queensland.

The QSGA's Queensland Strawberry Runner Grower Accreditation Scheme rules that had been used for many years were recognised as being seriously outdated, and were overdue for updating and redrafting.

DAFF research and technical staff have historically underpinned the economic viability of the strawberry industry by ensuring that good quality foundation plants are grown and delivered non-exclusively to approved runner growers in Queensland.

To ensure the supply of foundation plants DAFF's Redlands Research Facility (RRF) had dedicated staff, tissue culture and glasshouse facilities to undertake the following germplasm services:

- Maintain a nucleus collection of mother plants for all trial and commercial varieties in a high health status glasshouse.
- Maintain new introductions either from the Queensland based breeding programs or introduced overseas varieties in a 'low health' status glasshouse.
- Transfer varieties from the low health to high health status glasshouse through tissue culture.
- Initiate into tissue culture from nucleus plants enough material to meet runner grower foundation plant orders each year.
- Multiply tissue culture initiations over a period of several months.
- Eight to twelve weeks prior to collection by runner growers, transfer multiplied tissue culture plants into individual cells containing a soilless media and grow and harden-off these plants prior to collection.
- Annually or biannually index nucleus plants to verify they are virus free.
- Test foundation plants to confirm they are colletotrichum and nematode free.
- Collect samples from individual nucleus plants and bulked samples from foundation plants to be sent to runner growers. These samples were freeze dried and sent for DNA genotyping at the California Seed and Plant Laboratory, California, USA to confirm variety.
- Establish and maintain duplicate tissue culture collections of each variety held in the nucleus plant collection. These collections were held at two sites, RRF and DAFF's Maroochy Research Facility (MRF).

Each year around 10,000 foundation plants comprising 20 to 30 varieties and breeding lines were produced annually at the Redlands Research Facility. Subsequently, runner growers multiplied these plants up for direct sale to industry over a two year period and approximately 20 to 25 million plants were produced for the Australian strawberry industry under this system.

In 2010, the overseas licensors of the two of the three mainstream varieties grown in Queensland indicated that the then current practice of producing foundation plants from multiplied tissue culture initiations was not acceptable. In their view, tissue culture propagation carried a risk for the introduction of off-types into the runner production system and accordingly they directed their licensees to move to a wholly vegetative propagation system by 2014. The licensors believed that propagation using vegetative techniques will reduce the risk

of off-types arising, and has the advantage that if off-types do occur then early identification and removal of them in the multiplication process is possible.

In conjunction with the transition to vegetative propagation methods it was considered timely to review and update the runner scheme and should suitable options be available transfer the responsibility for the maintenance of germplasm and production of foundation plants from the DAFF into the hands of industry.

The outcomes of the project were expected to be:

- An improved strawberry germplasm services system which delivers true to type, high quality, minimal and pest disease status* strawberry plants to approved runner growers in a timely manner.
- An updated approved runner scheme for the Queensland strawberry industry. The new rules for this approved runner scheme will have been fully documented and freely available to both fruit growers and current and future runner growers.
- Improved satisfaction levels of approved runner growers supplied plants from this process, and increased demand for new lines from the sub-tropical breeding program (northern node) from commercial growers.
- The Queensland strawberry industry will have the capability to manage its own germplasm supply chain of high health status strawberry planting stock and the industry will take full responsibility for maintenance of strawberry germplasm and runner production.

** The phrase "minimal and pest disease status" indicates that the plants are produced in high health status glasshouses or screenhouses where every precaution is taken to ensure that pest and diseases are eliminated from the growing environment and that plants are kept as free as possible of pest and disease infections.*

Materials and Methods

The project had two main functions:

1. **Management of germplasm and foundation plant production for the existing scheme based on tissue culture propagation.** To provide management, personnel, materials and equipment for the ongoing maintenance of the nucleus plant collection and production of tissue cultured foundation plants at the DAFF's Redlands Research Facility (RRF).
2. **Development of a new scheme based on vegetative propagation.** To decide and develop future methods for the management of strawberry germplasm in Queensland and facilitate the establishment of the systems and structures required for the successful operation of a new scheme. The requirement for the development of a new system for germplasm management was driven mainly by the licensors of the main varieties grown by the Queensland industry, who had indicated to their licensees that they required a transition to a vegetative propagation based runner production scheme by 2016. They felt was this would be a more reliable than the tissue culture propagation methods of the existing scheme. In addition the Queensland Government was seeking to transfer to the industry full responsibility for the maintenance and production of strawberry germplasm.

Management of the existing scheme based on tissue culture propagation involved the following:

- Operation of the tissue culture laboratory and glasshouse facilities required for the maintenance of the nucleus plant collection and production of foundation plants.
- Introduction of new varieties from the northern node of the Australian breeding program (based at the Maroochy Research Facility) and from overseas (via the Australian Quarantine Inspection Service's quarantine facility at Knoxfield, Victoria) into the low health glasshouse.
- Transfer of nucleus material, via tissue culture, from the low health glasshouse into the high health glasshouse.
- Production of foundation plants for supply to the two Stanthorpe runner growers. These plants were produced from tissue culture initiation and multiplied up as required to meet orders.
- Virus indexing of the nucleus mother plant collection using both biological and molecular virus indexing techniques to ensure freedom from viral diseases.
- Sampling and testing of nucleus mother plant and foundation plants to ensure freedom from colletotrichum disease.
- Inspection sampling and testing of nucleus mother plant and foundation plants to ensure freedom from nematodes.
- Production of small numbers of meristem plants for the runner growers as required.

During the period of transition to the new scheme the project also was responsible for:

- Production of vegetatively propagated F1 foundation generation plants to provide material for the propagation of F2 foundation increase generation plants at the runner growers facilities.
- Conducting trials for the production of F2 foundation increase plants from vegetatively propagated F1 foundation plants in soil less media in fruit bins.
- Production of vegetatively propagated plants for the transfer of material to establish nucleus plant collections at the Crop Health Services (Crop Hygiene - Biosecurity Services) facilities at Knoxfield and AgriBio, Victoria.

A Project Steering Committee was established to oversee and facilitate the development of a new scheme based on vegetative propagation. The Project Steering Committee consisted of the two Queensland runner growers and three fruit grower representatives.

The runner growers were:

- Ian Mungall (Red Jewel Nursery)
- Wally Sweet (Sweets Strawberry Runners)

The fruit grower representatives were:

- Ray Daniels (Strawberries Australia Incorporated and QSGA)
- Merv Schiffke (QSGA)
- Rick Twist (QSGA)
- Bill Sharpe (QSGA) - attended as a proxy for Rick Twist in the first two meetings and Merv Schiffke in the third meeting.

Three DAFF staff also attended Project Steering Committee meetings.

- Roger Broadley chaired each meeting and provided comment and advice where DAFF and technical input was required in discussions.
- Peter Rigden who provided the secretariat services for 12 meetings, and technical support between meetings.
- Peter Nimmo who provided secretarial services for one of the meetings.

The role of DAFF staff in the meetings was strictly one of facilitation and the provision of information. They took no part in the decisions taken by the fruit and runner grower members of the Project Steering Committee regarding the future management of strawberry germplasm management and foundation plant production.

It should be noted that all decisions were taken by consensus and not by majority voting. The Horticulture Australia Limited's Industry Services Manager for strawberry, Stuart Burgess, was invited to attend the Project Steering Committee meetings, but was for logistical reasons unable to attend. He was kept informed of the progress of the meetings by being provided with the Meeting Notes which were circulated after each meeting.

This Project Steering Committee met on 13 occasions, at a range of venues, during the project to discuss how the transition to the new system of germplasm management could be achieved and facilitated. All of the decisions made in the meetings were taken by unanimous agreement, not by vote.

In addition two trips to Melbourne, Victoria were undertaken by members of the Project Steering Committee to explore options for the utilisation of Victorian Strawberry Industry Certification Authority (VSICA) and Crop Health Services (Crop Hygiene – Biosecurity Services) and facilities as part of the new system of germplasm management.

The following table details dates and venues of the 13 steering committee meetings and visits to Victoria:

Meeting	Date	Venue	Attendees	Apologies
1	4th March 2011	Redlands Research Facility, Cleveland	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Bill Sharpe (proxy for Rick Twist)	Rick Twist Stuart Burgess
2	4th May 2011	Redlands Research Facility, Cleveland	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke Bill Sharpe (proxy for Rick Twist)	Rick Twist Stuart Burgess
3	6th July 2011	Maroochy Research Facility, Nambour	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Rick Twist, Bill Sharpe (proxy for Merv Schiffke)	Merv Schiffke Stuart Burgess
4	12th October 2011	Ray Daniel's farm, Wamuran	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Rick Twist	Stuart Burgess
5	3rd February 2012	Redlands Research Facility, Cleveland	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Rick Twist	Stuart Burgess
6	10th May 2012	Applethorpe Research Facility, Stanthorpe	Roger Broadley, Peter Nimmo Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Rick Twist	Peter Rigden Stuart Burgess
7	8th August 2012	Ray Daniel's farm, Wamuran	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Rick Twist	Stuart Burgess
8	6th February 2013	Ray Daniel's farm, Wamuran	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Rick Twist	Merv Schiffke Stuart Burgess
9	1st May 2013	Gatton Research Facility, Gatton	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Rick Twist	Stuart Burgess
10	10th July 2013	Maroochy Research Facility, Nambour	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke, Rick Twist	Stuart Burgess
11	11th September 2013	Maroochy Research Facility, Nambour	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke,	Rick Twist Stuart Burgess
12	9th January 2014	Sweet's Strawberry Runners, Stanthorpe	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels, Merv Schiffke,	Rick Twist Stuart Burgess
1st visit to Victoria	20th January 2012	AQIS and Crop Health Services (Crop Hygiene - Biosecurity Services) facilities.	Roger Broadley, Peter Rigden	Ian Mungall Wally Sweet Ray Daniels Merv Schiffke
2nd visit to Victoria	10th January 2013	Crop Health Services (Crop Hygiene -Biosecurity Services) facilities.	Roger Broadley, Peter Rigden Ian Mungall, Wally Sweet Ray Daniels	Merv Schiffke Rick Twist

The Agenda for each meeting are given in Appendix 1.

Detailed notes prepared after the Project Steering Committee meetings 1 to 12 have been presented in the Project Milestone Reports. The notes from Project Steering Committee meeting number 13 are attached to this report at Appendix 2.

During the second meeting, the members of the Project Steering Committee were familiarised with the work being undertaken at Redlands Research Facility, including the existing methods and complexity of strawberry germplasm management and the production of tissue cultured foundation plants.

Updates on the progress of strawberry work at Redlands Research Facility were given at each meeting by Peter Rigden who was responsible for managing the strawberry work done at the RRF during the project.

During subsequent meetings the Project Steering Committee progressively reviewed, discussed and explored all possible options for germplasm management. The new improved system had to be practical, economically sustainable and meet the requirements of all stakeholders. It was recognised that whatever options were chosen the work needed to be undertaken by an organisation that was capable of providing specialised expertise and facilities such as:

- High health status screen houses or glasshouses required to maintain nucleus plant collections, and vegetatively propagate F1 foundation plants and F2 foundation increase plants.
- Biological and molecular virus indexing capacity.
- Entomological and pathology expertise for monitoring for pest and disease.
- Tissue culture facilities to establish and maintain backup tissue culture genebank collections.

As the project progressed the Project Steering Committee progressively discussed and developed a set of scheme rules for use in the new scheme, and established a limited liability company to oversee the operation of the new scheme.

Various options were explored regarding how and where nucleus collections were to be maintained and the vegetatively propagated F1 foundation plants could be propagated. The following options were considered, either singly or in various combinations:

- Victorian Strawberry Industry Certification Authority's (VSICA) facility at Toolangi, Victoria.
- The DAFF Redlands Research Facility.
- The DAFF Applethorpe Research Facility.
- The Queensland runner growers own facilities.
- Crop Health Services (Crop Hygiene -Biosecurity Services) facilities at Knoxfield and at Agriobio, a new $300M facility at La Trobe University Victoria.

As an aid to decision making a number of documents detailing estimates of the costs for the various options were prepared. These were considered and discussed during the Project Steering Committee meetings.

After extensive discussion and deliberation the Project Steering Committee decided that the following policies, facilities and organisations be adopted for the management of germplasm on conclusion of the project:

- Each runner grower to establish a nucleus plant collection and tissue culture genebank with Crop Health Services (Crop Hygiene – Biosecurity Services) at their new facility AgriBio at La Trobe University, Melbourne, Victoria.
- The runner growers are to be responsible for establishing and maintaining individual contracts with Crop Health Services (Crop Hygiene -Biosecurity Services) and for the introduction of new varieties to their collections from Australian breeding programs or overseas.
- Crop Health Services (Crop Hygiene -Biosecurity Services) will produce F1 foundation vegetative plants for supply to each runner grower annually as directed by each runner grower.
- The runner growers to establish insect and mite proof screen houses on their own runner farms suitable for the production of F2 foundation increase plants from F1 foundation plants in soil less media.
- A new approved runner scheme to be established to provide the rules for the production and supply of accredited runners to commercial fruit growers.
- A new limited liability public company to be established to oversee the operation of the new approved runner scheme.

Results

At the Redlands Research Facility (RRF) the nucleus plant collection was successfully maintained during the project. Tissue cultured foundation plants and vegetatively propagated F1 foundation plants were successfully produced to meet the runner growers' requirements in 2011, 2012 and 2013.

Nucleus plants were tested either annually or biannually (as required by the licensors) to ensure that they had remained free from virus infection. Foundation plants and vegetatively propagated plants were checked and sampled for testing prior to despatch to ensure they were free of colletotrichum and nematode infection. Samples from all individual nucleus plants and bulked samples of tissue cultured foundation plants and F1 foundation vegetative plants were sent to at the California Seed and Plant Laboratory, California, USA for trueness to type testing using DNA genotyping.

The production of vegetatively propagated F2 foundation increase plants in plastic fruit bins from F1 foundation plants in a soilless potting mix was successfully trialled at the RRF and also on both Queensland runner growers' properties. A range of F1 foundation plant spacings (1, 2 or 4 plants per bin) were trialled to assess the number of F2 foundation increase plant that could be produced per bin per growing season. For most varieties one F1 foundation plant per bin was found to produce up to 250 F2 foundation increase plants after which culling of runners would be required due to crowding.

A total of 13 Project Steering Committee meetings were held and two trips to Melbourne, Victoria were undertaken to explore options for the utilisation of VSICA and/or Crop Health Services (Crop Hygiene -Biosecurity Services) facilities and services in the new system of germplasm management.

The decision to transfer the strawberry germplasm collection from RRF to Crop Health Services (Crop Hygiene -Biosecurity Services) Victoria was taken and actioned in May 2013 when 66 selected nucleus plants were transferred from RRF to Crop Health Services (CropHygiene – Biosecurity Services) facilities at Knoxfield Victoria. This plant collection will be transferred to the AgrioBio facility at La Trobe in June 2014 when the Knoxfield site is closed.

Operations in respect of strawberry germplasm management were terminated at RRF in November 2013. A back up tissue cultured genebank collection is to be maintained at MRF until a similar collection has been successfully established at Crop Health Services (Crop Hygiene - Biosecurity Services) AgriBio facility in Victoria.

Runner growers established individual contracts with Crop Health Services (Crop Hygiene - Biosecurity Services) for the management of their own nucleus plant and tissue cultured genebank collections and for the provision of vegetative potted F1 foundation plants each year. The runner growers will use the F1 foundation plants to vegetatively propagate the F2 foundation increase plants in purpose built screen houses that have been established on their own properties.

A new scheme, the Australian Strawberry Runner Accreditation Scheme (ASRAS) was developed and established by the Project Steering Committee to provide for the production and supply of accredited runners to commercial fruit growers.

A new public company, limited by guarantee, the Australian Strawberry Runner Accreditation Authority Limited (ASRAA) was established to oversee the operation of ASRAS. ASRAA was registered with the Australian Securities and Investment Commission on the 19th March 2014. The ASRAA constitution was developed by the Project Steering Committee with the assistance of Clarke Kann Lawyers. ASRAA was incorporated on 19th March 2014.

Operation of ASRAS became the responsibility of ASRAA as from the inaugural Board Meeting that was held on the 27th May 2014.

The following documents, associated with the above, are attached:

- The certificate of incorporation of ASRAA (Appendix 3).
- The final version of the ASRAS scheme rules developed by the Project Steering Committee (Appendix 5).

Discussion

The need for a change in the management of strawberry germplasm and the production of approved runners became necessary in the period prior to this project being initiated. The impetus was initially provided by a 2010 directive from the licensors of some of the main varieties grown in Queensland that the propagation of foundation plants using tissue culture was not acceptable. They indicated that a move to a vegetative propagation system was required by 2014.

In addition, with the transition to vegetative propagation methods it was considered timely to review and update the runner scheme and should suitable options be available transfer the responsibility for the maintenance of germplasm and production of foundation plants into the hands of industry.

Furthermore, the need to make changes to the propagation system for strawberry germplasm provided a timely opportunity to review, update and improve the existing Queensland Strawberry Growers Association (QSGA) approved runner scheme.

The project has successfully developed a new runner scheme, ASRAS, that uses vegetative propagation techniques for the production of F1 foundation plants and F2 foundation increase plants that were trialled and proven at three locations during the project. It has also developed and established an industry based organisation ASRAA to over see the operation of the new scheme.

Management of strawberry germplasm is now in the hands of commercial runner growers who have successfully been able to:

- Enter into contractual agreements with Crop Health Services (Crop Hygiene - Biosecurity Services) in Victoria to maintain their nucleus plant collections at a high health status facility, establish a back up tissue culture genebank for all of their varieties and propagate and supply vegetatively propagated F1 foundation block plants.
- Established their own 'state of the art' screenhouse facilities to produce F2 foundation increase plants.

The project has delivered ownership and responsibility for the management of germplasm and production of quality strawberry runners to the Queensland strawberry industry through the development of ASRAS and formation of ASRAA. These services are now provided by efficient and dedicated industry organisations with expertise and using appropriate facilities. The economic efficiencies and long term sustainability afforded by this transition compared to a scenario of continued use of the old system based on services being provided by DAFF are expected to be significant as the overheads related government machinery under which the public sector service providers operate fall away.

An independent organisation ASRAA has been established to oversee the new runner scheme with a board that includes equal representation of runner growers and fruit grower representatives who are QSGA members. It is reasonable to expect that this across industry stakeholder involvement in ASRAA will result in an improved understanding of germplasm management throughout the industry and facilitate improve lines of communication on matters relating to germplasm management and runner production.

The new ASRAS scheme outlines clearly what is required of a new runner grower who wishes to become an approved runner producer and the ASRAA constitution accommodates new runner grower members who can meet the requirements of the scheme. Should a new runner grower become a member then their addition to the ASRAA Board will be matched by the addition of another fruit grower member thus maintaining balanced representation on the. It should also be noted that runner growers do not have to grow their runners in Queensland to join ASRAS. This will allow for future expansion of the Queensland strawberry industry with an increase in the number of runner growers being matched by a commensurate increase in fruit growers and/or fruit production.

The strawberry industry now has the capability to manage its own germplasm supply chain of high health status strawberry F2 foundation increase plant stock. This will lead to improved satisfaction levels of approved runner growers being supplied plants from this process, and the demand for new lines from the sub-tropical breeding program (northern node) from commercial growers.

Tissue cultured foundation plants being prepared for despatch to runner growers

The nucleus plant collection in the high health status glasshouse at Redlands Research Facility.

Tissue culture involves the dissection of a runner tip in a laminar flow cabinet with the aid of a binocular microscope.

Biological virus indexing involves grafting a petiole form the test plant onto an indicator plant.

Vegetative propagation of F1 foundation plants from a nucleus plant.

Trial production of F2 plants in fruit bins containing soilless media at Redlands Research Facility

Members of the Project Steering committee inspect the AgriBio Facility at La Trobe, Victoria

The Project Steering Committee inspecting a runner grower's screenhouse for production of F2 foundation increase plants.

Vegetatively propagated F1 foundation plants at Crop Health Services (Crop Hygiene - Biosecurity Services) facility in Victoria.

F2 foundation increase plants growing in fruit bins in a runner grower's screenhouse.

Outputs

This project has:

- Identified and appointed an industry provider Crop Health Services (Crop Hygiene - Biosecurity Services) that is capable and equipped to maintain virus free nucleus plant and backup tissue cultured genebank collections for all runner growers.
- Identified and appointed an industry provider Crop Health Services (Crop Hygiene - Biosecurity Services) that is capable and equipped to use vegetative propagation techniques to produce and deliver true to type, high quality, F1 foundation strawberry plants to approved runner growers in a timely manner. These plants are produced under strict protocols and in facilities where freedom from pests and diseases is maximised. This meets the requirement of variety licensors to use vegetative propagation techniques rather than tissue culture based propagation systems to produce F1 plants.
- Trialled and established new vegetative methods of producing minimal disease F2 foundation increase plants from F1 plants in a soilless potting media, to replace the labour intensive and expensive tissue culture of foundation plants. Runner growers have established their own screen house facilities in which the F2 plants can be produced in an environment where pest and disease problems can be minimised and controlled. This meets the requirement of variety licensors to use vegetative propagation techniques rather than tissue culture based propagation systems to produce F2 plants.
- Facilitated the development of ASRAS and developed new improved scheme rules to provide clear guidance to all involved on the production of accredited runners. Appendix 5 details the scheme rules.
- Facilitated the establishment of ASRAA to oversee the administration and operation of ASRAS.
- Resulted in industry (runner growers and fruit growers) taking full responsibility for maintenance of strawberry germplasm and runner production in accord with renewal objectives that commercial companies should take over work from the Queensland Government Sector, where it is feasible to do so.

Outcomes

Industry is now positioned with the systems and structures to take control of strawberry germplasm management through a co-operative collaboration between runner and fruit growers.

The project has delivered an improved professionally managed, industry operated integrated runner scheme that will underpin the future profitability of the strawberry industry.

There will be timely supply into the future of quality vegetatively propagated F1 foundation strawberry plants to approved runner growers, which in turn provides the starting point for them to produce plants in the quantity and quality required by Queensland and Australian commercial fruit growers. In turn it is expected that there will be improved satisfaction levels amongst fruit growers with approved runner plants from the new scheme and increased demand for new lines from the sub-tropical breeding program (northern node) from commercial growers.

It should be noted that entry of new runner growers to the strawberry industry will be facilitated by the detailed new improved ASRAS scheme rules. For the first time, prospective new runner growers will know exactly what is required to produce approved runners.

The approved scheme (ASRAS) is not involved in any commercial activity such as acquiring variety licences. This is now the province of runner growers and any other entity wishing to be the licensee for new varieties. ASRAS is totally focused on producing quality approved plants.

It is recognised that the value of the industry is around $180 to 200 million and is the second biggest fruit industry in Queensland after bananas.

Comments made by members of the Project Steering Committee at their last meeting when reviewing the work done over the three year project and the outcomes of the project included:

- All options for the establishment of a new scheme were considered.
- The project evolved well and has involved all sections of the industry from its inception.
- Individuals have been empowered to develop the industry.
- The growing area has expanded and there is now an estimated six million runners grown in the Bundaberg region.
- A note should be made in the final report that the two outcomes of the project, ASRAA and ASRAS, have given the industry direction and a way to maintaining the strawberry germplasm.
- This has given the industry more confidence in the germplasm management system.
- Up until now the industry relied on DAFF for a significant proportion of germplasm management and foundation plant supply, but now industry manages and controls the complete production system.
- Confidence has risen in the industry with the professionalism of both the fruit and runner growers that has been developed in recent years and the work of the germplasm project has contributed to this.
- Quality has to be maintained.
- There are opportunities for the development of exports to the Chinese market in August-September that has big potential for the continued expansion of the strawberry industry.
- The industry is expected to continue growing in size but not in a straight line.
- The work of DAFF in convening, running and supporting the Steering Committee was recognized.

At the last meeting Roger Broadley thanked the fruit growers and runner growers for their unwavering support. They in turn thanked Roger and Peter Rigden for their work on the committee and for dealing with the complex issues of approved runner production for industry.

Industry Adoption

The proceedings of the Project Steering Committee meetings were confidential because of the commercial in confidence issues that were discussed in the course of deciding the future direction of germplasm management and the development of ASRAA.

The Project Steering Committee consisted of the runner growers and fruit grower representatives from Queensland Strawberries and Strawberries Australia. This was done to ensure that as far as practical the different sections of the Queensland and the Australian strawberry industry was involved in the decision making process throughout the project.

All decisions taken by the Project Steering Committee were unanimously agreed by consensus. No majority voting was done.

In the latter stages of the project, the following action was taken to update industry on the progress and outcomes of the project:

- The QSGA executive were briefed throughout the project by Project Steering Committee fruit grower members.
- On 12th September 2013, Roger Broadley (DAFF) briefed the QSGA President, Luigi Coco, on the progress of the project, once the format of the new scheme had been finalised.
- A draft of the improved ASRAS rules was sent to the QSGA on the 28th January 2014.
- Members of the Project Steering Committee gave a presentation to the 2014 Queensland Strawberry Growers Association AGM on 4th February 2014 outlining the projects work and outcomes. The slides used in this presentation are attached at Appendix 4. Comments of fruit growers made after the presentation indicated an overall satisfaction with the establishment of the new ASRAS and ASRAA and the future management of germplasm and runner production.

The first meeting of the ASRAA Board was held in Brisbane on the 27th May 2014 and this constituted the completion of the transition to ASRAS, which will provide the basis for the future management of strawberry germplasm and the provision of quality strawberry runners to the strawberry industry.

Commercialisation

No new Intellectual Property was created by this project.

Note that ASRAA is not involved in any commercial activity such as the procurement of variety rights.

Technology Transfer

The development of vegetative soilless production systems for the propagation of F2 foundation increase plants by the two runner growers was facilitated during the project and adopted for use in the new approved runner scheme.

Members of the Project Steering Committee co-presented a presentation to fruit growers at the Queensland Strawberry Growers Association's AGM on the 4th February 2014. The presentation gave an overview of the project, outlined the reasons why a new runner scheme is required, explained the long and due diligence process the committee undertook to develop the new scheme and explained the key features of the new ASRAS scheme and the new authority ASRAA. The presentation was well received by the fruit growers at the meeting and their comments were positive. The slides used in this presentation are given at Appendix 4.

An article on the development of ASRAS and ASRAA for publication in the QSGA magazine 'Simply Red', under the name of the Project Steering Committee, is being prepared.

Recommendations

The ASRAA Board should implement a continuous improvement process and continue to engage with both QSGA and Strawberries Australia on a regular basis to meet the ongoing and future need s of the industry.

Acknowledgements

The project team gratefully acknowledge the following contributions to this project.

Assistance with information (meetings and correspondence) regarding the various options for future germplasm management:

- Fiona Constable, Crop Health Services (Crop Hygiene -Biosecurity Services)
- Geoff Kelly, Crop Health Services (Crop Hygiene -Biosecurity Services)
- Mirko Milinkovic, formerly with Crop Health Services (Crop Hygiene -Biosecurity Services)
- Pete Merrriman, Victorian Strawberry Industry Certification Authority
- John Baker, Victorian Strawberry Industry Certification Authority

Assistance with the dissemination of project outcomes and information to industry:

- Luigi Coco, President, Queensland Strawberry Growers Association (Queensland Strawberries)
- Jennifer Rowling, Industry Development Officer, Queensland Strawberry Growers Association (Queensland Strawberries)

Assistance with virus indexing of strawberry plants:

- Mary Grace, Department Agriculture Fisheries and Forestry
- Michelle Paynter, Department Agriculture Fisheries and Forestry

Bibliography of literature cited

None.

Appendix 1. Agendas for the 13 Project Steering Committee meetings.

Agenda: 1st meeting of the Project Steering Committee of the 'Developing improved strawberry germplasm management and runner quality' project

Date: 4 March 2011 (1.00pm to 4.00 pm)

Venue: Redlands Research Station

- Project Background.
- Meeting chair.
- Outside expertise.
- Committee membership.
- Project funding.
- Primary objective of project.
- Meristem and vegetative propagation systems.
- Possible VSICA role.
- DEEDI tissue culture facilities.
- Agreed for consideration at the next and future meetings.
- Meeting representation.
- Dates for Next Meetings.

Agenda: 2nd meeting of the Project Steering Committee of the 'Developing improved strawberry germplasm management and runner quality' project.

Date: Wednesday, 4th May 2011

Start time: 12:00 pm Finish time: 16:30pm

Venue: Redlands Research Station, 26 - 40 Delancy Street Cleveland, 4163

12:00 pm Arrival and lunch

12: 25 Meeting welcome

12: 30 Review Mark Herrington's notes on meristem, tip culture and micro propagation (see page 4 in the attached notes)

12:35 Visit TC lab and glasshouses.

- Demonstration of tissue culturing, inspection of glasshouse facilities and plants in 4B and 5G

13:30 Actions arising from last meeting

- Review attached notes (Items 1 to 11)

15:30 Other business including following items for discussion/decision:

- Vegetative propagation trial to start 2011 at Redlands Research Station.
- Crop Health Services and VSICA options for further consideration?
- DNA virus indexing trial (Lien Ko) to be run in parallel with 2011 biological indexing.

16:15 Plan for next meeting

16:30 Close

Agenda: 3rd meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 6th July 2011

Start: 9:00 am
Finish: 1:00 pm

Venue: Maroochy Research Facility, 47 Mayers Road, Nambour, Qld 4560

9:00 am: Arrival and welcome

9: 10 am: Meet Mark Herrington to check fruit from this season's selections (post harvest shed/field).

10:15 am: Morning Tea

10:30 am: Matters arising from last meeting:

- **Update progress at Redlands on 2011 foundation plant production** – Peter Rigden
- **Definitions of meristem, tip culture and micro propagation:** Ian's feedback/clarifications from his overseas contacts on definitions etc.
- **Inspection of Applethorpe Facilities by Roger, Ian and Wally:** Discuss suitability for use as a site for vegetative propagation.

11:15 am: Discuss and plan the future direction of project.

- **2011 Vegetative propagation trial:** Plants have been potted up at Redlands, next stage of trial to be discussed and agreed.
- **Decide on future involvement of Victorian facilities in vegetative propagation work:** If there is to be significant role for Knoxfield/VISCA then a visit needs to be arranged for 2012.
- **2012/13 plans:** Discuss calendar? Numbers of foundation plants to be produced? Vegetative system to be run in parallel with the tissue cultured production (e.g. replace in entirety, 50:50; key varieties only)?
- **Operations at Applethorpe Research Station:** Timing, improvements required staff and skills requirements etc.

12:45 pm: Plan next meeting.

13:00 pm: Close and lunch

Agenda: 4th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 12th October 2011

Start: 9:00 am
Finish: 1:00 pm

Venue: Ray Daniel's Farm at 347 King Road, Wamuran, QLD 4512

9:00 am: Arrival and welcome.

9:05 am: Matters arising from last meeting.

9:10 am: Update on 2011 foundation plants: Foundation plants in cells; DNA variety test; nematode testing of foundation plants and nucleus plants

9:20 am: Virus indexing: Biological and DNA molecular indexing.

9:25 am: Update on vegetative propagation trial: Review trial design as given in the minutes of the 3rd Steering Committee meeting.

9:45 am: Discuss/plan a visit to VSICA/AQIS facilities in Victoria: Decide if a visit is needed and if so, when and who will be involved.

10:00 am: Nematodes: Review results of fruit farm sampling done by DEEDI staff.

10:15 am: Morning Tea.

10:30 am: Planning for future vegetative propagation model and future commercialisation: The three previous meetings have explored and discussed the complexities of the existing tissue culture propagation system and the general issues concerning replacing it with a vegetative propagation system. At this point we need to specifically identify and plan how to manage the short, medium and long term actions needed to successfully develop and implement a commercial vegetative propagation operation.

12:45 pm: Plan next meeting: date, venue, time.

13:00 pm: Close and lunch.

Agenda: 5th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Friday, 3rd February 2012

Start: 10:00 am
Finish: 1:30 pm

Venue: Redlands Research Station, 26 - 40 Delancy Street Cleveland, Qld 4163

10:00 am: Arrival and welcome.

10.05 am: Visit glasshouses 4B and 5G: Inspect nucleus plants – Wear clean clothes as we will enter the high health status greenhouse.

10:15 am: Check fruit bin trial: View plants in fruit bins at Redlands and discuss progress. Ian and Wally to bring photos of their fruit bins trials.

10:30 am: Morning Tea.

10:35 am: Matters arising from last meeting.

10.45 am: **DNA testing of nucleus and foundation plants**: Discuss 2011 results.

11.00 am: Molecular virus indexing: Discuss the results of the Victoria/Queensland molecular indexing project and their implications for current and future virus indexing practice.

11:30 am: Roger and Peter's visit to AQIS and CHS facilities in Victoria on 20/1/12: Discuss findings of visit and implications for Queensland work.

12:00 pm: **Roger's and Peter's meeting with Peter Merriman and John Baker on 20/1/12:**

- Brief review what was covered at the meeting.
- Discuss the possibility, raised by Peter and John, that VSICA's operations can be widened to become Australia wide.
- Decide if we wish to become part of a larger VSICA operation.
- If this option is to be pursued, Peter and John requested that the Project Steering Committee raise a formal proposal outlining our interest and requirements for production of Queensland plants in Victoria. Discuss and agree what is to be put in the proposal.
- Peter and John suggested a "face to face" meeting between the Steering Committee and VSICA to discuss our proposal. Discuss and agree arrangements for this meeting.

Note: If we do not go with the VSICA option, instead of discussing the last two dot points we need to decide how to develop and operate an approved Queensland based vegetative production scheme.

1:15 pm: Plan next meeting: date, venue, time.

1:30 pm: Close and lunch.

Agenda: 6th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 9th May 2012

Accommodation: The Boulevard Motel, 76 Maryland Street, Stanthorpe QLD 4380 Phone: (07) 4681 1777

6.30 pm: Meet at the Boulevard Motel

7.00 pm: Dinner/discussions at venue to be decided.

Date: Thursday, 10th May 2012

07.30 am: Leave motel for Red Jewel, Ballandean

08.00 am: Inspect trials at Red Jewel

09.00 am: Travel to Sweets, Nundubbermere Rd

09.30 am: Inspect trials at Sweets

10: 30: Travel to Applethorpe Research Station

11.00 am: Arrive Applethorpe Research Station

11.00 am: Morning tea

11:10 am: Matters arising from last meeting:

- DEEDI to check with CHS, as to whether or not they can virus index plants from our field sent to them in pots, what would the charge be per pot and what time of year can it be done. – $950.00 per variety – copy of email from CHS will be in the meeting notes.

- Red Jewel, with DEEDI assistance, will develop two models to give indicative costs for a "QSICA" operation based on vegetative propagation done by 1) DEEDI and 2) a non-government entity. – Not done due to other commitments. Probably this is best done after the model for the scheme is decided and agreed.

- Also required is a costing for production and maintenance of plants in the low health and high health greenhouses. A possible option being that nucleus plants will continue to be kept at Redlands Research Station to service either a bin or field based model for vegetative production of foundation plants. – Maintenance of 160 nucleus plants at Redlands for the 12 months of 2010 cost approximately $750 per plant. This figure includes: labour (excluding any DEEDI multipliers); sundry materials such as potting mix, fertiliser, etc; biological virus indexing and DNA testing but excludes the cost of the greenhouse hire.

- **Dimethoate use in runner nurseries:** DEEDI to check progress regarding the granting of "Critical use exception" for strawberry nursery production (not non-fruiting use). – Now with Growcom, Janine Clark has advised that she will need authorization from the Strawberry industry and funding to process the application.

- **Assessment trial for production methods:** Confirmation needed as to whether or not the plants of a particular variety that were used for the vegetative propagation trials

are from the same nucleus plants in 4B. – Not all the plants, of each variety, used in the 2011 vegetative trial were from the same nucleus plant. Should be possible to trace back from the information on the labels that were in the potted plants which showed a) date, b) variety name and c) a number in a square indicating the bin/clone number for the nucleus plant the runner was taken from.

- DEEDI to check with researchers and biometrician on how to replicate and set up the trial. – Done see meeting notes. Trial was postponed to 2013.

- **Harvest date for Fortuna:** DEEDI to follow up with Annelle Reed to obtain clear confirmation that EMCOCAL agree to allow the digging of 'Fortuna' runners by Queensland Runner growers to commence on 24th March 2012. – Done and an email confirming this was sent to runner growers by DAFF Business manager
- **Correspondence with VSICA:** Correspondence from Peter Merriman has previously been circulated, copies will be in the meeting notes.

- **Propagation method trials:** Decide what to do with plants/runners in fruit bins at Redlands.

11.30 am: Where to from now?

Decisions need to be made today by the runner growers and fruit growers on the future of the scheme. This is the meeting where decisions need to be taken on what the scheme will look like and who will do what.

Some of the questions to be resolved today are:

- Final decision on whether or not to take the VSICA option
- How will the new runner scheme be structured? (e.g. adopt a VSICA model?)
- What are the steering committee's views on the new scheme?
- Where will foundation plants be grown?
- Who will produce the foundation plants?
- How will foundation plants be grown: in ground/soil production, in fruit bins in soil-less media?
- How will the production of foundation plants be funded after June 2014?
- Where and who will maintain nucleus plants and germplasm bank after June 2014?
- Who will provide pathology, virus and DNA testing services after June 2014?
- What will be required of DAFF (DEEDI) in by the new scheme?
- Who will develop and write the new scheme rules?
- When are the new scheme rules needed

1:00 to 1.15 pm: Lunch.

3:30 pm: Plan next meeting: date, venue, time.

3.40 pm; Inspect glasshouse/greenhouse facilities at Applethorpe Research Station

Agenda: 7th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 8th August 2012
Start: 9:00 am
Finish: 13:00 pm

Venue: Ray Daniel's Farm at 347 King Road, Wamuran, QLD 4512

9:00 am: Arrival and welcome.

9:05 am: Matters arising from last meeting.

9:10 am: Update on 2012 foundation plant production: Foundation plants; virus indexing; DNA variety test; Redlands fruit bin trial.

9:30 am: Review industry support for the decisions made at the last Steering Committee meeting: Feedback from discussions at the last QSGA meeting.

10:0 am: **Review and decide on the establishment and operation of an entity to manage and oversee the maintenance of strawberry germplasm and the production of runners in Queensland.** As a starting point, topics to discuss include:

- Will the new entity operate under the auspices of the QSGA or be a completely separate organisation?
- What will be the legal structure of the new entity e.g. incorporated?
- Name of new entity.
- Chair's role and responsibilities.
- Remuneration for committee members and chair.
- Examine feasibility of different scenarios regarding operational responsibilities and practices pending State Government staffing and funding decisions (expected end of September) that will inform the DAFF's response to the Steering Committee's letter of request for services of 9/7/12.
- Funding for operations.
- DAFF representation.

11:30pm: Runner scheme rules: Discuss draft rules.

12:30pm: Other issues

- Harvest date of Fortuna in Victoria.

12:45 pm: Plan next meeting: date, venue, time.

13:00 pm: Close and lunch.

Agenda: 8th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 6th February 2013
Start: 9:00 am
Finish: 15:00 pm

Venue: Ray Daniel's Farm at 347 King Road, Wamuran, QLD 4512

9:00 am: Arrival and welcome.

9:05 am: Scheme update, including:

- Redlands progress report
- New inspection process for runner blocks
- Dimethoate permit
- Harvest date of Fortuna runners

9:30 am: Decide future direction of the new scheme.

Decisions to be taken include:

1. Review CHS visit e.g. Agribio, Screenhouse cooling, costs and fees for Agribio
2. Make a final decision on whether or not the CHS option is to be used, if so:
   - Map out a transition for moving plants from RRS to CHS.
   - Decide timing of transfer of plant material from RRS to CHS?
   - Which DAFF varieties should be sent to CHS?
   - Will the CHS system for annual renewal of the nucleus plants be used?
   - How will the CHS costs be funded?
3. Legal advice required (establishment and operation of ASRAA)
   - What advice is required?
   - How will legal advice be sourced? (Issues regarding conflict of interest etc)
   - How to pay costs for obtaining legal advice?
4. Chair for new entity and chair's role and responsibilities.
5. Registration of business name (ASRAA).
6. Introduction of new DAFF bred varieties and who will be responsible for associated costs.
7. Current and future variety licensing arrangements including reporting requirements.
8. Funding of ASRAA's operations.
9. New scheme rules.
10. Future of the two germplasm banks currently held at Redlands and Maroochy Research Facilities.
    - Where will the genebank material be maintained?
    - How the cost of maintaining the genebanks be funded?
11. Next steps

2:50 pm: Plan next meeting: date, venue, time. 3:00 pm: Close

Agenda: 9th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 1st May 2013
Start: 9:30 am
Finish: 14:30 pm

Venue: Gatton Research Station, Warrego Highway, Gatton

9:30 am: Arrival and welcome.

9:05 am: Scheme update, and matters arising form last meeting, including:

- Redlands progress report.
- Chemicals for runner production (Strategic Agrichemical Review/Strawberries Australia Incorporated).
- New runner growers and variety licenses.
- 8 x fruit bins at Redlands Research Station.

9:30 am: Decide future direction of the new scheme.

1). Crop Health Services Agribio option:

Review: DAFF response to request on the possibility of DAFF continuing to provide services.

Review: Fiona Constable's responses regarding:

- Rooftop glasshouse options;
- Availability of colletotrichum, nematode and DNA testing;
- Cost of introduction of material both from Redlands and overseas;
- Individual runner growers to have separate contracts.

Decision: Whether or not Crop Health's Agribio facility will be used.

Decision: If Crop Health is chosen then which DEEDI varieties (and clones) will be sent to Crop Health Agribio and when they will be sent?

Decision: Back up arrangements for nucleus collection through transition period and establishment of collections at Agribio (or other facility), in case of any problems developing with new facility.

Decision: Future of the two germplasm banks currently held at Redlands and Maroochy Research Facilities.

- Where will the genebank material be maintained?
- How the cost of maintaining the genebanks be funded?

2). DAFF response to request for EMCO CAL variety license transfer to runner growers

Review: DAFF's response to the request and consequences regarding operations of the new scheme and ASRAA.

3). Establishment of ASRAA

Review: Outcome of Wally's discussions with Peter Johnson and others regarding advice obtained regarding the mechanism and costs of setting up an incorporated association, or a cooperative.

Decision: Which business structure to use:

- Operates under the QSGA (as an Incorporated Association if required).
- Independent Incorporated Association.
- Public Company Limited by Guarantee.

Decision: The operation of ASRAA
- Management.
- Operational responsibilities.

Decision: Next stages in the establishment of ASRAA including:
- Finance,
- Registration of business name,
- Appointment of chair (the criteria needed to select and appoint a Chairperson).
- Appointment of board/committee,
- Who will manage process for this to happen?

4). New scheme rules

Discuss any further amendments (if required).

2:25 pm: Plan next meeting: date, venue, time.

2:30 pm: Close

Agenda: 10th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 10th July 2013
Start: 9:00 am
Finish: 15:00 pm
Venue: Maroochy Research Facility, 47 Mayers Road, Nambour, Qld 4560

9:00 am: Arrive and meet in Conference Room Block B, Maroochy Research Station.

9:05 am: Items for discussion:

- **Establishment of ASRAA**

  Action: Wally to ask Clarke Kann to provide a quote regarding the use Clarke Kann services to guide the establishment of ASRAA. Once a quote has been obtained then seed money to fund the process can be raised. Wally agreed to be responsible for the costs of any fees required to obtain this advice and for the establishment process to be completed, but would be compensated by ASRAA at a later date.

  Action: The Steering Committee will hold discussions with QSGA regarding the appointment of the QSGA nominated ASRAA board members. It was agreed that the Steering Committee recommend that two of the current members of the Steering Committee take these positions initially, to maintain continuity.

  Action: Wally to follow up with Clark Kann (on the basis of the discussions and agreements of this meeting) as soon as possible and circulate the outcomes of his discussions to the Steering Committee. Wally to then arrange for John to meet with the Steering Committee at a mutually agreed time and place to progress the formation of ASRAA.

The following aspects need to be further discussed and decided:

- The outcome of discussions with Clarke Kann.
- The outcome of discussions with QSGA.
- Management structure.
- Operational responsibilities.
- Finance.
- Registration of business name.
- Appointment of chair (the criteria needed to select and appoint a Chairperson).
- Appointment of board/committee.

- **Variety licenses.**

- **New scheme rules**

Discuss any further amendments (if required).

- **Chemicals for runner production (Strategic Agrichemical Review (SAR) for Strawberries Australia Incorporated).**

  Action: Wally to seek advice on cost of obtaining quotes for permits and chemical registrations before this option is considered further.

  Action: Chemicals considered worthy of registration for use in runner production are to documented by the QSGA Industry Development Officer and submitted to SAI for inclusion in the SAR.
  Action: Peter to forward the DAFF document to the group and to the QSGA's IDO.

Action: This issue is to be raised at the next Strawberry Australia meeting by the Steering Committee's grower representatives due to be held in Queensland later in May 2013. The dimethoate review also needs to be raised at this meeting.

- **Transfer of nucleus collection to Crop Health Services (CHS) facility at Agribio.**

  Action: Peter to circulate to runner growers lists of vegetative plants in pots for each variety and runner growers are to indicate which varieties they want to be sent to Agribio.

  Action: Peter to discuss with Fiona Constable the best arrangements for transport of plants to Agribio and make arrangements for this to be done.

  Action: Peter to contact Fiona Constable to find out if plants can be sent to Agribio prior to signing of contract between runner growers and CHS. This would occur under a Material Transfer Agreement with DAFF.

  Action: It was agreed that plants are to be transferred to Agribio under a Material Transfer Agreement as soon as possible. Peter to arrange this, after discussion with the HFS Business Manager.

  Action: Peter to check with Fiona Constable to see if DAFF can transfer plants to their cold rooms and simply pay for storage, over the next two months, pending finalisation of license arrangements between DAFF and the runner growers. A Material Transfer Agreement rather than a contractual arrangement would be the preferred vehicle for this as an interim arrangement until license transfers have been completed and runner growers can establish their own contracts with CHS.

- **Redlands progress report.**

- **Meristem propagation and requirements for 2014 collection Redlands**

  Action: Meristem propagation is to be used in 2013 to maintain the nucleus collection. For example, meristem 5 tips each from the old and new Festival clones at Redlands in October/November/ December 2013 (each group of several old and several new plants being a single clone). Other varieties will also be identified for meristeming in the back up collection at Redlands.

  Action: Roger to seek clarification on whether or not Maroochy Research Facility staff and facilities will be available for meristem work when the tissue culture laboratory closes at Redlands at the end of December 2013.

  Action: Potting up of runners from the plants held in the back up collection at Redlands in will need to be done in March /April 2014, rather than January February 2014.

  Action: Peter to check if any material still requires transfer from 5G to 4B. This needs to be completed during 2013. Glasshouse 5G will not then be required in 2104 and onwards.

2.55 pm: Plan next meeting: date, venue, time. 3.00 pm: Close

Agenda: 11th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 11th September 2013
Start: 9:00 am
Finish: 15:00 pm
Venue: Maroochy Research Facility, 47 Mayers Road, Nambour, Qld 4560

9:00 am: Arrive and meet in Conference Room Block B, Maroochy Research Station.

9:05 am: Items for discussion:

1. **Establishment of ASRAA**

Actions from 10th meeting:

- Wally to ask Clark Kann for a quote for the work he will need to do to advise on the establishment of ASRAA.

- Ian to update the draft Scheme Rules and forward to Wally for forwarding to Clark Kann.

- Clark Kann will return the questionnaire to Wally and Wally will circulate to the other Steering Committee members with a proposed date (preferably a Wednesday) for a meeting to decide the Steering Committee's responses to the questionnaire. Wally to forward the agreed responses to John.

- Wally to check with John as to whether or not QSGA will need to pay a fee to become a member of ASRAA.

Review the outcome of discussions with Clark Kann regarding:

- Scheme rules.
- Constitution for ASRAA.
- Finance.
- Registration of business name.
- Appointment of chair (the criteria needed to select and appoint a Chairperson).
- Timeframe for finalisation/establishment of ASRAA.
- The frequency of board elections (annual or biennial).
- How many directors QSGA will appoint?
- How to meet the requirement for QSGA director nominations to be agreed by the rest of the ASRAA Board.
- How to build a mechanism into the constitution to prevent sudden changes to the ASRAA Board.

Discuss arrangements for the Steering Committee to brief the QSGA members.

2. **New scheme rules**

Action from 10th meeting:

Ian to update the draft rules accordingly for Wally to forward to John Toigo,

Review the most recent draft of the Scheme Rules and finalise.

3. **Management of back up collection at Redlands Glasshouse 4B.**

Action from 10th meeting:

Peter and Roger to work out the costs for continuing the maintenance of the nucleus plants at Redlands if a) DAFF operates and manages the facility OR b) the runner growers operate and manage the facility.

Roger to arrange a meeting between Ian Mungall, Wally Sweet, Dr Michael Kennedy, Roger Broadley and Jodie Campbell to be arranged for the 30th or 31st July 2013 to discuss the cost of Redlands facilities, licenses and virus indexing costs.

Outcome of the meeting to be advised and discussed.

4. **Chemicals for runner production (Strategic Agrichemical Review (SAR) for Strawberries Australia Incorporated).**

Action from 10th meeting:

Wally to seek advice on cost of obtaining quotes for permits and chemical registrations before this option is considered further.

Roger to ask Apollo to get an update on Nemacur registration for Ian and Wally.

Discuss progress since last meeting.

5. **CHS Request to continue using Knoxfield facility for 2013/2014**

On 4/9/13 Fiona Constable contacted Peter Rigden seeking agreement to continue using the Knoxfield facility to house the nucleus plants for another 6 -8 months. She suggested that during the coming months only non-critical plants will be transferred to Agribio so that they can test the new facility and the Queensland plants will be moved to Agribio in 2014.

6. **TC germplasm collection**

Confirm that DAFF will maintain collection in the short term (12 – 24 months) at MRF and in the long term at CHS Victoria OR at a commercial lab.

7. **Redlands progress report.**

2.55 pm: Plan next meeting: date, venue, time.

3.00 pm: Close

Agenda: 12th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Thursday, 9th January 2014
Start: 8:00 am
Finish: 14:30 pm
Venue: Sweet's Strawberry Runners, 846 Nundubbermere Road, Stanthorpe Queensland 4380

8:00 am: Meet at Red Jewel and inspect screenhouse plants etc.

9:00 am: Travel to Sweet's

9:30 am: Arrive Sweet's and inspect screenhouse plants etc.

Meeting to be held in Sweet's boardroom:

10:30 am Discussions with Mark Herrington regarding the introduction of material from new breeding lines for trials under the new arrangements.

11:00 am: Items for discussion:

Item 1. Establishment of ASRAA

Review the progress on the establishment of ASRAA.

Items for review include:

- Update on constitution since last meeting.
- Update on finance since last meeting.
- Registration of business name.
- Appointment of chair person.
- Timeframe for finalisation and establishment of ASRAA.

Decide the next steps required to complete the establishment of ASRAA and how these will be achieved.

Actions from the 11th meeting:

Action: Wally will provide the details required for himself, Ian, Merv and Ray to be the four Directors of ASRAA.

Action: Wally to provide the required details relating to the three members of ASRAA. These will be Sweets, Red Jewel and QSGA.

Action: Wally will check with Clarke Kann Lawyers that they can be used as the registered premises on an interim basis**.**

Action: Wally to provide the above information regarding Items 8 and 11 on John Toigo's Action List to Clarke Kann lawyers.

Action: Wally to seek confirmation from Clark Kann that with the agreement of the incumbent Board then numbers can be increased in future.

Action: Wally to check with John Toigo whether or not a phone link for directors who cannot attend a Board meeting in person is possible.

Action: It was agreed that Wally will submit the Steering Committees responses to Clark Kann's questions (as above) and that Clark Kann Lawyers should be instructed to go ahead and progress matters on this basis.

Action: Ray and Merv to seek advice form QSGA regarding who will be nominated to the Board as the QSGA Directors.

Item 2. New Scheme Rules.

Review the updated Scheme Rules from last meeting.

Item 3. Redlands progress report.

Update on the completion of operations at Redlands.

Action: Peter to advise Fiona Constable that the Steering Committee had agreed to her suggestions and that he will send the six trial plants down as soon as possible.

Action: Peter to send lists of which varieties have already been sent to Victoria to Ian and Wally so that they can check all the plants that they wish to send have already been sent.

Item 6. TC germplasm collection

Update on the transfer TC from Redlands to Maroochy and the establishment of TC collection in Victoria. Red Jewel and Sweets to amalgamate their TC collections?

Action: Peter to confirm with Fiona Constable that a tissue culture germplasm collection can be established at CHS and to seek confirmation that the potted plants sent in May have successfully been moved out of the cold store into their screenhouses.

Action: Ian and Wally are each to advise Fiona Constable to establish a tissue culture germplasm collection straight away (as soon as plants produce runners).

Action: Peter to discuss with Sharon Hamill and Mark Herrington regarding how many tubes of each variety are required.

Action: Peter to circulate list of varieties in TC to Ian and Wally, so they can decide which varieties are to be maintained in the germplasm bank at MRF.

Action: Peter to provide an estimate of costs for maintaining a TC germplasm bank at MRF for a year.

Item 7. Preparations for QSGA growers meeting in February 2014.

What to present at the meeting e.g. Background to project, what was done at RRF, Steering Committee Meetings, CHS arrangements, establishment of ASRAA , new Scheme Rules etc.

Item 8. Reflections.

If this is the last meeting a brief discussion will be helpful regarding what we did well, could do better, outcomes.

2.20 pm: If required plan next meeting: date, venue, time. 2:30 pm: Close

Agenda: 13th meeting of the 'Developing improved strawberry germplasm management and runner quality' Project Steering Committee

Date: Wednesday, 14th May 2014

Start: 9:00 am

Finish: 12:30pm (unless any major issues arise that require extensive discussion)

Venue: Maroochy Research Facility, 47 Mayers Road Nambour Qld 4560

9:00 am: Meet at Small Conference Room

9:05 am: Review progress on the establishment of the New Scheme and ASRAA.

Outstanding matters that required follow up after the last meeting were:

- The registration of the business name.
- QSGA need to give a written authority from their executive that Ray and Merv will be appointed to ASRAA as their representatives.
- The President of QSGA will be their member representative who will have the authority to vote on the election of the directors of ASRAA.
- Appointment of chair of board.
- Final review of Scheme Rules (if needed).

Additional issues include:

- ASRAA and Biosecurity issues (Ian)
- Inspections and audits (Wally)
- Assistance to new runner growers (Rick)

10:00 am: Mark Herrington, 2014 strawberry breeding work update.

10:45 am: Sharon Hamill, view the MRF germplasm collection.

11:00 am: Update on plants at Crop Health Victoria.

11:15 am: Next steps for ASRAS and ASRAA (if not covered in the earlier session).

11:45 am: In preparation for the Final Project Report to be submitted to HAL on 31st May 2014, we need to review what we did well, could do better and the outcomes of the project.

12:30 pm: Lunch and close.

Actions from the 12th meeting were:

Action: Wally to contact John Toigo at Clarke Kann and ask him to progress registration of the business name, so that it is registered by the time of the next QSGA meeting on 4th February 2014.

Action: Wally will provide the details required for himself, Ian, Merv and Ray to be the four Directors of ASRAA.

Action: Wally to provide the required details relating to the three members of ASRAA. These will be Sweets, Red Jewel and QSGA.

Action: Ray and Merv to seek advice form QSGA regarding who will be nominated to the Board as the QSGA Directors.

Action: After amendment by Ian to show the F1 and F2 stages of the Propagation Model a copy of the Scheme Rules is to be forwarded by Peter to QSGA's IDO for her information, but not for tabling at the QSGA meeting.

Appendix 2. Notes from Project Steering Committee meeting 13

BS09024: Developing improved strawberry germplasm management and runner quality

13th Meeting of the Project Steering Committee

Date: Wednesday, 14th May 2014

Venue: Maroochy Research Facility, 47 Mayers Road Nambour Qld 4560

Present: Roger Broadley (DAFF)
Peter Rigden (DAFF)
Wally Sweet (Sweets Strawberry Runners)
Ian Mungall (Red Jewel Nursery)
Ray Daniels (Strawberries Australia Inc.)
Merv Schiffke (Queensland Strawberry Growers' Association)
Rick Twist (Queensland Strawberry Growers' Association)

Apologies: Stuart Burgess (HAL)

Start: 9:00 am

Finish: 12:30 pm

AGENDA

9:00 am: Meet at Small Conference Room

9:05 am: Review progress on the establishment of the New Scheme and ASRAA.

Outstanding matters that required follow up after the last meeting were:

- The registration of the business name.
- QSGA need to give a written authority from their executive that Ray and Merv will be appointed to ASRAA as their representatives.
- Appointment of chair of board.
- Final review of Scheme Rules (if needed).

Additional issues include:

- ASRAA and Biosecurity issues (Ian)
- Inspections and audits (Wally)
- Assistance to new runner growers (Rick)

10:00 am: Mark Herrington, 2014 strawberry breeding work update.

10:45 am: Sharon Hamill, view the MRF germplasm collection.

11:00 am: Update on plants at Crop Health Victoria.

11:15 am: Next steps for ASRAS and ASRAA (if not covered in the earlier session).

11:45 am: In preparation for the Final Project Report to be submitted to HAL on 31st May 2014, we need to review what we did well, could do better and the outcomes of the project.

12:30 pm: Lunch and close.

Actions from the 12th meeting were:

Action: Wally to contact John Toigo at Clarke Kann and ask him to progress registration of the business name, so that it is registered by the time of the next QSGA meeting on 4th February 2014.

Action: Wally will provide the details required for himself, Ian, Merv and Ray to be the four Directors of ASRAA.

Action: Wally to provide the required details relating to the three members of ASRAA. These will be Sweets, Red Jewel and QSGA.

Action: Ray and Merv to seek advice form QSGA regarding who will be nominated to the Board as the QSGA Directors.

Action: After amendment by Ian to show the F1 and F2 stages of the Propagation Model a copy of the Scheme Rules is to be forwarded by Peter to QSGA's IDO for her information, but not for tabling at the QSGA meeting.

MEETING NOTES

Sharon Hamill, view the germplasm collection.

The Steering Committee inspected the Maroochy Research Facility (MRF) tissue culture facilities with Sharon Hamill, the Senior Principal Scientist who manages the tissue culture laboratory. The tissue culture material from Redlands Research Facility has been transferred to MRF and the unified collection is now split into two separate tissue culture rooms, one kept at 6º C and one at 18º C. The tissue cultured plants are transferred onto new media every 3 months.

Mark Herrington, 2014 strawberry breeding work update.

Fruit harvested from the 2014 breeding trial were inspected.

Discussion initially centred on how to facilitate the transfer of prospective new material in an efficient and timely way so that the runner growers would have sufficient plants to have:

- F1 plants in their screenhouses
- Foundation plants in the runner grower's foundation blocks
- Enough plants available for trial assessments to be done on fruit farms
- Mother plants at Agribio to ensure supply of F1 vegetatively propagated plants to runner growers.

This with a view to supplying as soon as possible runner generated plants to fruit growers from the runner farms, rather than supplying tissue cultured plants form the MRF.

The breeding program can supply tissue cultured foundation plants to runner growers as in the past whilst material is being taken through the Agribio facility.

An advisory committee should be set up to get grower input into the Queensland breeding program.

Registration of the business name.

ASRAA was registered on 19th March 2014 and the Certificate of Registration is given in Appendix 1.

QSGA appointed representatives to ASRAA.

QSGA have indicated Ray Daniels and Merv Schiffke will represent them on the ASRAA board, a letter confirming this is still required.

Appointment of the ASRAA Board Chair.

To be progressed at the first Board Meeting of ASRAA

Review of Scheme Rules

It was agreed that the reference to “Insert Photo” in Appendix 1 should be deleted, because in practice there are too many variables for a photographic reference to be a useful guide to a typical runner.

ASRAA and Biosecurity issues

It was noted that the Scheme Rules do not contain any protocol for the notification of a biosecurity incursion on a runner farm to the ASRAA Board.

During discussion it was noted that the field inspections and maintenance of records (Internal Audits) for identification of pests and disease problems and appropriate actions are the responsibility of the runner growers and that the External Audit is to check the runner growers are compliant with the scheme requirements. This is already adequately covered in the Scheme Rules but notification of any biosecurity incursion on a runner farm to ASRAA is not.

It was agreed that a clause should be included to correct this.

Ray moved that a suitable clause would be: ***If there is a suspected exotic disease or pest notification that requires the involvement of Biosecurity Queensland then ASRAA should be notified that Biosecurity Queensland has been involved.*** This was unanimously agreed.

It was noted that there would be no obligation to detail the situation to the ASRAA Board and that any such notification would remain confidential.

Inspections and external audits

It was agreed that the timing of the audit needs to be flexible and there was extensive discussion regarding the best timing of the audit.

Ian proposed that the following clause should be inserted into the Scheme Rules: ***External Audits should be conducted between the 10th February and the 10th March.*** This was unanimously agreed.

Assistance to new runner growers.

There was extensive discussion on how the scheme would assist the entry of a new runner grower in future. This included the following comments:

- Roger explained that the ASRAS rules will be available to a prospective new runner grower and this will ensure that they will know exactly what they will need to do to become a runner grower.
- The ASRAS rules provide a road map for new runner growers.
- Future entry to the industry will require new runner growers to have commitment over several years as they will need to arrange their licenses for varieties, contracts with Agribio and establish facilities such as screenhouses.
- It was good that the ASRAS and ASRAA have been established as this will ensure that only committed runner growers would be servicing the industry in future.

- It was noted that the existing runner growers have been establishing their businesses since the 1990's and have demonstrated their commitment.
- Licenses for varieties and contracts with Crop Health Services Victoria will be required by new entrants but the establishment of ASRAS and ASRAA do not prevent this being done.
- The new scheme distils all the learning's of the Project Steering Committee and makes them available to anyone considering becoming a runner grower.
- The final report to HAL needs to detail what has been done to develop a recognised scheme that can bring dedicated persons to the industry.
- The ASRAS rules and ASRAA constitution are "living documents" and can be updated and amended as required.

Action: Ian to update the ASRAS rules to include the two new clauses relating to biosecurity incursion and external audits. The reference to a photo in Appendix 1 is to be deleted.

Action: Peter to send the final version of the ASRAS rules to QSGA for circulation to industry.

Action: Peter to prepare an article on the development of ASRAS and ASRAA for publication in the QSGA magazine Simply Red (under the name of the Project Steering committee).

Update on plants at Crop Health Victoria

Peter informed the meeting that in his recent phone conversations with Fiona Constable at AgriBio she had indicated that:

- The nucleus plant collections are in good condition (pictures were circulated).
- They had successfully produced the runner growers' requirements for F1 vegetative runner plants for all except one variety.
- The summer temperatures in the AgriBio facility had been reduced by 10º C using misters, however they now need to reduce the frequency of misting to avoid making the conditions in the screenhouse too wet.
- They had not been able to establish tissue culture genebank collections, this was because they gave priority to potting up the F1 vegetative runners early in the running season and after the potting up of vegetative runners had been completed there had been problems with contamination of the tissue culture for tips taken in late February.
- The move of plants from the Knoxfield site to the AgriBio facility is scheduled to be completed by the end of June 2014.
- Transfer of part or all of the tissue culture genebank form MRF to Agribio, would help them to establish their genebank.

The proposal to send part of the MRF collection to Agribio was discussed and agreed.

Action: Peter to send three of each of the tissue culture plants from each runner growers collection held at MRF to AgriBio for each variety where six plants are available, where less than 6 plants are available only those surplus to three will be sent.

Next steps for ASRAS and ASRAA

The provisional date for the first ASRAA board meeting was set for the 27th May 2014, at the Clarke Kann Brisbane office starting at 1.00 pm.

A Clarke Kann representative is to be invited to the meeting to advise and guide the board at its first meeting.

Wally pointed out that under the new scheme the accreditation process used by ASRAA of the runner growers will no longer involve a formal visit of fruit growers to the farm just prior to the commencement of the runner harvest. It was agreed that instead now the non-runner grower members of the ASRAA Board will visit the runner grower's farms as part of a board meeting to be scheduled just prior to commencement of harvest.

It was noted that a separate visit of fruit growers to the runner grower's farms, prior to runner harvest beginning, organised by QSGA can still be arranged.

It was noted that DAFF will relinquish responsibility for any involvement in the production of commercial foundation plants or the operation of ASRAS as of the date of the first meeting of the ASRAA Board on 27th May 2014.

Action: On completion of the first meeting of the Board, ASRAA is to send a letter of notification to QSGA and DAFF that the new scheme has begun.

The tissue culture laboratories at AgriBio and MRF will need to be formally accredited by ASRAA in due course. AgrioBio may also need to be accredited for vegetative production.

Roger acknowledged the commitment and considerable time that the Project Steering Committee had put into the project and thanked them.

Merv and grower members of the Steering Committee thanked and acknowledged Roger Broadley and Peter Rigden for their considerable contributions to the project.

What we did well, could do better and the outcomes of the project

Comments by members of the Steering Committee included:

- All options for the establishment of a new scheme were considered.
- The project evolved well and has involved the industry.
- Individuals have been empowered to develop the industry.
- The value of the industry is around $180-200 million and is the second biggest fruit industry in Queensland after bananas.
- The growing area has expanded and there is now an estimated 6.0 million runners grown in the Bundaberg region.
- A note should be made in the final report that the two outcomes of the project, ASRAA and ASRAS, have given the industry direction and a way to maintaining the strawberry germplasm.
- This has given the industry more confidence in the germplasm management system.
- Up until now the industry relied on DAFFQ for a significant proportion of germplasm management and foundation plant supply but now industry has control of the complete production system.
- Confidence has risen in the industry with the professionalism of both the fruit and runner growers that has been developed in recent years and the work of the germplasm project has contributed to this.
- Quality has to be maintained.
- There are opportunities for the development of exports to the Chinese market in August and September that has big potential for the continued expansion of the strawberry industry.
- The industry is expected to continue growing in size but not in a straight line

The meeting closed at 1:00 pm

Appendix 1: ASRAA Certificate of registration.

CLARKEKANN ATTN: SANDRA STEPHENSEN
GPO BOX 2249
BRISBANE QLD 4001

Remove this top section if desired before framing

Certificate of Registration of a Company

ASIC
Australian Securities & Investments Commission

This is to certify that

AUSTRALIAN STRAWBERRY RUNNERS ACCREDITATION AUTHORITY LIMITED

Australian Company Number 168 630 966

is a registered company under the Corporations Act 2001 and is taken to be registered in Queensland.

The company **is limited by guarantee.**

The company is a **public** company.

The day of commencement of registration is **the nineteenth day of March 2014.**

CERTIFICATE

Issued by the
Australian Securities and Investments Commission
on this nineteenth day of March, 2014.

Greg Medcraft
Chairman

Appendix 3. Certificate of incorporation of ASRAA.

CLARKEKANN ATTN: SANDRA STEPHENSEN
GPO BOX 2249
BRISBANE QLD 4001

Remove this top section if desired before framing

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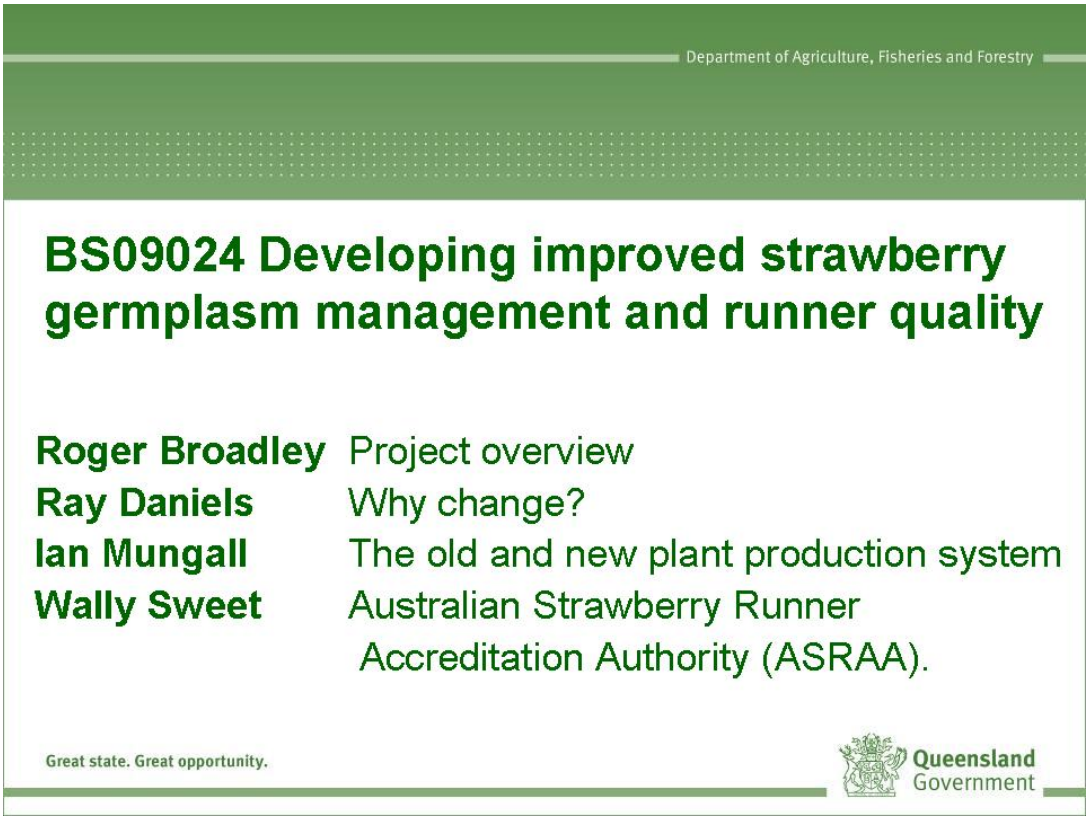
Greg Medcraft
Chairman

Appendix 4. Project Steering Committee presentation to fruit growers.



Steering committee

- Roger Broadley (Chair, DAFF Q)
- Peter Rigden (Secretariat, DAFF Q)

- Rick Twist (Bill Sharpe)- QSGA
- Merv Schiffke - QSGA
- Ray Daniels – QSGA and Strawberries Australia

- Ian Mungall (Red Jewel)
- Wally Sweet (Sweets)

Acknowledge commitment for over three years (13 meetings, two trips to Victoria)

Overview – Roger Broadley

Before we go into detail of the new arrangements, I would like to make a few points:

- All committee decisions made by consensus, not voting.
- The new arrangements are such that ASRAA is focused on producing and accrediting quality plants - no commercial activities.
- New rules will make it easier for new runner growers to enter the industry.
- ASRAA will have equal representation between fruit growers and runner growers with and independent chair.

Why change – Ray Daniels

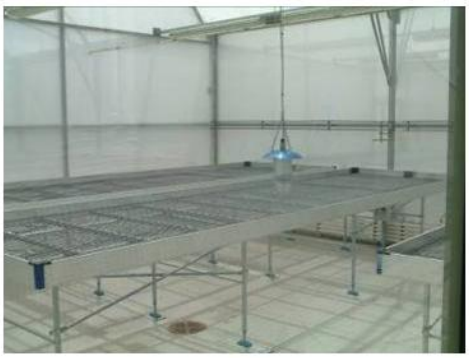
- Queensland Approved Runner Scheme overseen by QSGA, but new rules required.
- DAFF Q licensors directed that a new system of producing commercial plants be developed.
- New government indicated that where a private commercial entity could do the work, they should do so.
- The focus for DAFF Q is RD and E not commercial plant production.
- Risk management reduction was also an important consideration for DAFF Q.
- So a project was set up to see where to next?

Why change – Ray Daniels

- Licensor requirement – risk of off-types in tissue culture multiplication process.
- Align with international best practice.
- Reduce QG/DAFFQ investment.
- Project Steering Committee established to oversee any changes or transition (2011 to 2014).

What the Project Steering Committee did – Ray Daniels

- Reviewed options for where nucleus collection can be maintained – VSICA, Crop Health Victoria, Redlands and Applethorpe Research Station.
- Visited and discussed the above options with their staff.
- Considered costings for the options.
- Trialled vegetative propagation systems at Redlands Research Station and on the runner grower farms.
- Discussed and facilitated establishment of new scheme rules and an authority to oversee the new scheme. Draft rules given to QSGA.



Runner Production (old and new) – Ian Mungall

Operations at DAFF Q's Redlands Research Facility (RRF):

- Tissue culture laboratory.
- Low health status glasshouse – introduction of new varieties from breeding program and overseas.
- High health status glasshouse – maintenance of nucleus mother plant collection.
- Replaced by Crop Health Services (CHS) in Victoria.

Old foundation plant production – Ian Mungall

- Produced at DAFF Q's Redlands Research Facility until 2013
- Tissue culture initiated from tips taken from nucleus mother plants.
- One tip in tissue culture was multiplied to produce up to 150 foundation plants.
- Tissue culture plantlets grown out in cell trays of soil-less media in high health glasshouse.
- Approximately 10,000 foundation plants per year sent to runner growers.
- Tested for freedom from viruses, colletotrichum and nematodes.
- DNA variety check.

New vegetative propagation method – Ian Mungall

- Nucleus plant is the source of a vegetative F1 plant.
- Produced at CHS in Victoria in sterile soil-less media.
- F1 plant is used to produce F2 foundation plants.
- F1 plants grown in protected environment in screen houses at nurseries.
- F2 plant produces mother plants for field production.
- Plants virus indexed and DNA tested at CHS.

Virus indexing – Old & New - Ian Mungall

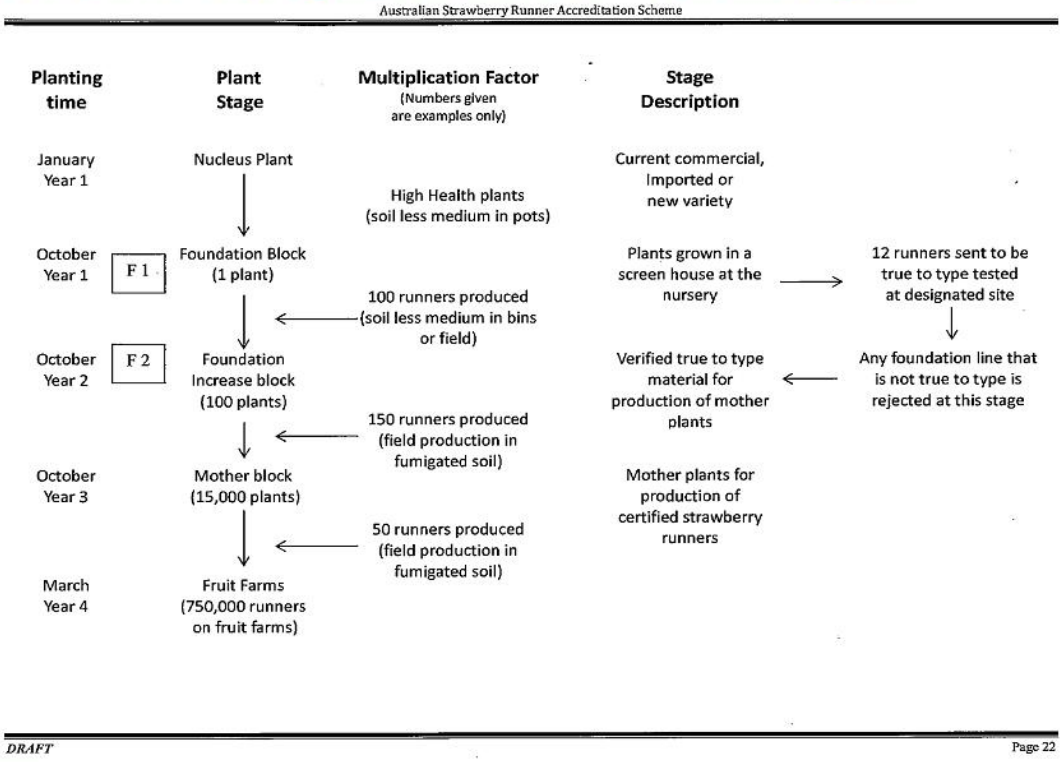
- Grafting of three petioles from the test plant to a virus sensitive indicator plants (UC4, UC6 and UC10).
- After 8 weeks the indicator plant should be free of any virus symptoms.
- Positive controls are established to validate test.

Healthy test plant Virus infected positive control

Foundation plant production – Ian Mungall

- Nucleus plant collection is now maintained by Crop Health Victoria.
- Vegetative F1 plants produced in Victoria are sent to runner growers in spring each year.
- Runner growers have established screen houses to grow F2 plants in bins in soil-less media.
- Extra 12 months to produce foundation plants (F1).
- Opportunity to observe and cull atypical plants at F1 stage.
- Grow out plants from each clone on fruit farms on coast to ensure true to type.

ASRAA Propagation model – Ian Mungall



The Australian Strawberry Runner Accreditation Authority (ASRAA) – Wally Sweet

- Developed by the Project Steering Committee using the services of ClarkeKann lawyers.
- Public company limited by guarantee.
- 3 Members: The two runner growers and QSGA.
- 5 Directors: An Independent Chair plus equal numbers of runner growers and fruit growers nominated by QSGA (currently 2 + 2).
- No one group predominates – equal numbers if extra runner grower

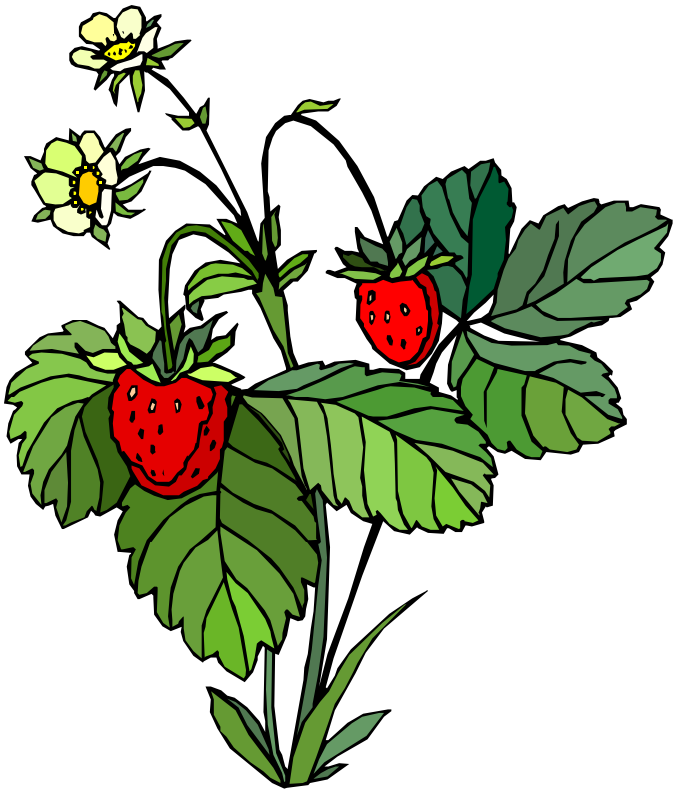
Duties of ASRAA Board – Wally Sweet

- Oversee the administration and operation of ASRAA.
- Oversee an annual audit of the runner growers prior to runner harvest.
- Has a structure that provides for entry of other runner growers.
- Will not be involved in commercialisation or importation of new varieties.

Features of ASRAA scheme – Wally Sweet

- Rules for ASRAA developed by the Project Steering Committee .
- The Australian Strawberry Runner Accreditation Authority (ASRAA) will administer ASRAA scheme rules.
- Continue to maintain regimes for virus indexing of propagation material.
- Provides a clear set of guidelines to a new runner grower regarding what is required to enter the Scheme.
- Auditable.
- Efficient.

Appendix 5. ASRAS rules



Australian Strawberry Runner Accreditation Scheme

Version 1.9 May 2014

1. Purpose of Australian Strawberry Runner Accreditation Scheme

The purpose of the Australian Strawberry Runner Accreditation Scheme is to facilitate the production of true to type, disease-free, healthy runners, plug plants or tips which when planted in accordance with good agronomic practices and managed properly, will produce timely and economic quantities of marketable fruit.

This Scheme outlines the procedures, standards and practices required at all levels of nursery production to achieve the supply of quality plants for the strawberry fruit growing industry while balancing the interests of all stakeholders.

This Scheme is for the production of nursery plants only.

2. Scope

The Australian Strawberry Runner Accreditation Scheme is responsible for accrediting Strawberry Runner growers and approval of the practices associated with the growing, harvesting and dispatch of the strawberry runners, plugs or tips.

Accredited runner growers should commit to the implementation of the scheme and communicate appropriate procedures to the relevant staff members.

The completion of an external audit of the Runner growers operation shall be carried annually, in the time period immediately prior to the commencement of the main harvest, to ensure compliance with Scheme Accreditation Requirements.

The completion of an annual audit is required to maintain Accreditation by the grower with the Australian Strawberry Runner Accreditation Scheme.

Scheme Requirements:

- The nursery owner or appropriate senior manager signs a commitment statement to support and comply with the scheme.
- Entry to the property is granted to persons who are authorised for the purposes of auditing for accreditation.
- Completion of an annual external audit for compliance to Scheme Requirements for Accreditation and copy of audit report submitted to Accreditation Authority.

3. Definitions

a. In this Scheme Accreditation guidelines the following definitions apply –

- **"Accreditation"** means compliance with the requirements of the Scheme and obtaining the approval of the Accreditation Authority
- **"Accreditation Authority"** means the body empowered to manage the scheme (ASRAA for short). Membership details outlined in Appendix 4
- **"Approved Source"** means a certified facility that has been approved by the Accreditation Authority to produce foundation plants (Appendix 3)
- **"Accredited Strawberry Runner"** means a strawberry runner arising from a Mother Plant and produced in compliance with the Scheme Accreditation and meeting the required standards as defined in Appendix 1 at time of harvest.
- **"Accredited Production Area**" means that area within the Designated Growing Area from which certified plants will be produced for the current year.
- **"Designated Growing Area"** means the area or areas of land on an Applicant's Property (or leased properties) which are marked on a sketch plan (or plans) and shown on Farm map as the area or areas of land intended to be used for production of Certified Plants.
- **"Foundation Plant"** (F1) means a plant arising by vegetative or tissue culture multiplication means from a Nucleus plant.
- **"Foundation Stock"** means runners or plants derived by vegetative means from a Foundation Plant and from which Foundation Increase Plants or Mother Plants are produced.
- **"Foundation Increase Plant"** (F2) means a plant arising from a Foundation Plant by vegetative means or in certain circumstances, derived from tissue culture multiplication of a Nucleus plant.
- **"Foundation Increase Stock"** means runners or plants derived by vegetative means from a Foundation Increase Plant and from which Mother Plants are produced.
- **"Mother Plant"** means a plant arising from a Foundation Increase Plant or in certain circumstances, derived from tissue culture multiplication of a Foundation plant.
- **"Mother Stock"** means runners or plants derived from a Mother Plant by vegetative means and from which Certified Plants are produced
- **"Nucleus Plants"** means plants that have been virus indexed at least every two years and held in a glasshouse/screen house approved under this scheme.
- "**Nucleus Stock"** means meristems or plantlets in tissue culture derived from nucleus plants in a laboratory approved under this scheme from which Foundation Plants are produced.
- **"Off Types"** means strawberry plants which vary in their genetic constitution from their known varietal type in one or more distinguishable characteristics.
- "**Plug Plant"** is a plant produced from a runner tip in soil less medium.
- **"Property"** means each area of land owned by an Applicant or secured by lease in a particular location as evidenced on the Applicant's land title deed or by written lease arrangement;
- **"Runner"** is a plant produced by vegetative means from a stolon attached to a parent plant.
- **"Runner Tip or Tips"** is a healthy growing tip produced from a stolon attached to a mother plants and capable of producing roots used for the production of plug plants.
- **"Scheme"** means the Australian Strawberry Runner Accreditation Scheme (ASRAS for short).
- **"Scheme Requirements"** means the minimum standard of documentation and/or action required to be accredited by the Scheme.

b. words imparting the singular include the plural and vice versa and words imparting a gender include other genders;

c. a reference to a person is a reference to an individual, firm, body corporate or other entity (whether incorporated or not) and a reference to a position is a reference to the individual occupying the position;

d. A reference to a clause or a schedule is a reference to a clause or a schedule of the Scheme.

4. Administration

This Scheme will be governed by the Australian Strawberry Runner Accreditation Authority (ASRAA), a company limited by guarantee, which is administered by a board of directors as set out in Appendix 4.

The Accreditation Authority will be responsible for the governance and administration of the Australian Strawberry Runner Accreditation Authority, including maintaining the appropriate level of indemnity for authority board members.

The Accreditation Authority will assess all applications for accreditation, determine if accredited growers are complying with the Scheme, and issue certificates of accreditation.

All applications and external audit reports submitted to the Accreditation Authority will be treated as confidential, unless determined otherwise by ASRAA.

The Accreditation Authority may seek competent technical advice before reaching a final decision on any application for accreditation or any on-going assessment of an accredited grower. The Accreditation Authority will consider all technical advice but will make its own decision in relation to such advice.

The Accreditation Authority will maintain a list, Appendix 6, of technical specialists who in the opinion of the Accreditation Authority, are qualified to provide the nominated services of approved auditor and/or inspector.

The Accreditation Authority may suspend or revoke a growers accreditation if;

- In the opinion of the Accreditation Authority any of the requirements of the Scheme have not or are not being complied with; or
- In the opinion of the Accreditation Authority, the accredited grower has abused any privileges of the Scheme or neglected any responsibilities or obligations imposed by the Scheme; or
- The accredited grower sells or otherwise assigns ownership or lease of its property.

The Accreditation Authority will advise any accredited grower in writing of any decision to suspend or revoke their accreditation.

The Accreditation Authority has the right at any time to vary, amend, delete or add to the scheme requirements whenever the accreditation authority reasonable deems a variation, amendment, deletion or addition to be necessary or desirable for better regulating or protecting the Scheme. Any changes to the Scheme Requirements will be done in consultation with all members of the Accreditation Authority. A variation, amendment, deletion or addition will bind each accredited grower when written notice of the change is given to them by the Accreditation Authority. New versions of the Scheme requirements will be updated and distributed to Scheme participants.

The Accreditation Authority will notify all accredited growers of proposed changes to the Scheme Requirements within 14 calendar days of the Accreditation Authority's decision to vary the Scheme Requirements.

An accredited grower or grower making application for accreditation who disagrees with a decision of the Accreditation Authority concerning any matter under the Scheme Requirements may make a written submission to the Accreditation Authority requesting a review of its decision. The Accreditation Authority will take into account any new or additional information supplied by the accredited grower or applicant and will review its decision. The reviewed decision will be final and conclusive.

The board of ASRAA will undertake review of the Australian Strawberry Runner Accreditation Scheme and the Scheme requirements on an annual basis to ensure that they remain current to the requirements of the Australian strawberry industry.

5. Membership and Board representation

Membership and board representation of the Accreditation Authority will be as set out in Appendix 4.

The independent chair shall be elected annually by the members of the Accreditation Authority. The independent chair will be entitled to an annual stipend as determined by the board of the Accreditation Authority on an annual basis.

An initial application fee for accreditation as detailed in Appendix 5, will be payable to the Australian Strawberry Runner Accreditation Authority on notification of successful acceptance for accreditation.
An annual membership fee shall be payable to the Australian Strawberry Runner Accreditation Authority in July of each year as detailed in Appendix 5.

An annual accreditation fee shall be payable to Australian Strawberry Runner Accreditation Authority in July of each year as detailed in Appendix 5.

6. Application for Accreditation

A grower wishing to be accredited to produce Certified Strawberry Runners under the Australian Strawberry Runner Grower Accreditation Scheme must submit an application for consideration by the Accreditation Authority for any new or additional growing sites.

The application must contain:

- Name of grower or business making the application
- Business address of the applicant
- Contact details of applicant
- Location of proposed growing site
- Map of the proposed growing site
- Evidence of suitability of proposed growing site for the production of Strawberry Runners as detailed within the Scheme requirements (section 10 a.) including;
    - suitability of the soil type and nutritional analysis of the proposed growing site;
    - drainage considerations of the proposed growing site;
    - weed analysis of proposed growing site;
    - availability and analysis of water proposed to be used for growing site;
    - a risk assessment of the growing site of contamination from;
        - persistent chemicals
        - heavy metal contamination
        - potential spray drift
        - physical contamination (i.e. plastic, glass, wood, metals)
    - The proximity of the proposed growing site to commercial strawberry fruit production or other strawberry runner growers.
- Evidence of the ability of the grower to support the proposed growing site with the necessary equipment, resources and infrastructure required to produce Certified Strawberry Runners.

An external inspector, approved by the Accreditation Authority, is engaged to conduct a site inspection for the proposed new or additional growing site and the report provided as part of the application.

The applicant may be required to provide the Accreditation authority with additional information that may requested to supplement the application.

Failure by the applicant to make a full disclosure in application for Accreditation may preclude applicant from being granted Accreditation.

Growing sites are required to be re-accredited every 5 years or after a significant audit failure, as determined by the Accreditation Authority, to comply with the requirements of the Scheme by the strawberry runner grower.

All costs incurred in the process of submitting an application will be borne by the applicant. An initial application fee of $10,000 is payable to the Australian Strawberry Runner Accreditation Authority on successful application to become an accredited grower under this scheme. An accredited grower applying to accredit a new growing site is not required to pay any additional fee for accreditation of that site.

7. Documentation

- A grower or business who has made the application in Section 6 above or a business representative must take responsibility for managing documents and records to ensure that only the latest version is used and available where needed. This applies to business documents and record forms and to external documents such as product specifications, codes of practice and quarantine regulations.

Scheme Requirements:

- The latest version and editions of the Australian Strawberry Runner Accreditation Scheme are retained and used.
- Legible records and documentation required to verify compliance with Scheme are maintained.
- As documents and records change, out-of-date versions are replaced with the new version.
- All records are dated and have the name of the person completing the record.
- All records are kept for a minimum of two years (or longer if required by legislation).

8. Audit and Corrective Actions

An audit is a formal review of practices. An internal audit is when a person in the business conducts a review of processes and procedures. An external audit is when a person independent to the business reviews the practices.

The costs associated with engaging an Auditor, either internal or external, are solely the responsibility of the grower being audited.

Scheme Requirements - Internal Audit:

Conduct internal audits to verify on-going compliance with the Scheme.

- An internal audit of all activities and records relevant to the Scheme is conducted at least once every 12 months, at times when practices are occurring. A record of the internal audit is kept.
- Those responsible for completing the internal audit are identified on audit documents and, where possible, are independent of the practices being assessed.

Scheme Requirements - External Audit:

- This audit shall be conducted by a person external to the organisation and approved by the accreditation authority.
- An external audit is required to be completed each year as part of the grower's accreditation and will be done between the 10th of February and the 10th of March each year.
- All relevant records and practices of the business are reviewed to ascertain compliance with the scheme.
- Where compliance is found not to occur, a list of corrective actions is developed by the external auditor and compliance is revisited once the corrective actions have been addressed to the auditors satisfaction.
- A random inspection of blocks within the Accredited Production Area should be conducted by the auditor to confirm that nursery practices conform to records provided by the grower and to the Australian Strawberry Runner Accreditation Scheme guidelines.
- Documentation of compliance, i.e. certificate of accreditation, is obtained from the Accreditation Authority once a report received from Auditor.

A Corrective Action Record is completed when the requirements of the Scheme are not being met or fulfilled to the auditors' satisfaction.

A Corrective Action Record includes:

- Description and cause of the problem

- Short term fix (action taken to fix the problem)
- Long term fix (action taken to prevent the problem recurring)
- Date action completed and name and signature of the person responsible
- Verification that action has been effective
- Name and signature of the person reviewing that short term and long term actions are completed and effective, and date of the review

Scheme Requirements - Corrective Action:

- Complete corrective action record for any non-compliance or deficiency.

9. Training

Workers whose roles could impact on the quality of the nursery plant should have adequate knowledge and skills to perform the duties required of them. Their training needs should be considered with appropriate training planned and carried out.

Overall responsibility for quality of plants supplied to customers rests with the owner and/or senior management and they are responsible for providing appropriate training of their employees.

Scheme Requirements:

- Record of required training provided to, or obtained by employees is kept.

10. Designated Growing Area

Some growing sites may not be suitable for the production of strawberry runners. An assessment of the suitability of the growing site should be completed prior to planting. Growing sites may include paddocks or other growing facilities such as screen houses and shade houses.

Suitable growing sites only become Designated Growing Areas once approved by the Accreditation Authority. Any Designated Growing Area should be a minimum distance of 2 kilometres from the nearest commercial fruiting strawberry plants. Where this is not possible the grower applying for accreditation must be able to demonstrate to the Accreditation Authority that acceptable processes can be implemented to prevent the spread of disease or pests to the accredited production area.

a. Growing Site Requirements

i. Site contamination

The growing site may be a source for contamination with chemicals, foreign matter or weeds. The condition of sites should be suitable for the production and preparation of quality strawberry plants. Contamination may occur due to poor design, construction or maintenance of these sites or the previous use of these sites.

A risk assessment of the growing site will help determine its suitability. When assessing the site, attention must be paid to any risk of contamination from:

- Persistent Chemicals
- Heavy metal contamination
- Spray drift
- Physical contamination (i.e. plastic, glass, wood, metals)

ii. Soil and weeds

- Soil type should be suitable to the growing of strawberry runners and soil analysis performed to determine nutritional requirements.
- Designated Growing Area must be free of all weeds listed in Appendix 2.
- Preventative actions should be taken to prevent the incursion of weeds listed in appendix 2 as well as all other weed species.
- Ensure that nematode species listed in Appendix 2 are not present in the Designated Growing Area after fumigation.

- All necessary steps are taken to prevent contamination of the Designated Growing Area with soil or other material from outside sources including any material composted that contains strawberry plant or solanaceous plant residues.

iii. Drainage

- Designated Growing Area should be free draining soil or sub-surface drainage installed to prevent areas of water-logging.
- Designated Growing Area should be protected by diversion drains to prevent contamination by run-off water from adjacent land.
- Drains should be installed within the Designated Growing Area to prevent soil movement or water-logging

iv. Water

- Water should be of a high quality suitable for the growing of strawberry plants with a conductivity of less than 800 micro siemens.
- A minimum of 6 Megalitres of high quality water per hectare of Designated Growing Area producing Certified Strawberry Runners must be available for use on the Accredited Production Area in each annual growing cycle.

Scheme Requirements:

- An external inspector, approved by the Accreditation Authority, is engaged to conduct a site inspection of the Designated Growing Area for the relevant weed analysis for each new Designated Growing Area and records of the inspection kept, and inspection repeated after 5 years.
- Nematode tests are conducted (after initial fumigation) for each new Designated Growing Area to ensure soil borne nematodes have been removed. A record of this test must be kept and tests repeated after 5 years.
- Soil tests are conducted for each new Designated Growing Area to ensure suitability of soil. A record of this test must be kept and test repeated after 5 years.
- Water tests are conducted for each new Designated Growing Area to ensure suitability of water for irrigation. A record of this test must be kept and test repeated after 5 years.
- A hazard analysis is conducted for all growing sites to determine the risk of contamination of plants from persistent chemicals, heavy metals, physical contaminants, and spray drift and a record of the hazard analysis is kept if there is deemed to be a risk.

b. Map of Growing Site/s

The map must clearly identify a specific area/s to be used for the production of Foundation Stock and/or Certified plants (“the Designated Growing Area”).

Each area used for the production of Foundation Stock and/or Certified plants must be able to be identified i.e. have a number, letter or code associated with the block/paddock. This should appear on the farm map.

Scheme requirements:

- Farm or Designated Growing Area map kept for each growing site with block identifiers clearly shown.
- Foundation and Foundation Increase block/s should be listed on farm map.
- Blocks used for the production of Certified Strawberry Runners or Plants listed on the farm map.
- Foundation and Foundation Increase Plants are labelled with details such as clone or bin number and recorded on a map to ensure integrity of variety

11. Ground Preparation and Planting

Ground preparation should be carried out in such a way as to provide a suitable planting bed for the establishment of strawberry plants for nursery production.

Planting material must have originated from approved sources. Approved planting material sources are listed in Appendix 3.

a. Soil Fumigation

Soil fumigation is the best way to ensure soil is free of disease and weed/pests are eradicated prior to planting of plant stock. Any in ground production or nursery area planted with Foundation Plants or Mother Plants must be fumigated with an appropriate fumigant at a suitable rate.

Documentation must be maintained to capture details of pre-plant fumigation including:

- Date of fumigation
- Block Treated
- Chemical used or other approved treatment
- Details of the rates and
- The prevailing weather conditions

b. Pre Plant Treatment

To remove fungal disease present on planting material, plants may be treated prior to planting with appropriate chemicals.

Documentation must be maintained to capture details of any pre-plant dipping/ spraying of plants including:

- Date of treatment
- Number of Plants treated
- Variety of plants
- Chemical/Treatment applied
- Details of the rates
- Methods of application

c. Planting records

To enable trace ability of runners to Foundation Plants and nucleus stock, planting records must be maintained.

Documentation must be maintained to capture details of planting schedule including:

- Date of planting
- Block Identifier
- Variety
- Number planted and
- Other information that will enable the trace ability of plants to the foundation material, such as;
    - Clone number
    - Bin number

Scheme requirements:

- Soil Fumigation Record
- Pre-plant treatment record
- Planting records

12. Chemicals

Incorrect and careless storage, handling and use of chemicals can lead to the contamination of water, equipment, containers and packing materials that come into contact with plants. Accidental spillage directly onto product can also occur.

To optimise application of chemicals:

- Chemicals should be applied by a person with the relevant certificate in chemical application.
- Chemical application equipment must calibrated at least annually
- Chemical must only be applied at recommended rate
- Chemical must be stored is a safe and effective chemical storage facility and checked for permit or label expiry on an annual basis. Record of any out of date chemicals must be maintained and the chemical must be segregated from other chemicals. Disposal method for out of date chemicals must be recorded

Scheme Requirements:

- Chemicals are used in accordance with labels and/or relevant permits.
- Chemicals should be applied by a person with the relevant certificate in chemical application
- Chemical application records must be maintained including:
    - application date
    - identification of treated area
    - chemical used; including batch number if available
    - rate of application and/or quantity applied
    - equipment and/or method used to apply the chemical
    - weather conditions including wind speed and direction
    - name of the person who carried out the application
- Calibration record must be kept include details of:
    - equipment calibrated
    - date of calibration,
    - results of calibration including application rate per hectare; and
    - name of person performing calibration.
- Out of date chemicals are segregated and records maintained of
    - Date of check
    - chemical name and quantity
    - disposal date
    - disposal method

13. Fertiliser and Soil additive records

Before using any fertiliser or soil additive the composition, treatment, application method and timing need to be considered. Fertilisers and soil additives include organic and non organic materials.

Scheme Requirements:

- Records of all fertiliser and soil additive applications are kept, including:
    - application date
    - identification of treated area
    - product used and rate of application
    - method of application
    - name of the person applying the fertilisers or soil additives

14. Foundation Plant Requirements

Foundation plants must be sourced from an approved facility (Appendix 3), and meet the following requirements:

- Foundation Stock is derived from Nucleus Plants maintained in high health glasshouses/screen houses and virus indexed at least every 2 years;
- Multiplication should be conducted via vegetative methods or meristem procedure or tissue cultured micro-propagation; as approved by the Accreditation Authority
- The Vegetative Propagation Model is listed in Appendix 7

Foundation plants may only be produced by tissue culture methods in case of exceptional circumstances or as agreed with the approval of the Accreditation Authority and relevant licensing body.

- Where Foundation Plants are produced from Nucleus Stock in tissue culture, and if multiplied in tissue culture, they are multiplied by enhanced auxiliary bud development without callus with each initial tissue culture plantlet subcultures on approved plant hormone media with no more than 5 times multiplication of no more than 5 plantlets at each subculture to generate a maximum multiplication of 3,125 plantlets from each initial tissue culture plantlet;
- Standard media in conjunction with appropriate minerals and sugars is used for tissue culture with a N^6-Benzyl Amino Purine hormone component not exceeding 0.5mg/1 litre.

- Plants moved from tissue culture to growing-on areas are:

- established in tubes, seedling trays or other suitable containers that are either previously unused or have been sterilised as per industry standards, using a well-aerated, freely draining potting mix disinfested with steam or a fumigant and stored in sterile bins or on disinfested sealed floors prior to use;
- kept a minimum of 300mm above the floor on bench tops of wire mesh or disinfested wooden slats;
- maintained in a weed free environment;
- grown in a nursery or hardening off area with a sealed floor or with a floor consisting of plastic sheeting or weed mat covered by gravel;
- irrigated with chlorinated or deep bore water;
- sprayed in accordance with label rates with fungicides, insecticides, miticides and herbicides as necessary.

Scheme Requirements

- Material which does not meet the standards above is immediately discarded and a record kept
- Record of supply of Foundation plants to nursery must be kept including:
  - Description and quantity of planting material supplied including any clone or variety identifiers to allow trace ability of material
  - Method by which the foundation plants were produced
  - Date of supply
  - Name of receiver and signature
  -

15. Field Growing Requirements

An Accredited grower must make every effort to comply with the following growing requirements in the production of runners for sale as Certified Strawberry Runners or Plants.

a. Field Grown Runners:

i. Foundation Plants

- Ensure that only plants directly from approved sources (Appendix 3) are to be brought onto the property and used as Foundation Plants;
- Foundation plants may be planted either directly into the soil or grown in a soil-less medium in bins for runner multiplication;
- Ensure that only field or bin propagated plants or cell propagated plants from field or bin grown tips are used as Foundation Increase Plants in any year;
- Ensure that Mother Plants and Certified Strawberry Runners are produced only from field grown Foundation Plants or in exceptional circumstances from pathogen tested tissue cultured tube plants.
- Foundation and Foundation Increase Plants are to be planted out in runner production beds at a spacing consistent with good agronomic practice and with sufficient surrounding buffer to ensure no contamination between varieties or clones can occur;
- Foundation and Foundation Increase Plants are labelled with details such as clone or bin number and recorded on a map to ensure integrity of variety;
- Sprayed in accordance with label rates with fungicides, insecticides, miticides, and herbicides as necessary;
- Plant nutrition standards are to conform to the most recent available data standards;
- Irrigation systems are to provide sufficient and uniform distribution;
- Ensure that all ‘off-types’ are recorded and then eliminated from Foundation Plants and Foundation Increase beds;
- Foundation and Foundation Increase Plants should have all fruit or flowers removed to reduce disease pressure and prevent seed propagation occurring;
- Foundation and Foundation Increase Plants should be maintained in a weed free environment;
- Ensure that Accredited Production Area is regular monitored for the presence of diseased or otherwise unacceptable plants and rouged as necessary to remove those plants;
- Monitor for unacceptable pests or pathogens and treat appropriately.

ii. Mother Plants

- Mother plants are to be planted out in runner production fields at a spacing consistent with good agronomic practice;
- Sprayed in accordance with label rates with fungicides, insecticides, miticides, and herbicides as necessary;
- Plant nutrition standards are to conform to the most recent available data;
- Irrigation systems are to provide sufficient and uniform distribution;
- Accredited Production Area should be maintained in a weed free environment;
- Mother Plants and Runners should have all fruit and flowers removed to reduce disease pressure;
- Ensure that all 'off-types' are recorded and then eliminated from Accredited Production Area;
- Ensure that Accredited Production Area are regular monitored for the presence of diseased or otherwise unacceptable plants and as necessary, remove those plants from the Accredited Production Area;
- Monitor for unacceptable pests or pathogens and treat appropriately;
- Within one month of the completing harvest of Strawberry Runners ensure all remaining strawberry plant material in the Accredited Production Area is completely destroyed.

b. Plug Plants

A runner grower must comply with the following growing requirements in the production of plug plants for sale as certified plug plants.

- Runner grower must ensure that runner tips for production of Plug Plants are produced only from Mother plants or Foundation plants grown as for Certified Runner production;
- Plugs must be established in tubes, seedling trays or other suitable containers that are either previously unused or have been sterilised using a well-aerated, freely draining soil less potting medium;
- Plugs must be maintained in a weed free environment;
- Plugs must be grown in a nursery or hardening off area with a sealed floor or with a floor consisting of plastic sheeting or weed mat covered by gravel;
- Plugs must be irrigated with chlorinated (or satisfactorily treated to eliminate disease causing organisms);
- Sprayed in accordance with label rates with fungicides, insecticides, and miticides as necessary;
- Plant nutrition standards are to conform to the most recent available data;
- Irrigation systems are to provide sufficient and uniform distribution;
- Ensure that all 'off-types' are recorded and then eliminated from Plug Plants;
- Monitor for unacceptable pests or pathogens and treat appropriately;
- Ensure that Plug plants are regularly monitored for the presence of diseased or otherwise unacceptable plants and rouged as necessary, remove those plants from the Accredited Production Area.

c. Trial Plants

Trial plants of new strawberry selections may only be introduced into a nursery if they have been produced in a secure low health screen house and supplied in a potted soil-less medium. Plants should only be derived by tissue culture multiplication sourced from a plant that has returned at least one negative virus indexing. Plants must be apparently free of pests, pathogens, viruses, weeds and parasitic nematodes before being introduced into the nursery.

Trial plants must not be planted in an area designated for the production of foundation or foundation increase plants and should not be used for the production of mother plants. Trial plants should be planted with sufficient segregation from other varieties to ensure that no contamination with other plantings can occur. Trial plants should be grown in accordance with the requirements for mother plant production.

Scheme Requirements

- Plants are monitored regularly and any "off-types" or diseased plants or plants not meeting the standards above are immediately discarded (rouged);
- Rouged plant records are kept including date, plant numbers, plant variety, reason for being discarded;
- Map/s of production area/s clearly showing location of varieties;
- Records of all nursery practices are maintained in accordance with previously mentioned requirements including;
    - chemical and fertilizer application records
    - planting records

16. True to Type Test

From the foundation plants grown in the foundation screen house or field, 12 Runners of each clone will selected and relocated to be true to type tested at an appropriate site. Any foundation line that is not true to type is discarded and plants from which those test plants were derived are also discarded.

Scheme Requirements

- Document any off type plants and removal of foundation plants.

17. Customer Requirements

Runner or Plant standards are a clear description of the features of the Runner or Plant for sale and any special handling requirements. Standards are detailed in Appendix 1.

Runners believed to be delivered out of standard will be dealt with by negotiation between the runner grower and fruit grower. If a resolution satisfactory to both parties cannot be reached, an independent 3rd party as appointed by Australian Strawberry Runner Accreditation Authority will act as arbitrator. Technical advice may be sought as necessary to make an objective decision in each case.

Scheme Requirements

- If the runner or plant does not meet the minimum standard for Certified Strawberry Runner or Certified Strawberry Plant as detailed in Appendix 1, the plant cannot be sold as a Certified Strawberry Runner or Certified Strawberry Plant;
- Should a plant not meet the minimum standards for Certification, it may be eligible for sale as a non-Certified plant as long as the buyer is fully informed and agrees, in writing, to accept the uncertified plants.
- Where a Runner or Plant standard different to that listed in Appendix 1, has been agreed with a customer, a written copy of the agreed specification is kept.

18. Harvest

a. Maximum Pest and Disease Tolerance

Plants cannot be sold as Certified Plants if at time of harvest threshold levels exceed the maximum pest and disease tolerances listed in Appendix 2.

b. Post Harvest treatment

Documentation must be maintained to capture details of any post harvest treatment of plants including:

- Date of treatment
- Number of Plants treated
- Variety of plants
- Chemical/Treatment applied
- Details of the rates
- Methods of application
- Reason for treatment

Scheme Requirements

- Post Harvest Treatment record is kept (if required)
- Harvest Record is kept including:
  - harvest date
  - crop/variety
  - block identifier
  - packing date and / or batch identification code (where applicable)

19. Shipping / Dispatch Records

To enable trace ability and confirmation of fulfilment of orders, shipping/ dispatch records should be maintained. All packed produce sent to a customer is marked with:

- Receiving business name and address for plant delivery
- Packing date and / or batch identification code
- Variety of plant
- Number in box

Scheme requirements:

Dispatch records maintained listing

- Date of dispatch
- Customer name/Destination
- Variety
- Number of plants per box
- Number of boxes sent
- Total plants sent to customer
- packing date and / or batch identification code

20. Product Identification and Trace-ability

To enable trace-ability from the nursery field to the customer, batch codes or similar identifying method should be used. These are generally by field or block that is treated the same for fertilisation and chemical application.

The location of separate growing areas must be located on a property map to ensure trace ability to where product is grown. Identification used to distinguish separate growing areas should be documented on all records used for the production of the crop.

For harvested plants, the shipment identifier needs to be linked to harvest date and where on the farm the produce was grown. Cross referencing the harvest date and growing area identification to farm records allows the nursery to show what happened to each batch of plants during production.

Records need to be kept to link harvested product to destination. This can be done using consignments, batch codes or packing date stamped on boxed or another document.

Scheme requirements:

- Must be able to trace a shipped box back to production field. A test should be conducted to ensure trace ability exists
- Dispatch/Shipping records
- Harvest Records
- Property Map/s

21. Bio-security

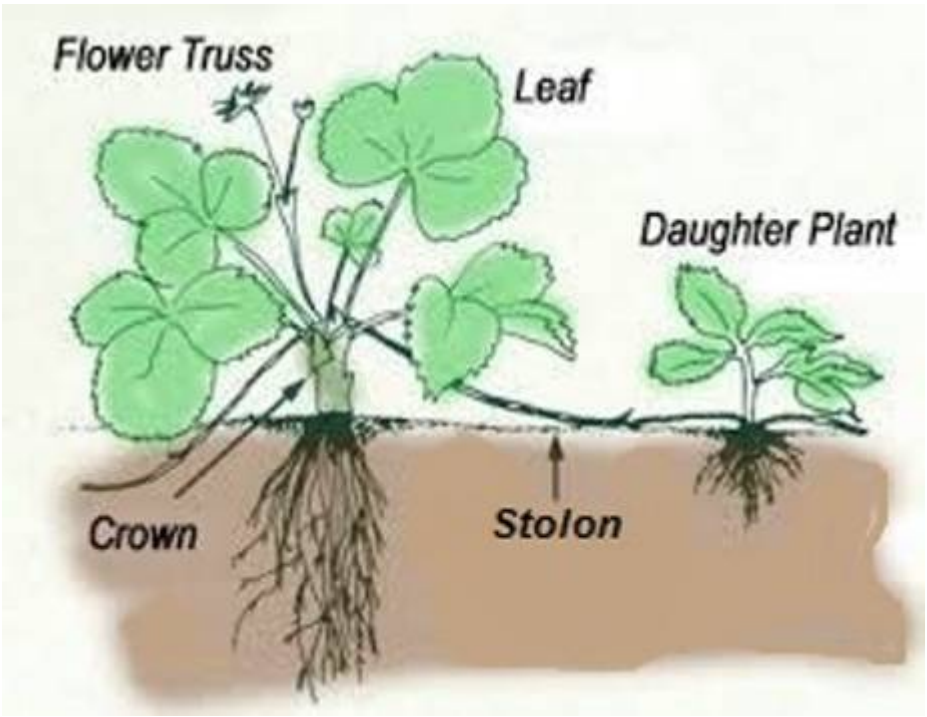
An Accredited Grower must make every effort to prevent the incursion of an exotic pest or pathogen into the designated growing area. The designated growing area should be regularly monitored for signs of atypical growth in plants or symptoms unresponsive to standard treatments. Any irregularities should be investigated for the cause and if required, samples supplied to the appropriate agency for further investigation. Protocols for the movement of people and equipment between designated growing areas should be developed and implemented.

Scheme requirements:

- Document protocols for the movement of people and equipment or vehicles between designated growing areas.
- Notify ASRAA and the appropriate Bio-security agency on becoming aware of any suspected incursion of an exotic pest or pathogen.
- Record date and action taken for plants removed for further testing and identification by an external agency.

Appendix 1 – Strawberry Runner or Plant Standards

- Runners complying with the standard may be labelled as “Certified Strawberry Runners” or “Certified Strawberry Plants”.
- Plants must be apparently free of pests, pathogens, viruses, weeds and parasitic nematodes.
- Plants offered as ‘leaf on’ must have a minimum of three expanded functional leaves.
- Petiole length not more than 300mm in length.
- Have a developed root system with a minimum of 7 primary roots not less than 60mm in length and have secondary roots visible.
- Roots to be free of excessive soil and undamaged.
- Sufficient moisture on the root systems to prevent plants dehydrating.
- Crown is to be visually clean, undamaged and a minimum of 6mm in diameter (measured at the widest part).
- Runners are to be trimmed of all dead leaves, stolons and debris before packing.
- Runners offered to growers as ‘leaf off plants’, may be mowed immediately prior to digging and processing.
- Plants offered as ‘leaf off plants’ to fruit growers must have a crown with a minimum diameter of 8mm (measured at the widest part), be visually clean, undamaged and have a minimum of 70 mm and maximum of 125 mm of stem present with 9 primary roots of at least 100 mm length present with secondary roots visible.
- Plants offered as ‘plug plants’ must be exhibiting good growth and have well developed root systems visible throughout the cell.
- ‘Plug Plants’ must have well established green tops, and meet all other plant health standards as for Certified Strawberry Runners.
- An overall tolerance of 5% of plants not meeting standard is permitted.



Appendix 2 – Weeds, Pests and Diseases

Weeds and Pests during Growing Cycle

- Eradicate any
    - Cyperus rotundus (nut grass),
    - Oxalis pescaprae (soursob),
    - Oxalis corymbosa (pink shamrock),
    - Nothoscordum inodorum (onion weed) and
    - Cyperus esculentus (yellow nut sedge)

  from the Designated Growing Area prior to commencing runner production;

- Ensure that
    - Meloidgyne hapla (root knot nematode),
    - Pratylenchus vulnus (root lesion nematode) and
    - Aphelencoides besseyi (crimp nematode)

  are not present in the Designated Growing Area.

Maximum Pest and Disease Tolerance at time of harvest

Plants cannot be sold as Certified Plants if diseases are found which exceed the following maximum pest and disease tolerances listed below.

- viruses: nil visible symptoms
- Fusarium or Verticillium diseases: nil
- Phytophthora: not greater than 0.1% of plants affected
- bud nematode: not greater than 0.1% of plants affected
- big bud mycoplasma disease: 0.1% of plants affected
- fungal leaf spots: not greater than 1% of plants affected
- lethal yellows: not greater than 1% of plants affected
- crown and stolon rot (Colletotrichum sp): not greater than 1% of plants showing symptoms

Appendix 3 – Approved Sources of Foundation Plant Material

Department of Agriculture, Forestry and Fisheries glasshouses and tissue culture facilities at:

- Cleveland Queensland
- Nambour Queensland

VSICA glasshouse facilities at Toolangi, Victoria

Crop Health Services facilities at LaTrobe, Victoria

Driscolls Australia Pty Ltd, glasshouse facilities at Palmwoods, Queensland

Appendix 4 – Members of Accreditation Authority

The Accreditation Authority consists of 3 members as per the following:

- Queensland Strawberry Growers Association (QSGA)
  -represented on the board by 2 QSGA executive appointed positions
- Two Strawberry runner growers
  –represented on the board by a member from each nursery

Note: There must always be equal representation from QSGA and the Strawberry Runner Growers on the board of ASRAA.

An independent chair will be appointed by a majority of the board on an annual basis.

There must be a minimum of 2 board meetings held each year

Appendix 5 – Fees of Scheme

Runner Grower Membership fee of $5000 due in July of each year

QSGA membership fee of $500 due in July of each year

Initial Application for Accreditation Fee $10,000

(Application Fee becomes payable upon successful application)

Annual Accreditation fee of $5000 due in July of each year

Appendix 6 – Approved Auditors and /or inspectors

Auditors or Inspectors may be approved by the board as required.

Current approved inspectors:

Geoff Waite

Paul Jones

Steven Tancred

Appendix 7 – Vegetative Propagation Model