

**SEARCH CRITERIA**

<b>Model</b>	Model C: Technological Development Model
<b>Industry</b>	Horticulture, strawberry
<b>Focus/Level</b>	Industry
<b>Purpose</b>	Creating knowledge
<b>Outcomes</b>	Development of a management practice
<b>Special Interest Groups</b>	Other
<b>Design and Implementation</b>	Designed and managed by researchers/experts

**1. PROJECT TITLE:**

The Better Berries Program

**2.FUNDERS:**

Project funds were provided by Strawberries Australia from the national strawberry industry levy. These funds were matched by Horticulture Australia Limited, (previously HRDC). The Queensland Department of Primary Industries provided the major funding through its Queensland Horticulture Institute.

**3.PROVIDERS:**

Those who actually manage and carry out the project activities. There is, of course, overlap where state departments can be both funders and providers. However providers can also be totally separate agencies, organisations or individuals to the funders of the program.)

Horticulture Australia

**4.KEY CONTACTS:**

Neil Greer

Principal Extension Officer, QHI, AFFS, Maroochy Research Station  
PO Box 5083 SCMC Nambour Q4560

**5.INDUSTRY/ISSUE/GEOGRAPHY:**

The Better Berries project is aimed at the Queensland Strawberry industry. It is a new approach to strawberry research. It allows more efficient management of the resources needed to undertake meaningful strawberry research and development and to address issues holding back the sustainable development of the Queensland strawberry industry.

Project components include breeding, nutrition and irrigation, integrated pest and disease management and extension, (technology transfer).

**6.PROJECT CONTEXT:**

Prior to the formation of the Queensland Horticulture Institute's (QHI), Better Berries Program there were six individual strawberry projects each requiring applications, reports, liaison with industry and funding bodies and organisation of industry activities.

In 1993/94 Extensive consultation was conducted with the Queensland strawberry industry in order to develop a more efficient approach to industry development. This led to a single strawberry project and team from which grew the "Better Berries Program". This was designed to bring under its umbrella all externally funded strawberry project work in the QHI. A joint industry/QHI strategic planning process identified issues which were limiting industry performance. From these issues the Better Berries Program was designed.

#### **7.PROJECT NICHE (SPECIFIC OBJECTIVES):**

The following project objectives were given in the 2001 final report of the Better Berries Program. They include breeding, nutrition and irrigation, integrated pest and disease management and extension, (technology transfer).

##### **Breeding**

- Increase strawberry consumption through development of cultivars better suited to winter production areas with improved consumer acceptance and high early production
- Determination of optimal planting dates for project developed and other commercial cultivars.

##### **Nutrition - Irrigation**

- Develop desirable levels of sap nitrate for new varieties over the growing season.
- Investigate the effects of fertiliser/irrigation rate and strategy on fruit yield.
- Further study the use of controlled release fertilisers.

##### **Disease Management**

- Review the ongoing efficacy of the Colletotrichum crown rot control strategy.
- Investigate alternative chemicals for Colletotrichum control.
- Study disease susceptibilities of new cultivars and advanced breeding lines.
- Investigate innovative experimental plant protectants for fruit rot management.

##### **Pest Management**

- Refine our integrated strawberry pest management approach, emphasising mite control.
- Investigate the impact of the fungicide Captan on our mite control system.
- Investigate bait trap crops for Queensland Fruit Fly control.
- Trial caterpillar controls compatible with our IPM mite management system.

##### **Fourth ISHS Symposium in Finland Component**

- Win the next International Strawberry Symposium due in 2004 for Australia
- Identify potential new areas of research for inclusion in the Better Berries Program
- Promote the achievements of the Better Berries Program and therefore interest amongst international strawberry professionals to attend our Symposium in 2004.

##### **Extension**

- Update the Queensland Agrilink Strawberry Information Kit with project results and discoveries
- Produce a CD version of the kit.
- Presentation of all results of the project to the maximum number of growers through, seminars, conferences, training and field days.
- Presentation of results at National Berryfruit Conferences in 1999 and 2001.

**8. PHILOSOPHY/APPROACH:**

The Better Berries Project is based on Model C – Technological Development

The 2001 Final Report shows that the results of project trials and activities have been developed into an updated “best practice” production system which forms the basis of our Queensland Strawberry Agrilink Kit. An interactive CD version, Agrilink Strawberry Information Online, was released at the National Berryfruits Conference held on Queensland’s Sunshine Coast in May 1999. These kits are produced entirely at the expense of QDPI without any external funding. Over six hundred copies have been sold to date.

Information developed during the project is continually being applied to the Queensland Runner Scheme. This information has made vital contributions to the viability of the Scheme.

**9. RESOURCES, MANAGEMENT AND STAFFING STRUCTURES:**

There are nine professionals from QHI and Natural resources and Mines, Queensland at various research stations, plus consultants and a large number of casual staff.

A team member is appointed leader for each project component (breeding, nutrition and irrigation, disease management, pest management, and extension) and is responsible for administering the negotiated component budget and supervising component activities. Trials are conducted throughout Queensland and interstate. This is a very large and complex program.

**10. PROCESS/METHODS USED:**

With over 60% of the subtropical strawberry industry serviced by professionally trained strawberry consultants this project has worked closely with these consultants to ensure rapid uptake of project results by the consultants and the clients they serve. The strawberry consultants were also included in the development of project activities and trials and in regular feedback and training sessions.

The Project also ran a full program of field days/ seminars/conferences and grower meetings. Details of the Project have been made available to growers at 11 field days/seminars, two national industry conferences, three international industry and professional conferences and at numerous local and regional industry meetings.

Project trial results, overseas trip reports, conference and seminar proceedings and milestone reports have also been made available to QFVG for inclusion on the Queensland Strawberry Industry website: <http://www.strawberriesqld.com>.

Other methods of transferring the learned technology included reports to industry on Better Berries Program outcomes prepared for inclusion in the joint QFVG/QHI Research, Development and Extension Report and the Strawberries Australia R&D Newsletter.

A number of articles were published in grower magazines including:

- Good Fruit & Vegetable News (Australia wide)
- Sunshine Coast Daily (SE Queensland)
- Queensland Country Life (Rural Queensland)

Other media exposure encompassed two major segments of the Totally Wild television program and three radio interviews with the ABC and regional stations.

The 2001 Final Report also notes that the Better Berries Team won the right to conduct the next ISHS International Strawberry Symposium in Brisbane in 2004. This will present an outstanding opportunity for Australian strawberry growers to listen to and communicate with 250+ international strawberry scientists.

### **11. IMPACTS TO DATE (AND EVALUATION APPROACHES USED):**

The results of the project to date have been categorised under the objectives of breeding, nutrition and irrigation, integrated pest and disease management and extension, (technology transfer). Summarised results under each of these headings appear in the 2001 Final Report.

#### **Breeding**

- Maroochy Flame and Maroochy Jewel joined the commercialised early season cultivar suite in 1998-1999. These cultivars produce all season but are noted for early heavy crops.
- Two new cultivars, QHI Earliblush, and QHI Earlimist, were released in 2000. These cultivars produce all season but QHI Earliblush has very early production and high aromatics.
- In 2001, approximately 4M runners of QHI cultivars were grown by Queensland runner scheme growers. This represented approximately 20-25% of Queensland plantings. This is the most runners we have ever sold but as plantings are increasing each year, it is less than the 30% achieved in 1997.
- Plantings of our early cultivars have allowed the industry to recapture and retain the lucrative early season market previously lost to imports worth \$3 to \$4M/year. Figure 1 graphically outlines the dramatic drop in imported fresh fruit during the early season market targeted. These figures are based on recorded strawberry import data purchased from the Australian Bureau of Statistics.

#### **Nutrition - Irrigation**

- Desirable sap nitrate have been developed for a further 5 cultivars.
- The sap analysis management technique is now used on approximately 66% of plantings.
- Irrigation rate had minimal effect on fruit yields, but an adverse consequence of over watering was high off site removal of nutrients.
- Continuous soil moisture monitoring gave the clearest picture of soil water dynamics under trickle irrigation.
- Controlled release fertilisers are a viable alternative fertiliser strategy in south Queensland if supplemented with fertigated N during the colder months to sustain optimal fruit yield.

#### **Disease Management**

- The effectiveness of our *Colletotrichum* crown and petiole rot management strategy was confirmed. Losses to this disease are now minimal.
- Strains of *Colletotrichum gloeosporioides* resistant to prochloraz could not be identified.
- The new generation plant protectants, the strobilurins, offered some promise for the control of *Colletotrichum* diseases, powdery mildew and grey mould.
- Ongoing disease testing of new and commercial cultivars as well as advanced breeding lines is providing growers and our breeder with information to make sound cultivar choices.

**Pest Management**

- The predatory mite source has no impact on the final mite control result.
- The viability of the 'simultaneous release' mite control system was confirmed.
- Captan® had no effect at all on predatory mite numbers
- The data generally supported the use of 'trap crops' for limiting fruit fly strike. It also confirmed the greater susceptibility of hydroponically grown strawberries to fruit fly attack.

**Extension**

- Project details were made available to growers at 11 field days/seminars, two national conferences, three international conferences and numerous local and regional meetings.
- Results were developed into an updated "best practice" Queensland Strawberry Agrilink Kit. An interactive CD version was also released. This kit is funded entirely by QDPI.
- Sales of Queensland cultivars have reached 4M or 20-25% of Queensland plantings. Use of the sap analysis based nutrition program exceeds 66% of plantings. The "pest-in-first"/"simultaneous release" system is used by 70% of growers on 40% of the crop.

**12.EFFECTIVENESS:**

The 2001 Final Report says that the Better Berries Program has already contributed to improved industry performance through the development of the new cultivars and management systems outlined above and will continue to do so over the coming years.

The team approach developed in this project enabled the production benefits for industry far beyond our capacity to do so through the previous discipline based, multi-project approach. According to the 2001 Final Report, benefits to the industry of the Better Berries Program are estimated at \$20M annually. These significant, measurable results have provided a basis for strong, ongoing support by QDPI as evidenced by the high level of staff and other resources they provide to the project. This support has allowed us to deliver a unique level of service to the strawberry industry, considerably above that available to other horticultural industries.

**13.PROJECT DOCUMENTATION AVAILABLE:**

Edited by Neil Greer for the Better Berries Team, Wamuran 22<sup>nd</sup> May 2002, *Strawberry Seminar 2002*

Edited by Neil Greer, 24<sup>th</sup> February 2000, *Strawberry Seminar 2000*

Neil Greer for the Better Berries Team, July 1998-June 2001, *Final Report*, Better Berries Program (Australia), Maroochy Research Station

**14.ISSUES:**

The following recommendations for the strawberry industry were made in the 2001 Final Report.

- Growers and retailers should display the cultivar name of the fruit being offered to consumers.
- Growers should use the Better Berries nutrition programs to improve fertiliser management.

- Growers should move to adopt Enviroscan type water management technologies.
- Growers should consider use of controlled release fertilisers supplemented with fertigated N.
- Industry should continue with the proven strategy of monitoring and controlling *Colletotrichum* sp diseases at all stages of the Queensland runner scheme.
- Growers should ensure disease levels are minimal prior to commencement of first harvest.
- The biological mite management system must be continuously supported and promoted to ensure that all growers especially new growers continue to use it.
- Plant Maroochy Flame and QHI Earlimist early from 17-22 March. Sweet Charlie, Maroochy Sundew and Maroochy Jewel slightly later from 28 –31 March. QHI Earlimist is best from 22 March-April 6.

### **15.COMMENTS/CONCLUSIONS:**

The 2001 Final Report states that the good work started in this project needs to be continued and modified as the problems and issues facing the industry change. This work should be based on close and on-going liaison with industry.

- The grower/runner producer/project model should continue to be used to evaluate cultivars. This coordinated model offers potential to rapidly and efficiently benchmark cultivars/grower practices nationally within the national project.
- The Florida strawberry industry has similar market and cultural needs to our industry. It is recommended that closer collaboration between these programs be developed.
- Optimal sap levels should continue to be developed for each new cultivar produced.
- New chemical and non-chemical options to strengthen the prochloraz resistance management strategy for scheme runner nurseries should be investigated.
- The search for reliable alternatives for the control of powdery mildew should continue.
- Ongoing testing of new cultivars and advanced breeding lines for response to fruit rots and plant diseases is essential.
- New fungicide introductions should be assessed for their safety to predatory mites.
- Further research is required to develop an IPM-compatible fruit fly management strategy.
- Caterpillar management studies should continue.
- The containerised runner production systems outlined at the ISHS Finland conference should be investigated and trialed under Australian conditions.
- The Better Berries Team should develop a “minimum input system” for subtropical conditions as part of the next BBP project.
- The Australian industry and the Better Berries Team should remain in close contact with developments in the biotechnology area.
- At this stage, Australia should not invest scarce R&D capital in the production of genetically modified strawberry cultivars.
- All strawberry stakeholders should strongly support attendance of key strawberry professionals at future strawberry symposia and conferences.
- Organisers of the 5th International ISHS Strawberry Symposium to be held in Brisbane in September 2004 should receive the full, active support of industry, research providers and Horticulture Australia.

**16.REVIEW METHODS:**

Desktop review of available literature and reports. Personal contact with Neil Greer.