

**A joint venture for
development of new pome
fruit products**

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(APAL)

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AP03020

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Know-how for Horticulture™

Final Report

HAL Project – AP03020

**A JOINT VENTURE FOR DEVELOPMENT OF NEW
POME FRUIT PRODUCTS.**

(1 January 2005 to 30 September 2008)

Prevar 

PREMIUM APPLE & PEAR PRODUCTS

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Research Provider

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Apple & Pear Australia



Know-how for Horticulture™

HAL Project – AP03020

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This reports sets out progress to date in the development of new pome fruit products through Prevar™ Limited.

Prevar™ is a multi-national joint venture innovation company established to globally commercialise new and innovative apple and pear varieties developed by the globally respected HortResearch breeding programme.

Prevar™ develops intellectual property (IP) in the form of protected new varieties, trademarks, brands and know-how and licenses the IP to growers and fruit marketing companies.

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and

Horticultural Australia Limited

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1. Media Summary

Prevar™ is a joint venture company that has been established to provide an innovative and commercially sound vehicle for developing and globally commercialising new apple & pear products. The joint venture partners are Pipfruit New Zealand (PNZ), Apple & Pear Australia Limited (APAL), the Associated Group of International Nurseries (AIGN) and HortResearch New Zealand (HR).

Access to new apple & pear varieties is a key component for the ongoing vibrancy and development of the Australian and New Zealand pome fruit industries. Australian and New Zealand growers have a competitive advantage over elsewhere in the world as they have the opportunity for first access to all the products developed.

Plant breeders rights and trademarks are key tools in creating value in the intellectual property (varieties) developed. These are used in the licensing process to control both the Australasian and global development of the products. Prevar™ is currently licensing four apples and two pear varieties in Australia and New Zealand. Commercial plantings have begun in both territories.

Australia and New Zealand are very small players on the global apple and pear scene, first access to new products provides a significant commercial opportunity. HR is a world leading fruit science company and Prevar™ believes that it has the capability of creating more unique new varieties in the future based on the targeted commercial breeding objectives that it has developed for HR. AIGN has a global network and provides significant capability with regard to global distribution and evaluation.

The value of new products to growers and the industry overall has been demonstrated many times. The report “Options for Access to New Genetic Material for Australian Apple and Pear Growers – Business Case” clearly demonstrated the very high value of investment in breeding and it’s recommended that further investment is made in this program.

2. Technical Summary

The key issue with this project is to position the Australian apple & pear industry so that it has ongoing access to new high quality apple and pear varieties. This needs to be completed in the global environment where public funding of breeding is transitioning to operation from commercial returns. Local competitiveness is no longer the driving theme for breeding, there is now a very strong focus on commercial income being generated from the products developed. Australia represents under 0.5% of world production in both apples & pears and is a high cost producer. Access to new varieties is absolutely vital to the Australian industry's survival. The management of all new varieties through the use of plant breeders rights and trademarks and the associated licences has created opportunities for our industry to continue to be competitive in apple and pear production. Australia has led the world through its management of Cripps Pink cv Pink Lady™ globally so has significant experience and expertise available to develop new apple & pear products. The need for a global focus in developing new varieties is paramount if they are to become successful for both the breeder and all those involved with the product. Apple & Pear Australia Limited (APAL) clearly recognised that it would need to work with others if it was to be involved in this new product environment. The international joint venture that is Prevar™ has been established to develop & commercialise high quality apple & pear products both now and into the future. The joint venture partners are Pipfruit New Zealand (shareholding of 45%), Apple & Pear Australia Limited (33%), the Associated International Group of Nurseries (12%) and HortResearch New Zealand (10%).

The HortResearch (HR) breeding program in New Zealand is a world leading fruit science company with a proven track record in the development of new products (apples, kiwifruit etc). The Associated International Group of Nurseries (AIGN) is a global nursery network (represented on all continents) and has considerable expertise and capability in the global distribution and evaluation of new plant material. Prevar™ has been established as a Research Consortium in New Zealand and as such attracts funding support from the Foundation for Research Science and Technology (FRST). This funding is for the extremely valuable underpinning science from the HR breeding program. This includes biotechnology through the identification of molecular markers for key characteristics and the development of rapid breeding techniques to reduce the time between crossing and the production of pollen for subsequent crosses.

Prevar™ is an incorporated company in New Zealand. HR and AIGN provide the services described above through service agreements with Prevar™. This gives Prevar™ complete control over the development, distribution, evaluation and commercialisation of new apple & pear products. Prevar™ is managed by a board of directors; the appointment of these is described in the joint venture agreement.

Development of new apple products is a very long term process and access to public funding dollars is still a major factor in making it happen globally. Financial forecasts prepared by Prevar™ clearly show that commercial sustainability is achievable but over a considerable period of time. The report "Options for Access to New Genetic Material for

Australian Apple and Pear Growers – Business Case” prepared for Horticulture Australia Ltd by Commercialisation Connections Pty Ltd in January 2008 clearly supports industry investment in the development of new apple & pear products. The report in fact recommends that “this option is the strongly preferred option if the industry wishes to maximise its opportunities to compete domestically with imports and expand its export markets. This is the only option that will guarantee the industry access to new premium and niche varieties”.

During the life of the current project the business systems of Prevar™ have been developed to a high level. There is a very clear front door for commercial entities to enter and discuss the global options for Prevar™ products. Commercialisation of varieties is occurring first in Australia and New Zealand (four apples & two pears) as is the requirement of the JV. Prevar™ is also poised to begin the commercialisation process globally for these varieties. It’s vital that ongoing funding be available to Prevar™ so that Australia’s interest in the breeding program can be effectively maintained. It’s envisaged that this ongoing commitment would be in the form of quite specific R&D projects focused on the development of future Prevar™ product outcomes.

The pear breeding component of the HR breeding program could be enhanced if closer collaboration was developed with the Australian pear breeding program conducted by the Department of Primary Industry Victoria (DPIV). The science capability in the area of biotechnology being developed by DPIV could be of high value in the development of new pear products for the Australian industry.

3. Introduction

The introduction of new apple and pear varieties has been an essential element of the continued development of the pomefruit industry in Australia. The cost of developing new varieties is very high and in the pomefruit industry globally this cost has been borne through government support of breeding programs. In the main all the varieties developed were released into the public domain and each individual could do as they wished with the plant material and the product from it. Government funding support has slowly but surely been disappearing and new ways of funding cultivar development needed to be found. The return to the breeder needs to be much more than the warm inner glow that a breeder might have got from the knowledge that growers were planting his cultivar. This situation has led to considerable changes in the way that new varieties are introduced particularly over the past 10 years. Plant Breeders Rights (PBR) and the use of trademarks to protect product names are the two main areas in which financial recompense has been sought to fund cultivar development. These two things combined give the cultivar owner a source of income and control, the latter being a key instrument in the planned development of new varieties. This process has been described at many international and local industry conferences and in a range of global industry journals and magazines. To a large degree Australia has led the way in this new wave of cultivar development through the management of Cripps Pink cv Pink Lady™ globally.

The impact on growers from this process is that they no longer are just able to plant what ever they like and market the product as they please. To some this is a significant backward step but to others to participate in a managed program is a significant forward step and opportunity. Australia is a high cost producer of apples when compared to many other areas of production in the world so it needs high value and controlled products to produce and sell.

The Australian industry has invested in Australian apple & pear breeding programs for the past 15 to 20 years in anticipation that new varieties will be developed. Cripps Pink cv was bred by the Department of Agriculture And Food Western Australia and was released to the industry at the end of the 1980's. It now represents 22% of Australian production and 0.8% of world production and increasing. The dollar value to the Australian industry of this cultivar is significant.

The opportunity arose for the Australian industry to become an investor in the HortResearch New Zealand apple & pear breeding program after ENZA decided not to continue its funding commitment to the program following deregulation of the NZ industry in 2001/02. HortResearch (HR) is a world leading fruit science company and has a proven track record on the development of new apple varieties with Scifresh cv. Jazz™ the most recent global success from its program. Negotiations between Horticulture Australia Ltd (HAL), Apple & Pear Australia Ltd (APAL) and Pome fruit New Zealand Inc (PNZ) began in 2002 to establish a joint venture company to firstly fund the HR breeding on an ongoing basis and to globally commercialise the new apple & pear products that it developed. The Associated International Group of Nurseries (AIGN) was also invited to participate based on its global nursery expertise. Prevar™ was established as an incorporated company in New Zealand in January 2005, the shareholders being PNZ (45%), APAL (33%), AIGN (12%) and HR (10%). This joint venture company is unique in the world at the moment and brings together significant global expertise from the science around new products to global distribution and testing of varieties through to international trademark management. Prevar™ is considered a research consortium in NZ and attracts dollar for dollar funding from the NZ government; this comes via the New Zealand Foundation for Research Science and Technology.

The joint venture agreement has a competitive advantage clause that requires that Australian and New Zealand growers have the opportunity for first access to all new products developed. This recognizes the investment from these two industries but also recognizes the need for global development of varieties if they are to be successful. These two industries then in effect become the deal makers with regard to the new products developed as opposed to deal takers when it comes to considering the opportunities that might be presented to growers from other cultivar owners.

4. Materials & Methods

4.1 Breeding Programme Overview

An integrated conventional hybridization apple and pear breeding programme was undertaken by HortResearch, all under the auspices of a research contract with the New Zealand Foundation of Research Science and Technology known as the Pome fruit Research Consortium (Research Programme), together with a comprehensive intellectual property (IP) management plan.

Prevar™ has the contractual responsibility for setting the long-term breeding themes and determining the annual crossing plan consistent with these themes.

The cultivar breeding objective in the programme aimed to produce new cultivars for Prevar™ within 12 or so years from crossing (i.e. within 1 generation). In order to have a high probability of success in breeding for new cultivars, the HortResearch strategy was to only use high performing material (= elite germplasm) as parents for any theme. Generally these were those high quality selections at Stage 2, and occasionally high quality seedlings at Stage 1 and commercial cultivars. This ensured high levels of attribute commonality and, with careful matching of parents, additional high levels of attribute complementary for the many characters that need to be at high levels to make a commercial cultivar.

Breeding using a low performing selection/seedling (with an interesting attribute) will have a low probability of producing a commercial cultivar. Hence the HortResearch strategy in this case was to develop specific breeding lines focused on a particular attribute with the purpose of generating high performing cultivar breeding parents for future use in breeding new cultivars. The number of backcross generations required depended on the fruit quality of the accession with the trait of interest.

4.2 Overall Breeding Programme Objectives

The Research Programme had four interwoven broad contractual objectives:

- 1. Maintenance of the National Pome fruit Germplasm Collection** [used for the following 3 objectives]
- 2. Utilization of Apple Genetic Resources for Breeding** [using novel fruit traits in commercial cultivars]
- 3. Development of Technology for the Fast-breeding of Pome fruit with Novel Colours and Flavours** [to develop new breeding lines for traits of interest e.g. disease resistance, novel flesh colour and flavours; to identify and develop new molecular markers for the selection of elite plants with specific gene combinations and to develop new techniques to reduce the length of the breeding cycle in apple]

4. New Cultivar Assembly [to combine novel and rare fruit traits with other important economic and horticultural traits in pome fruit and to generate high quality selections with potential for new commercial apple and pear cultivars]

The overall breeding programme objective was to test the hypothesis that a strategy of ‘taking germplasm to market’ would be successful in apple and pear breeding and would result in the development of cultivars with new combinations of fruit traits to be made available to the apple and pear industry continuously over the next fifty years. New high-value fruit traits were sought whilst maintaining genetic diversity in apple and pear by carrying out a specific breeding strategy that utilized the New Zealand National Pome fruit Germplasm as well as using molecular markers. This work also sought to provide underpinning knowledge on the inheritance of these traits. New germplasm with these traits would be passed onto breeders so that in the future, they can be ‘assembled’ into new ‘market-fit’ cultivars, suitable for commercial production.

A ‘fast-track’ breeding system has also been developed for pome fruit breeders that will enable more rapid incorporation of the traits such as novel flesh colour and flavours into new cultivars than was previously possible. To facilitate selection of ‘best plants’ from breeding lines, specific molecular markers for these traits and whole genome maps were to be developed using candidate genes extracted from HortResearch’s apple gene database. These will be coupled with new methods for reducing the time to flowering and fruiting within a breeding cycle.

New cultivars for the pome fruit industry have and are being created by combining new textural and skin colour characteristics together with other important horticultural traits such as resistance to major diseases. New populations will be developed, best plants selected for their commercial and/or future breeding potential and then tested for adaptability throughout the world. Molecular marker assisted selection techniques will be incorporated into these breeding activities.

Prior to the inception of Prevar™, the apple breeding themes adopted by HortResearch in conjunction with ENZA, had emphasized new selection criteria based on good appearance (across a range of colours and bicolours), crisp firm texture and high juiciness, high brix, sweet and varietal flavour, maturity timeframe (early, mid and late) and durability and consistency of quality at harvest and post harvest. Prevar™ had via the Pome fruit Research Consortia contract confirmed these criteria and also included a stronger emphasis on disease and pest resistance selection and novel flesh colour breeding development.

For pears the pre-Prevar™ inception breeding themes were: ready-to-eat fruit with crisp texture, good appearance/red skin colour wherever possible, extended storage and shelf life and a range of flavours (e.g. pear flavour, pear tropical flavour, nutty, aniseed, plum) all derived from interspecific Asian: European crosses. Prevar™ confirmed with HR that the interspecific pear breeding themes were innovative and differentiated and should be the focus of the pear breeding programme.

4.3 Intellectual Property Protection

All plant material and other input IP used in the Research Programme is owned by HortResearch, is in the public domain, or has been obtained under the provisions of trial or germplasm exchange agreements or license which allow HortResearch to use the IP and plant material for plant breeding purposes. IP arising from the research activities vests with HortResearch.

All new cultivars arising from the Research Programme were evaluated on HortResearch controlled sites, and other sites managed by AIGN® as contractually allowed for by either HortResearch or Prevar™, within a proprietary testing programme and test agreements that maintain security of plant material and does not permit disclosures, disposal of propagating material or fruit that could trigger IP protection deadlines. The same conditions apply to those contracts under which plant health testing, post entry quarantine [PEQ], and plant material multiplication and bulk-up are conducted

4.4 Cultivar Distribution and Evaluation

HortResearch contracts with AIGN® and with Prevar™ concerning the global distribution of new cultivars emanating from the breeding programme. Consequently, all cultivars of prospective commercial interest have been forwarded to ANFIC in Australia and are at various stages from PEQ to nursery propagation to commercial trial.

When a cultivar meets the evaluation milestones [e.g. sufficient technical performance results are known and/or territorial-based commercial or independent orchard test results are available] required by Prevar™ to enter final stage commercial and market evaluations [which might include the sale or disposal of fruit] to commercialize a cultivar, then the cultivar is assigned to Prevar™ thus enabling the company through AIGN® to protect the IP in designated territories. The IP protection is achieved via a Plant Breeders Rights [PBR] or Plant Patent [US] and in some instances tradename registration and ownership.

Following the annual evaluation of the new selections performance data by AIGN® and Prevar™ selections are given a value rating based on differentiation of A, B or C. All A selections are distributed globally; the AIGN® members then have the opportunity to decide which of the B & C ranked selections they would like to have. ANFIC the Australian AIGN® representative has received all the selections (A, B & C) to ensure that Australia gets the maximum opportunity to evaluate the new selections.

The confidential list supplied as appendix 1 shows there are currently 38 apple and 32 pear selections either released from or in Australian quarantine. The confidential list supplied as appendix 2 lists the selections (13 apples & 8 pears) and the numbers of trees distributed in 2008 of each along with where they are to be trialed in Australia. This brings the total number of selections in the APFIP evaluation trials to 33 (20 apples and 13 pears). There are no commercial trials yet underway. It's anticipated that commercial

trials will begin from 2009 and follow on from the Australian commercialisation discussions to be held in October 2008.

4.5 New Cultivar Commercialization Processes

This is covered in Section 7. Technology Transfer

5. Results

5.1 New Cultivars

Twenty one pome fruit selections from the breeding programme have been assigned to Prevar™ since the start of the programme.

Of the assigned cultivars, Prevar™ has to date decided to commercialize 4 apples and 2 pears in both New Zealand and Australia [see later section herein for details] and elsewhere in the world subject to cultivar technical performance and market acceptance. These particular cultivars were chosen based on their product and technical features and market differentiation.

Licenses negotiations for the 4 apples and 2 pears in New Zealand are further advanced than Australia with licenses completed for 2 apples with another license nearing completion. The pears Maxie and Crispie have been licensed in New Zealand but Prevar™ in consultation with APAL has decided that they would not meet commercial requirements [lack of product differentiation] for Australia. The next generation of interspecific pears are of much higher quality with more differentiation than Maxie and Crispie so the focus for Australia has been on them.

Two other assigned apple cultivars are subject to market and product development option agreements.

Prevar™ has already released Sweetie™ as an open release [no licensing required] cultivar. Prevar™ receives a royalty from the sale of trees only, there is no production royalty. The licenses completed to date in New Zealand and those being negotiated in both Australian and New Zealand do/will include both tree and production royalties.

Annual nursery tree sales in Australia are approximately 500,000 per annum and New Zealand approximately 700,000. Based on this the Prevar share of Australian nursery tree sales in 2009 will be 2.4%, the percentage in New Zealand will be 13.6%.

The table below details Australian & New Zealand tree sales and orders to 2009.

Australia			
Variety	2007	2008	2009
Sweetie™	0	5,000	12,000
Total	0	5,000	12,000

New Zealand			
Sweetie™	11,400	5,000	9,000
T17	0	9,000	60,000
T153	500	19,000	5,000
T193	0	1,500	17,000
Total	11,900	34,500	95,000

No license agreements have been entered into elsewhere in the world at this point in time.

5.2 Key Science Results

Maintenance and exploitation of the apple and pear cultivar collections have been important activities in the programme. Over 700 different genotypes are maintained in the New Zealand National Pome fruit Germplasm collections on HortResearch Orchards, including a further 13 which were added in 2007/8. Over 100 heritage cultivars in the collections have been used to date by HortResearch scientists as part of their research in this programme.

The apple breeding programme designed to utilize this raw germplasm has resulted in 21 new selections being identified to date with new types of fruit textures, shapes and flavours that can be incorporated into new cultivars in the future. This programme has allowed HortResearch to study the complex diversity of flavours found in apple. Apple flavour is partly driven by the type and concentrations of aroma volatile compounds produced by fruit when they are ripe. An analysis of these aroma compounds has shown that 23 of them can be partitioned into several groupings which appear heritable, meaning that they can be bred for in a predictable way. Such understanding will improve HortResearch's capacity to breed for new high-value flavours in the future.

Further work has characterized the gene mutation that produces the Type 1 red flesh/red foliage trait in apple. The mutation has been successfully mapped to the promoter of a regulatory gene of red pigment biosynthesis which, at the molecular level, appears to work by enhancing its own transcription. This work is helping HortResearch identify the genes responsible for Type 2 red flesh in apple fruit found on green foliated trees. A locus partially controlling Type 2 red flesh has been located on a genetic map, and a potential candidate gene similar (but not the same) to the one controlling Type 1 red flesh, has been identified that may control this trait. HortResearch have also located on a genetic map a locus regulating the production of the main volatile compound responsible for a 'ripe flavour' in apple, but to date, candidate genes that might control this trait have not been identified.

High quality molecular markers have been identified and developed based on such candidate genes. These markers can then be used by breeders to select plants with the desired trait early in the breeding cycle and is one of the new 'fast-breeding' technologies HortResearch are developing to increase the efficiency, timeliness and speed of incorporating novel traits into new cultivars. In the programme to date, HortResearch have also developed and located molecular markers onto genetic maps associated with

five pest and disease resistance genes. HortResearch are continuing to employ and validate molecular marker technology in the apple cultivar breeding to select for plants with two resistance genes to the apple scab disease.

Apple selections with potential as parents for cultivar breeding have been chosen from several trait-specific breeding lines. These now include eight selections each with resistances to black spot, powdery mildew and/or woolly apple aphid, and 15 red flesh selections. HortResearch have commenced apple breeding with three new resistances to black spot that will allow them to introduce them into new cultivars in the future.

6. Discussion

The reasons for APAL and HAL investing in Prevar™ remain unchanged. HortResearch is a world class fruit science company with the ability to produce globally competitive apple and pear cultivars.

APAL believes that the opportunity for the Australian pomefruit industry that this investment brings has in fact increased in the time of the current project. Prevar™ has spent considerable time on developing its long term breeding themes and believes that in the life of the next funding round globally significant new varieties will be released. These will have pyramided gene resistance for apple scab and powdery mildew, unique internal flesh colours along with all the accepted market eating qualities crispness, juiciness etc. APAL has been working on a cultivar uptake model for Australia and this shows that the returns from the premiums that can be obtained from the current Prevar™ varieties easily justify the investment.

At inception it was believed, based on long-term financial forecast models, that Prevar™ would be cash positive just after the end of the first capital call period, i.e. between 8 and 9 years of establishment¹.

¹ The key reasons why Prevar™ has been unable to achieve a funding breakeven result within the period of the first capital call include the following:

- Prevar™ became commercially operational in April 2005; however, payments to HR of \$NZ2.4M were backdated to June 2003, effectively supporting breeding activity without commensurate commercial activity.
- Sufficient budwood was not available for global distribution to all AIGN® members until mid- late 2005 and in some cases 2006. Some budwood had been previously distributed to Europe, North America and Australia but not for all selections of interest to Prevar™ or on the established “best of list”. This placed a significant delay on the rate of first planting of available selections.
- It was originally believed that there were an adequate number of differentiated selections within the ongoing breeding programme that were immediately available for Prevar™ to commercialise as open release/substitute varieties and generate early income. This was not the case there were plenty of products but they did not meet commercial expectations in the area of differentiation in the market.
- The timeframes required to submit a new selection to quarantine, budding for tree growth to see fruit of kind before tree trialling, were significantly underestimated and not factored into the original financial forecast model (FFM). The Prevar™ establishment FFM had plantings of existing selections occurring at the same time in all territories. This assumption was based on assurances HortResearch of global budwood distribution being in place but did not factor the lengthy timeframes for tree propagation and trialling.

- Following further financial modelling with revised key input information and revised assumptions demonstrated that Prevar™ could be cash positive between 12 and 13 years following establishment, this being 2017 and 2018 respectively. Consequently a second and third cycle of product development investment would be required.

7. Technology Transfer

7.1 Scientific Technology Transfer

Publication in referred scientific journals and conference posters by HortResearch scientists is a key result area provided for in the underpinning science contract that Prevar™ has with the Foundation for Research Science and Technology.

The quality and international significance of the HortResearch science and breeding is demonstrated through publication of the first book on association mapping technology in plants edited and written by several members of the HortResearch project team in 2006/7 and the co-authorship of a book chapter on the use of genomics in Rosaceae crops.

Some eight papers to date have been accepted for publication in international scientific journals reporting on various aspects of the breeding and related science programme. To date, 16 presentations have been made at international conferences. In 2007/8 four presentations on aspects of the HortResearch apple breeding programme were made at the 12th International Eucarpia Symposium on Fruit Breeding and Genetics, three presentations on gene mapping in apple at the 16th Plant and Animal Genome Conference and one presentation on molecular marker analyses in apple at the 3rd International Conference of Quantitative Genetics. (see appendix 3. Papers and presentations.)

7.2 Commercial Technology Transfer

From business inception, Prevar™ embarked on a broad two-stage technology transfer strategy for the Australian pomefruit industry. It was important to raise the profile of Prevar™ at both individual grower level and with integrated apple and pear companies and to showcase the new varieties and commercial opportunities. Prevar™ determined that the business processes for new cultivar commercialization [technology transfer] participation were to be transparent, robust and highly structured.

7.2.1 Building the Prevar™ Profile and Australian Pomefruit Industry Understanding

The initiatives that Prevar™ undertook to raise the company profile and create awareness amongst the Australian pomefruit industry included:

- The development and promotion of the company website;
- The preparation and distribution of a Prevar™ company brochure that was mailed to all recipients of the pomefruit industry journal;

- Preparation and publication of two generic articles about Prevar™ in Australian pomefruit journals;
- promotion, invitation and hosting of Australian visitors [growers and fruit marketing companies] to Prevar™ and HortResearch in New Zealand to inspect both the breeding programme and the best of varieties that Prevar™ had commenced commercialization of.
- Giving two invited presentations to the annual industry pomefruit conference.

7.2.2. Australian Cultivar Licensing

Following approval by the Prevar™ Board and consultation and agreement with APAL, representatives from Prevar™, APFIP and ANFIC together undertook a major Roadshow tour and presentations throughout the eight [8] major pomefruit growing regions in Australia during April 2008 to announce that it was going to commercially release four [4] apples and two [2] pears.

Significantly, Prevar™ and APAL agreed the following key precepts for new cultivar commercialization in Australia:

The licensing business processes and broad licensing deal would be as close as possible to those used or already in place in New Zealand [commercial activity commenced a few years earlier in this territory due to the greater knowledge about cultivar performance as a result of the breeding programme being undertaken there]

A syndicated NewCo company structure business model would be used. Existing apple and pear companies would be invited to join together cooperatively to form a new company for the specific purpose of entering into a licence with Prevar™ for each new cultivar.

An innovative and staged new cultivar-specific commercialization approach was proposed; this allowed for NewCo and/or the prospective NewCo shareholders to formally “engage” and negotiate with Prevar™ for a prospective marketing licence whilst the cultivar technical and business due diligence was contemporaneously undertaken.

At each Roadshow meeting, Prevar™ outlined the key technical features and marketplace differentiation attributes of each new cultivar and provided a mechanism for growers, without prejudice or commitment, to formalize their interest in planting a new cultivar and to invite them to consider commercial orchard trial evaluation.

In order to protect all IP for Prevar™ and prospective licensees, all meetings were held in confidence. All participants were required to register their attendance and warrant their agreement by signature to treat all information provided in confidence.

Prevar™ also explained to the apple and pear companies [commercial interests] that might be interested in participating in a licence to market and sell the new varieties, the

commercialization process and the key dates, the consultation process, timeframes and steps that would have to be followed.

A handout was provided to each attendee so that they had a written record of the “engagement process” that Prevar™ was using and a technical summary of each new cultivar.

Over 160 growers, nursery and apple and pear companies’ representatives attended these Roadshows. Some 15 apple and pear companies [commercial interests] are presently negotiating with Prevar™ concerning the formation of cultivar-specific NewCo companies and possible licensing.

8. Recommendations

Prevar™ has clearly met its commercialization objectives although it recognizes that its commercial income objectives are still to be met. The report “Options for Access to New Genetic Material for Australian Apple and Pear Growers – Business Case” clearly demonstrated the very high value of investment in breeding and it’s recommended that further investment is made in this program.

Collaboration between Australasian breeding programs should be encouraged to ensure that the greatest possible new variety opportunities are available to Australian growers.

9. Acknowledgments

Australian Apple & Pear Growers through the specific Apple & Pear R&D Levy

Voluntary contributions from Prevar Ltd.

Matching funds from Horticulture Australia Limited.

10. Bibliography

- “Options for Access to New Genetic Material for Australian Apple and Pear Growers – Business Case” prepared for Horticulture Australia Ltd by Commercialisation Connections Pty Ltd in January 2008

11. Appendices

Appendix 1. Confidential list of all Prevar™ selections in Australia

Appendix 2. Confidential list of 2008 distribution of Prevar™ selections to APFIP evaluations sites.

Appendix 3. List of Scientific Papers and Presentations associated with the Prevar Pipfruit Research Consortium.

Appendix 3. Scientific Papers and Presentations associated with the Prevar Pipfruit Research Consortium.

Scientific Papers/Books/Book chapters

Arús P, Gardiner S 2007. Genomics for improvement of Rosaceae temperate tree fruit. In: Varshney RK, Tuberosa R ed. *Genomics-Assisted Crop Improvement : Genomics Applications in Crops*. Springer Verlag. Pp. 357-397.

Allan AC, Hellens RP, Laing WA 2008. MYB transcription factors that colour our fruit. *Trends in Plant Science* 13(3): 99-102.

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