Developing new avocado plant material: overview of the plant breeder's right / patent concept, time-frames in testing, internationalisation and commercialisation

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The development of new avocado plant material with commercial potential requires thorough testing and evaluation before a commercial release is warranted. In South Africa, Westfalia Technological Services (WTS) has developed expertise in this field, together with partners in several other avocado growing countries. As plant material owners often chose to protect their new plant material by Plant Breeder's Rights (PBR) or, in the USA by patent, the process and implications of this aspect will be explained. In addition, the introduction of plant material from one country to another requires diligent compliance with phytosanitary regulations. Time-frames and lessons learnt involved in the testing, internationalisation and commercialisation of avocado plant material will be discussed.

INTRODUCTION

Making a selection, identifying superior genetic make-up and seeing commercial application of this potential is merely the first step in the long process of cultivar development. Mr. Hank Brokaw aptly described the principal benefactor of a US plant patent as the end user – basically society itself. The motive behind the patent process is that new inventions are good for society (Brokaw, 1985).

In the same spirit, the International Union for the Protection of New Varieties of Plants (UPOV) provides an effective international protection system for new plant material, with the aim of encouraging the development of new cultivars, for the benefit of society. UPOV provides the basis for member countries to encourage plant breeding by granting breeders of new plant material an intellectual property (IP) right: the Plant Breeder's Right (PBR). If a cultivar is protected by PBR, the authorisation of the breeder is required to propagate this cultivar for commercial purposes, which protects breeders and enables them to recover their investment. The PBR is granted by the individual UPOV member country (UPOV, 2015).

By protecting new ideas or products from competition for a period of time, inventors are given an incentive to keep working at their ideas. If the characteristics of a new cultivar suit the grower, but not the end user, the cultivar is doomed (Brokaw, 1985). This two-edged sword, where a cultivar needs to satisfy the grower, but also be accepted by the whole value chain, requires years of testing and comparison to current commercial standards. This is a long and expensive process that may take up to 20 years (Roe & Brokaw, 2007).

This article explains what is, or what should be, involved in the development of a cultivar before release and commercialisation, what mechanisms are available to manage the cultivar once it is released and the importance of this process to ensure the end user can utilise the new cultivar with confidence. In this paper, the term cultivar refers to both, fruiting cultivars and rootstock cultivars.

What makes a cultivar release successful?

The release of new plant material does not necessarily mean it will be accepted by the industry as a commercially viable option. Various factors need to align in order to develop new plant material into a commercial cultivar. The main factors, albeit not the only ones playing a role, are listed below.

Genetic make-up

The success of any rootstock or fruiting cultivar release relies on, in the first place, the genetic make-up of that cultivar. New cultivars are selected because they can give some advantage over and above the current commercially used cultivars for one or more links within the value chain of that specific *commodity*. This value chain is quite short for avocado rootstocks (mostly limited to nurseries and growers acquiring the material) compared to the longer value chain for avocado fruiting cultivars, with more links that could benefit. Most of these advantages are directly realised by growers, including adaptability to greater ranges of climatic and environmental growth factors, increased production, ease and/or cost of production, or an extension of the season. However, links further along in the value chain also benefit, from e.g. longer storage life, lower susceptibility to post-harvest diseases, fruit size distribution that better suits a specific market, ripening behaviour and of course, taste.

Without a tangible genetic advantage when compared to the current standard cultivars, a marketing pull to justify a new product on the market does not exist, and therefore would lead to slow uptake in the market, and the probable demise of the cultivar (Brokaw, 1989).

Marketing as driving force

A concerted effort, specifically in the development of fruiting cultivars, is needed to ensure any new cultivar is taken up by the market and accepted by both, supermarkets and consumers (Brokaw, 1989). This is especially true at the onset of the cultivar release, when very small fruit volumes of the cultivar are available and need to be channelled and consolidated to supply sufficient fruit into a sales program.

Such consolidation also helps to standardise quality and build a brand. Brand building is becoming more important in the fruit industry, where "California Hass" stands out in the avocado industry, with tremendous ongoing marketing support for 'Hass' being supplied by the Hass Avocado Board, focusing, inter alia, on information for consumers and foodservice professionals while also providing media resources (http://www.avocadocentral.

com/about-hass-avocados). Further, the California Avocado Commission strives to enhance premium brand positioning for California avocados (CAC, 2015). In other fruit industries, relevant examples for well-known brands are Pink Lady® and Zespri® (Roe & Brokaw, 2007).

In this context, companies throughout the fruit industry value chain are increasingly realizing the advantages of new plant material, and the advantages it offers in further building a company brand. This includes supermarkets claiming exclusive marketing rights in a specific territory, or a company being able to exclusively extend their season (thus building a company brand) with a new cultivar.

Historic cases of avocado cultivar protection and release

According to the UPOV database as of 18 July 2015, there are 73 cultivars of avocado protected internationally, in 14 countries. In total, 156 country specific PBR protections for avocado were in place, with only 16 occurring in more than one country. South Africa and the USA had 27 protected avocado cultivars each, Australia 17 and Mexico 16 (UPOV, 2015).

In the USA, protection of avocado plant material was already feasible in 1930, when it was possible to obtain a plant patent for avocado material. By 1935, two avocado cultivars were protected by plant patent, one being 'Hass', patent number 139 awarded to Rudolph Hass of La Habra Heights, California (Coit, 1935). By 1944, through the efforts of Mr. H.H. Brokaw and Mr Rudolph Hass, the 'Hass' cultivar was sent to Chile for propagation; no protection measures were in place at that time for plant material outside the USA. 'Hass' was by then also recommended as a commercial cultivar for planting in California (Barrett, 1944). Many of the early 'Hass' growers were small producers, who marketed through United Avocado Growers, a packer that became a specialist in 'Hass' with tailor-made merchandising and promotion. It is believed this was a fortunate factor in speeding up the introduction of 'Hass' as a commercial cultivar, as no new cultivar makes it on its own - it needs a sponsor, "political" support, and a handler who will learn its eccentricities and back it up (Brokaw, 1989). It was not until the late 1960's that 'Hass' became a dominant cultivar in the California avocado industry (Brokaw, 1985), overtaking 'Fuerte'. By then, the plant patent protection of 'Hass' had already lapsed.

Another example refers to South Africa, where in the early 1980's, a tree on seedling rootstock was discovered in an avocado orchard heavily infested with root rot, at Westfalia Fruit Estate. Most trees in that orchard died of root rot, however, this tree, later labelled 'Merensky 2', was one of the few survivors and looked very healthy. The cultivar was distributed internationally under specific agreements for testing; and in the late 1990's, a PBR application for 'Merensky 2' was lodged in South Africa. In due course, the US plant patent for 'Merensky 2' was granted and protection in other UPOV countries followed. By 2011, a total of 1 million trees of the 'Merensky 2' cultivar were sold, and by 2014, this number reached the 2 million mark. Presently, 'Merensky 2' is the leading clonal rootstock in the USA, Spain, South Africa and Chile.
Until recently, the most important commercial avocado cultivars were a result of testing and releasing of chance seedlings and not products of structured and controlled breeding programs (Arpaia & Menge, 2004). 'Hass' itself was a chance seedling (Coit, 1935). So was 'Fuerte' (Shepherd & Bender, 2001), 'Pinkerton' (Brokaw, 1989) and the rootstock 'Merensky 2' (Köhne, 2004).

Funding of cultivar development

Cultivar development in tree crops is a long term project that stretches over decades. This duty has historically fallen on governmental horticultural research institutes and universities. However, over the past 20-40 years, funds for avocado cultivar development available to these public entities have decreased. Many institutions were forced to downscale or to close down. Few publicly funded institutions remain that perform avocado cultivar selection and development functions, and the survival of these avocado programs remains doubtful. In more recent years, this responsibility has therefore fallen increasingly on private entities.

MATERIAL TESTING STAGES

Although not all entities that release new avocado cultivars follow the same testing strategy, the authors are of the opinion that a three phase testing of new plant material is imperative for the responsible release of new cultivars. These stages are outlined below, and can be altered depending on the initial benefit a new cultivar is deemed to offer.

Initial testing

Any new cultivar that warrants further evaluation needs to be subjected to initial testing. For fruiting cultivars, new material is topworked onto several trees in an evaluation orchard. Once these topworks start to flower and set fruit, fruit is evaluated according to a set of established parameters, and compared to a commercial standard. If the new material showed any commercial potential, and if results confirmed what was found on the original trees, the new material is taken into extended field testing (Kremer-Köhne, 1998).

For rootstock cultivars, new material is bulked up to vegetatively propagate a limited number of clonal trees, which are then subjected to a screening process in a test facility. In the past, this screening was primarily aimed at selecting for tolerance to *Phytophthora* root rot, but in future, screening should be extended to selecting for tolerance to salt damage. If potential is shown, the cultivar is propagated and retested to confirm initial findings, in which case the new material is taken into the field (Kremer-Köhne *et al.,* 2007).

This initial testing may take approximately four years, but may also take longer, depending on the ease of propagation of the specific material, and the capacity of the system involved in these tests.

Extended testing

In most cases, companies conduct extended testing in only one location. However, there is a necessity to expand this testing to a range of countries and/or growing areas to evaluate the performance of the new material under a range of conditions. As quarantine and import regulations are a major hurdle to enter test material into some countries, extended testing seldom takes place concurrently in countries in which those tests are performed.
For fruiting cultivars, at least 15 mature trees are topworked with the promising cultivar to be compared to the most relevant commercial

standard (which is topworked at the same time). Extended testing takes at least five to six years to complete, with a minimum of four to five years of yield data to be collected and compared to the standard. If the performance of the new material in this phase is satisfactory, the new material can enter pre-commercial testing.

For rootstock cultivars, at least 15, but preferably 25 trees of each cultivar are clonally propagated and grafted to 'Hass'. Trees are planted with the industry standard, currently in most cases 'Merensky 2' (Dusa®). Extended rootstock testing takes at least seven years to complete, with a minimum of four to five years of yield data required. Based on the performance of the new material in this trial, a decision is made to proceed to pre-commercial testing, or to discontinue further evaluation.

Pre-commercial testing

Once new material passes through to this phase, pre-commercial plantings are initiated in relevant areas, depending on the expected commercial advantage the new material offers according to the previous test results. Pre-commercial plantings are at least one hectare in size to illustrate the potential commercial advantage. This stage can be as short as four years for fruiting cultivars if trees are topworked, but may be as long as six years if nursery trees are planted. For pre-commercial rootstock testing, five to seven years are required to confirm the results obtained during the extended testing phase. During the pre-commercial testing phase, and depending on the advantage the material offers, plans are devised within each country how to commercialise the new plant material.

Hurdles to overcome prior to release

There are major stumbling blocks for any cultivar owner to develop plant material within a limited period of time and still recoup the licensing cost. In various releases within the avocado sector, a combination of two or more of these factors have limited, or are currently limiting, the commercial potential of new cultivars.

1. **Phytosanitary restrictions**

   There are phytosanitary rules governing the movement of plant material between any two countries. Prior to importation, an administrative process of obtaining import permits, and official certification of plant health by the exporting country as well as acceptance of documentation by the importing country's plant health officials, are a prerequisite. Completion of this process is at times achieved within a month or two, but can take as long as several years in some countries (e.g. Australia, Colombia, Mexico, Argentina and New Zealand).

   The period plants need to remain under quarantine conditions varies from country to country. In the easiest case, so-called open quarantine can be granted. However, most countries require imported avocado plant material to remain locked up, in specific insect proof greenhouses, for a period ranging from a few months to up to three years. As quarantine facilities are usually small micromanaged structures, not more than 10 plants of a cultivar can enter the quarantine station.

   The phytosanitary requirements imposed by the importing country's department of plant health range from readily achievable to almost impossible to accomplish. It can therefore happen that importation to certain countries is in due course not considered worth the immense administrative effort. Also, in various countries, the cost of erecting and maintaining phytosanitary facilities, as well as the cost of hosting plants in these enclosed environments for extended periods of time falls upon the private entity importing the material. These factors may lead to the avocado growing community in such countries being deprived of the opportunity of obtaining access to interesting new avocado cultivars.
   Where importers are not responsible for the care plants receive in quarantine, this care is often suboptimal and the loss of imported material is not unusual. The importer has no means to improve the horticultural care of his plants while these are in the quarantine station. After a period of about one to three years in quarantine, with no exotic or unusual pest/disease occurrences observed, surviving plant material is normally released and thus allowed to be moved across the country.

   Potted plants received from quarantine are usually placed in a holding nursery, with the aim to nurse the plants to a stage where they can be used to obtain first budwood. It may take up to 2 years after release from quarantine until enough budwood is available to propagate a modest number of trees for testing.

   1.1. Location specific performance

   Plant material is tested in a specific farm, region or country to determine the competitive advantage the material can offer, compared to a specific standard that exists. If no advantages exist for the grower on both a micro and/or macro level, there is no incentive for the grower to divert from his/her status quo. The new plant may react in yet unknown ways to differing external factors imposed through climate, the environment or management.

   Although attributes that can genetically be ascribed to plant material are transferable if material is grown in different locations, it is imperative to test and confirm this under field conditions before commercial decisions are made. Material should therefore be tested in as many farms, regions and countries as possible, bearing in mind that the integrity of the material and its ownership are not to be jeopardised.

   1.2. Lifespan of protection

   Depending on the country specific plant protection regulations, avocado cultivars can be protected for a period ranging from 18 years to a maximum of 25 years in most UPOV countries. In some countries, this protection only starts once legal protection is granted; while in others the clock starts ticking once an application for protection is lodged. Given that it takes six to eight years

for any commercial orchard to come into full production, a grower, or even a value chain, has limited time in which to develop material commercially, with royalties payable to the owner of the plant material in return for the expected competitive advantage it will provide.

This means that in any country where an owner wants to protect a specific cultivar, both the licensee for that country as well as the owner would benefit most if the licensee can start with commercial development as soon as protection is granted. However, if the testing process still needs to occur, this leaves the licensee with limited time to capitalise on the exclusivity protection offers, and limits the income the owner can realise within a specific country dramatically.

1.3. Delay in material development

Most growers are sceptical of any new plant material, and very few show commitment to plant new cultivars to test them. It takes leading growers with a strategic view of gaining from being the initial implementers, or companies that realise the benefit of an integrated approach to material development and the advantages that can hold for a company to test material. It is only once these initial developments show promise (and those initial implementers share their results with their peers) that a second phase development can take place. This can take up to 10 years from the first planting of a specific cultivar.

Thus, if technical data is available for a specific region and material becomes commercially available, the period during which both the licensee and the owner can benefit from the advantages protection offers within a specific country is increased. Conversely, if legal protection is already obtained in a country before country specific field performance data is available, the chance for the IP owner to eventually earn some royalty income is greatly reduced.

2. **Brokaw-Westfalia testing partners**

Over the past 40 years, the combined efforts of Westfalia Fruit and Brokaw Nursery have resulted in building a strong network of testing partners throughout the avocado world. Of primary importance are the various Westfalia avocado fruit production hubs throughout the world, where Westfalia and/or Brokaw can guarantee safe keeping of material, and has the manpower and technical experience to evaluate material in depth. Brokaw Nursery in turn manages the introduction of new cultivars and supports nursery operations within the Americas and Europe. This facilitates the production and supply of quality trees, in particular clonal rootstocks, to enable meaningful field testing of to be performed under Brokaw

Nursery's supervision throughout this region.

The Brokaw-Westfalia alliance has developed a strong secondary base of partnering companies internationally whereby partners are given the opportunity to test material horticulturally. In return these partners provide feedback on pre- and post-harvest characteristics, supply fruit samples to further evaluate; and submit fruit to supermarkets for market acceptance testing.

Protection

IP in agriculture refers mainly to industrial property, which vests in inventions, patents, innovations, trademarks, industrial models, trade secrets and expertise (Thiele-Wittig & Claus, 2003). The impact of IP locked up in PBRs and Trademarks (TMs) on globalisation can be threefold – it can either be a barrier to internationalisation; it can be a blocker for constraining competitors' ability to leverage; and it can support the market and knowledge base (Mets *et al.,* 2010).

Protecting new cultivars

Legal protection of IP allows the owner of a cultivar to assert exclusive rights in relation to certain agricultural innovations (Le Buanec, 2006). Whether through breeding innovation followed by protection under PBR or through the patenting of genes and gene fragments, there is a clear trend toward searching and developing Intellectual Property Rights (IPRs) including TMs in agriculture (Blakeney, 2011).

2.1. Methods of protection

The following categories of IPRs are acknowledged by law: confidential information, trade secrets such as business plans, recipes, formulas, manufacturing processes, etc. are protected by common law. Other methods are TMs, trade names (including logos, slogans, or designs) and PBRs / US plant patents.

Explicit provisions exist which prohibit unfair competition and fraudulent imitation (goods passed off as being identical/similar to those of a competitor). Competition and Counterfeit Goods Acts regulate the matters in question. IPRs are mainly established through legislation, but the common law also has an influence on certain aspects of IPRs (Le Buanec, 2006).

A TM is a mark that has been registered with the aim of distinguishing, in the course of trade, the services or products of a person from the services or products of competitors. A TM gives its owner the right to exclude competitors' use of the mark with reference to identical or similar products or services. In addition to ordinary TMs, collective TMs and certification TMs also exist (Srinivasan, 2003).

PBRs are to a great extent dealt with in the same way as patents and guided by the UPOV Convention of 1978. There are however several important differences: In the case of trees, a PBR is granted for up to 25 years, with the period depending on the country issuing the PBR. An annual renewal fee is payable, as in the case of patents (Tripp *et al.,* 2007). In the USA, instead of a PBR, a plant patent is granted. The grant of a US plant patent, which lasts for 20 years from the date of filing the application, protects the inventor's right to exclude others from asexually reproducing, selling, or using the plant so reproduced (Roe & Brokaw, 2007).

As in the case of a plant patent, a PBR confers on the holder the right to produce, propagate, sell, import and export the cultivar. This right also applies to cultivars which are derived from the registered cultivar, but which are not necessarily distinct from it (Swanson & Goschl, 2000). The holder would typically be the owner of the plant material, i.e. the breeder or discoverer. Breeding and testing new avocado cultivars is a tedious and expensive undertaking. In the rare case that a new cultivar passes through all important evaluation steps with good enough results to warrant release, the owner needs to be rewarded for many years of prior work without income.

Increasingly, cultivars tend to be protected not only by PBRs and TMs covering their names, but also through the use of exclusive licensing agreements with companies (Ferguson *et al.,* 1999). The use of licensing agreements to entities to test material without any claim to ownership in the material allows a cultivar owner to get feedback on the performance of material under a wide range of growing conditions without losing ownership of the material. Material transfer agreements (which may take on various forms with limited to extended rights) are used in the horticultural industry between two parties. These agreements establish access levels and stipulate the type of benefit sharing in the case of commercialisation (Louwaars *et al.,* 2004).

IPRs help growers secure access to a range of cultivars; and provide cultivar owners the assurance that, when plant material is licensed in a controlled way, that they will get some benefit out of the protection. However, this only happens when these rights contribute to a responsible business environment (Louwaars *et al.,* 2004). Managers of cultivars have the responsibility to license plant material to trustworthy partners. This is especially true where PBRs are not necessarily operational in production countries, and their main point of application is in the export markets. Business trust, which is built up over years, allows potential licensees to gain testing as well as commercial rights before other entities in a specific industry, thus providing competitive advantage to these entities. The nature of the agreement set up between these parties depends in part on the length of the relationship and the trust between them (Louwaars *et al.,* 2004). Breaking of this trust by performing unlicensed activities with the material leads to the entity losing its advantage, while also missing out on the opportunity of future access to material.

Commercialisation

Commercialisation of a cultivar under license and the extent to which a cultivar manager is involved throughout the supply chain depends on various factors. These include the value the cultivar offers, to whom this value may portray further benefit, the extent of rights granted to the cultivar manager, and the rights contained within a country specific IP law. In general, a cultivar manager is expected to license all links within a value chain that will handle and/or benefit from the material. Licensing generally contains various conditions, such as payment of a licensing fee, or royalty, as well as various restrictions on rights, including the marketing channels licensed for use. Commercialisation is a concerted effort of all links in the value chain and does not solely depend on the adoption of the cultivar within one section of that value chain.

CONCLUSION

The process of new cultivar development takes long, and very few successful cultivars reach a stage where release is warranted. As protection is country specific, cultivar owners should realise the importance of technical information gathering, international testing and limitations of protection before material is released. Once new plant material is released, the protection period is limited. International partnering with entities that understand the complexities of avocado plant material development is therefore essential. Finally, only new avocado cultivars which truly benefit the end user and the grower will stand the test of time.

LITERATURE CITED

Anon. 1925. Report of the Cultivar Committee. California Avocado Association Annual Report 1925-26 10, 112-118.

Arpaia, M.L. & Menge, J.A. 2004. Enhancement of avocado productivity. Plant Improvement: Selection and evaluation of improved cultivars and rootstocks. 2nd Seminario Internacional de Paltos, Sociedad Gardiazabal y Magdahl Ltda. Quillota, Chile.

Barrett, C. 1944. Report of the Committee on Cultivars, California Avocado Association Yearbook 29, 12-16.

Blakeney, M. 2011. Recent developments in intellectual property and power in the private sector related to food and agriculture. Food Policy 36: 109–113.

Brokaw, W.H. 1985. A word about plant patents. California Avocado Association Yearbook 69, 63-64.

Brokaw, W.H. 1989. Introducing new cultivars: needs vs. risks. California Avocado Society Yearbook 73, 121-126. CAC, 2015. Our mission. Retrieved: August 12, 2015, of
http://www.californiaavocadogrowers.com/

Coit, J.E. 1935. Plant patents as applied to avocados. California Avocado Association Yearbook 20, 122-124.

Ferguson, A.R., Lowe, R., McNeilage, M. & Marsh, H., 1999. 'Hort16A': un nuovo kiwi a polpa gialla dalla Nuova Zealand. Frutticoltura 61: 24-29 (In Italian).

Köhne, J.S. 2004. Avocado tree named 'Merensky 2'. Retrieved: August 14, 2015, of https://www.google.co.za/patents/USPP15309?dq=PP15309&hl=en&sa=X&ved=0CBsQ6AEwAGoVChMIiouPo6yoxwIV0ArbCh3KPAm

Kremer-Köhne, S. 1998. Maintenance and evaluation of avocado cultivars and selections. South African Avocado Growers' Association Yearbook 21, 35.

Kremer-Köhne, S., Mukhumo, M.L., Willis, A. & Mavuso, L. 2007. Breeding and field testing of new avocado rootstocks for increased 'Hass' yields and tolerance to root rot – final report. South African Avocado Growers' Association, Confidential Report.

Lahav, E. & Lavi, U. 2013. Genetics and breeding. In: *The avocado: botany, production and uses*. Ed. Schaffer, B., Wolstenholme, B.N. & Whiley, A.W. CAB International, p.51.

Le Buanec, B., 2006. Protection of plant-related innovations: Evolution and current discussion. World Patent Information 28: 52-60.

Louwaars, N.P., Tripp, R., Eaton, D., Henson-Apollonio, V., Mendoza, M., Muhhuku,F., Pal, S., & Wekundah, J. 2004. Impacts of strengthened Intellectual Property Rights on the plant breeding industry in developing countries. A study commissioned by the World Bank, executed in 2004.

Mets, T., Kaarna, K. & Kelli, A. 2010. Intellectual Property – Lever or barrier to the globalization of knowledge - intensive SMEs of small country origin. Engineering Economics 21: 387-398.

Roe, D. & Brokaw, R. 2007. Intellectual Property Rights applicable to fruit trees and the likely effects on regional and global avocado industries. Proceedings of the VI World Avocado Congress.

Shepherd, J. & Bender, G. 2001. A History of the avocado industry in California. California Avocado Society Yearbook 85, 29-50.

Srinivasan, C.S. 2003. Concentration in ownership of plant cultivar rights: some implications for developing countries. Food Policy 28:519-546.

Swanson, T. & Goschl, T. 2000. Property rights issues involving plant genetic resources: implications of ownership for economic efficiency. Ecological Economics 32: 75–92.

Thiele-Wittig, M. & Claus, P., 2003. Plant cultivar protection – A fascinating subject. World Patent Information: 243-250.

Tripp, R., Louwaars, N & Eaton, D. 2007. Plant variety protection in developing countries: A report from the field. Food Policy 32: 354-371.

UPOV, 2015. Retrieved: August 14, 2015, of http://www.upov.int/portal/index.html.en

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