

Horticulture Innovation Australia

Final Report

Development of a kernel assessment and laboratory accreditation scheme for macadamias

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Summary

In the macadamia industry returns to growers are determined by the in-shell price (NIS) paid by processors. This is determined by an assessment of the kernel quality from a sample taken at consignment delivery. How the sample is taken and subsequently assessed is important, not only in determining growers income but equally importantly, in providing confidence and transparency in the payment process and ultimately driving quality improvement throughout the industry.

This project developed and implemented a kernel assessment and laboratory accreditation scheme which established clear, objective and documented standards for both the quality parameters used in kernel assessment and the procedures and processes used in that assessment. In addition the project established a steering committee to oversee the program and the ongoing implementation, management and review of the scheme. A revised and updated set of kernel assessment standards and laboratory accreditation scheme rules have been produced. A comprehensive laboratory assessment manual to guide laboratory staff and growers undertaking assessment, including colour accurate photographs and other materials to improve the scheme, has been developed and published.

The project has set in place structures and a funding mechanism to ensure the scheme can continue to review the standards, assessment protocols and manuals and to produce new versions when and as required.

The aim was to have a consistent standardised method of kernel assessment, a rigorous accreditation scheme to recognise laboratories undertaking kernel assessment against the standard and to establish

the resources and process necessary to ensure the continued improvement and development of the program. This aim has been achieved.

Over time the outcome will be clearer productivity and quality signals to growers through the kernel payments of processors and a direct financial incentive to lift productivity and quality. Already there has been a significant drop in the number of inquiries regarding concerns over kernel assessment received by the AMS.

Keywords

Quality; kernel assessment; standards; laboratory protocols

Introduction

In the macadamia industry returns to growers are determined by the in-shell price (NIS) paid by processors. However, the macadamia industry does not regularly batch process. In most cases grower consignments are pooled and processed to achieve economic run volumes. Individual grower consignments are sampled and assessed prior to pooling to determine quality and this crack-out and kernel assessment is used to determine the growers' payments. The quality parameters used in this assessment and subsequent payment are essential tools in driving a focus on quality production through to growers.

To encourage laboratories and processors to use standard kernel assessment protocols the AMS has developed clear, objective and documented standards for both the quality parameters used in kernel assessment and the procedures and processes used in that assessment. To support this a laboratory accreditation program to recognise labs using the standard and to ensure those labs were operating to high levels of laboratory practice has also been developed and introduced.

The Australian Macadamia Society (AMS) has previously developed sampling procedures and kernel assessment standards and laboratory accreditation through a Horticulture Australia Limited (HAL) funded project in 2005. Since that time there has been a gradual erosion of compliance with the standards due to the lack of an overseeing committee to keep the standards up to date and effective and the changing perceptions of quality, changes in the market environment and competitive pressures between processors.

This has seen a loss of focus on quality assessment and quality based payments in the industry and, if unchecked could lead to Australia being overtaken by other origins as the recognised leader in quality kernel production and processing.

The current project undertook a complete review and rewrite of the kernel standards and the laboratory accreditation and to establish a structure for the programs on going management and development.

Given the highly competitive nature of the processing sector there has been long term market failure to collectively develop kernel assessment standards. The first standards were only developed through the intervention of the AMS with HAL support and a similar role was needed so that the standards could be collectively reviewed and agreed.

Methodology

Kernel assessment standards

A working group of senior staff from currently accredited laboratories reviewed the existing assessment manual. The classification of kernel disorders and the severity of those disorders was comprehensively reviewed and revised. The photographs that were used in the existing manual to objectively describe the various disorders were reviewed and supplemented to remove as much subjectivity from the process as possible. The number of photographs was significantly increased to show clear examples of kernel disorders at all levels of severity.

This process will continue under the management and guidance of the Kernel Laboratory Assessment Scheme committed established as one of the outcomes of this project.

Laboratory accreditation

The laboratory assessment program aims to ensure that the kernel assessment standards are being implemented when a participating laboratory undertakes assessments and that the laboratory is operating within accepted good laboratory practice. This includes having appropriately trained and experienced staff carrying out the assessment.

The project reviewed the rules of the accreditation scheme and revised a number of procedures to ensure the protocols have kept up with developments in laboratory practice. The audit process was reviewed. The new rules were agreed by all participating laboratories and by the AMS Board as the accrediting authority.

Establishment of a kernel assessment and laboratory accreditation committee

The program previously had no management or oversight structure. This has meant there was no one responsible for the ongoing review and improvement of the assessment standards or the lab accreditation.

A scheme steering committee has been established with membership from across participating

laboratories and the AMS. This committee is now responsible for the annual review of the standards and the assessment manual and their ongoing development.

The training programs for laboratory staff and growers were reviewed and reworked as a result of the changes to the standards and the manual. Training programs were delivered by an accredited trainer for both laboratory staff and for growers.

Outputs

Kernel assessment standards

The kernel assessment manual has been comprehensively reviewed and rewritten. The classification of kernel disorders and the severity of those disorders has been revised. The photographs that were used in the existing manual to objectively describe the various disorders were reviewed and supplemented to remove as much subjectivity from the process as possible. The number of photographs was significantly increased to show clear examples of kernel disorders at all levels of severity.

This will remain an iterative process over coming years as each refinement of the manual and the photographs are used and evaluated each season and updated accordingly. Over the 3 years of the project participating labs collected and the AMS photographed good examples of existing disorders, particularly those that illustrate the margins of the various levels of severity. In addition examples of newly arising disorders or those of increasing occurrence were sampled, photographed and included in the new edition of the manual.

The standards and the manual will be completely reviewed and rewritten. New photographs will be incorporated to allow more objective assessment of disorders.

Sufficient copies of the new manual will be colour corrected and printed on high quality paper to allow distribution to staff of participating laboratories. Other processors and growers will be charged a cost recovery fee for manuals.

This process will continue under the management and guidance of the Kernel Laboratory Assessment Scheme committed established as one of the outcomes of this project.

Laboratory accreditation

The laboratory assessment program aims to ensure that the kernel assessment standards are being implemented when a participating laboratory undertakes assessments and that the laboratory is operating within accepted good laboratory practice. This includes having appropriately trained and experienced staff carrying out the assessment.

The project reviewed the rules of the accreditation scheme and revised a number of procedures to

ensure the protocols have kept up with developments in laboratory practice. One example was the changing of the rules to reflect the now widespread use of automatic samplers. The audit process was reviewed and unannounced random audits have now replaced the previous 7 days notice. In the past an AMS staff member has conducted the laboratory audits. Under the new protocols, an independent auditor conducts all audits and reports to the AMS and the cost of this is incorporated in the budget of the scheme.

New rules have been developed and published for the laboratory accreditation program. The new rules have been agreed by all participating laboratories and by the AMS Board as the accrediting authority.

An annual audit has been undertaken of all participating laboratories each year. While some minor non-compliance has been identified, all non-compliance was rectified within the required time frames. An inter laboratory round-robin comparison trial has been run each year. Some level of discrepancies have been identified in each of the three round robins. This has been discussed at the Steering Committee and the laboratories concerned have committed to additional training and monitoring.

Two random independent audits of participating laboratories were conducted with satisfactory compliance.

The new rules have been agreed by all participating laboratories and by the AMS Board as the accrediting authority. In fact two new laboratories have sought accreditation as a consequence of the profile and acceptance of the new scheme rules.

Establishment of a kernel assessment and laboratory accreditation committee

The program previously had no management or oversight structure. This has meant there was no one responsible for the ongoing review and improvement of the assessment standards or the lab accreditation.

A scheme steering committee has been established with membership from across participating laboratories and the AMS. This committee has met twice a year for each of the three years of the projects. Minutes of the meeting have been included in Milestone reports previously supplied.

The training programs for laboratory staff and growers has been reviewed and reworked as a result of changes to the standards and the manual. Training to both growers and laboratory staff has been delivered by an accredited. A Queensland and a NSW laboratory staff training session was conducted each of the three years of the project. A grower training session was held in NSW and Queensland in the first year of the project and in Brisbane in the second year of the project. No grower training session was held in year three due to lack of participants. This may be a result of very tight demand for in-shell and high prices leading to good returns almost regardless of quality at the moment.

Outcomes

The development of comprehensive, clear and more objective kernel assessment tools has led to greater confidence in assessment of kernel quality and payment criteria by growers. The number of inquiries regarding the process and fairness of kernel assessment received by the AMS has dropped in each season that the program has been running. At the time of writing in the 2015 season there had been no approaches to the AMS regarding laboratory kernel assessment.

There has been a measurable improvement in kernel quality over the period of the project although there is no evidence that this is directly attributable to more objective kernel assessment. The favourable weather conditions and improved crop protection measure are more likely the cause of the reduced reject numbers. Nevertheless, this does reinforce the levy funded marketing program focus on premium positioning and market leadership for Australian kernel.

Growers can now clearly identify which labs and processors are participating in the laboratory accreditation program. This has directly led to two processors who did not have accredited labs, now working towards accreditation of the laboratories.

The steering committee has already provided a mechanism to maintain the integrity and relevance of the program with a consensus approach to dealing with minor non-compliance through the auditing program and some minor discrepancies in the round robins. In a further encouraging sign, the steering committee has been able to promptly and unanimously agree to rules covering the entry of new laboratories into the scheme.

Evaluation and Discussion

The project has more than met its objectives. All relevant standards, documents and procedures have been reviewed and revised. The photo library to support the assessment manual has been completely reworked with the addition of hundreds of new photographs, tens of which have been included in the manual.

A well documented training program has been developed. Resources including lesson outlines, presentations, exercises and assessments have been developed. The training has been delivered by an accredited trainer. All staff from participating laboratories (over 50 individuals) have undertaken at least two training sessions over the three years. Formal recognition of staff operating at supervisor, unsupervised operator and trainee level has been put in place. Over 80 growers have undertaken the assessment training.

A steering committee representing all stakeholders in the program has been established and has run successfully for three years. Not only has this committee managed the program and seen a reduction in the numbers of complaints about kernel assessment, it has helped develop a culture of greater trust and sharing between laboratory managers and processors.

The project has delivered a self supporting scheme that will now be able to run on fees paid by accredited laboratories and supported by the AMS. Only if a major revision of the standards, the manual or the training program is required is it envisaged that external support may be needed.

Recommendations

The project was always planned to deliver a self supporting scheme that had the participation of all major processors and the support of the growers supplying those processors. It has achieved this aim.

Consequently, there are no major recommendations required at this time. What is suggested is:

- # The AMS continue to be the body responsible for owning and managing the laboratory assessment scheme, the kernel assessment standards and the training program
- # that together with laboratory managers and participating growers, the AMS oversee a review of the scheme by the scheme steering committee each year
- # that consideration be given to reviewing kernel and in-shell standards from time to time in line with developments in the international macadamia markets and customer requirements.

Intellectual Property/Commercialisation

There are no intellectual property issues related to this project. Copyright of all materials developed is vested in the Australian Macadamia Society to be used for the benefit of the Australian macadamia industry.

Acknowledgements

The AMS would like to acknowledge the role of Sarah Jane Hughes and Tamara Hepburn who have acted as the secretariat of the Kernel Laboratory Assessment Scheme steering committee. Both contributed a huge amount to the development and success of this project.

The members of the KLAS steering committee are acknowledged for providing technical and commercial knowledge and context without which this project could not have been successfully completed. The committee is:

Chair: Jolyon Burnett (CEO AMS), Michael Green (Agrimac), Royce Alcorn (Suncoast Gold), Vince Collins (Nambucca MacNuts), Anna Williams (MACAZ), Shane Johnson (Pacific Gold Macadamias), Craig Brice (MPC), Kim Jones (Cropwatch), Bob Evans (Pacific Farm Services), Bronwyn Carlish (Stahmann Farms) and Jon Perrin (Macadamias Direct). Ex-officio members include: Ken O'Brien (SCU), Mary Burton (Accredited Lab Trainer),