Macadamia sorting calculator – explanatory notes

Kevin Quinlan

District Horticulturist, Alstonville

The macadamia sorting calculator has been designed to assist growers to decide whether it is financially worth sorting macadamia nut in shell (NIS) or consigning directly to a processor. These notes explain the method used and the factors affecting the accuracy of the results. The results from the assessment should be entered into the Excel®-based calculator on the DPI web, which will estimate the quality results for the sample. You will need Excel to use the calculator.

Why use a sorting calculator?

A large amount of time, effort and money is spent by macadamia farms on post-harvest operations. The MacMan best practice groups have found that dehusking, sorting and handling is the largest labour category, with an average of 19.4 hr/ha spent. A large amount of this time is spent sorting NIS.

The macadamia sorting calculator allows growers to determine the value of a sort relative to the level of NIS rejected. Results from the MacMan groups found that an average of 6% of the total harvested yield is thrown out, with some farms rejecting considerably more than this. In 2006, 10% of these rejects were good nuts.

The calculator aims to allow you as a grower to determine whether a sort will give increased or decreased returns. It also aims to allow you to make informed decisions about sorting, by giving you the information you need. Like any decision support system, this system relies upon accurate information, and there are limitations to the method. These are outlined in the section 'Factors affecting the accuracy of the system'.

By knowing the quality of NIS you are sorting, how long it takes you to sort, what it costs to do this sorting and what the payment would be for the NIS delivered pre- and post-sorting, the gains or losses from this sorting can be determined.

Method

The aim is to assess a small representative sample of nuts to determine the quality of the whole batch. The processes followed for a belt sorting decision and a belt and water sorting decision are detailed below.

Sampling

Take multiple samples of NIS after the initial dehusking and sort, from the end of the sorting table or just before the NIS is augered into the silo. Take these samples over the day, to ensure you get a representative sample of the NIS you are putting into storage. The initial sample size should be 2.5% of the total amount of NIS being sorted. Ensure the samples are taken over time to get an accurate reflection of the total NIS. From this you will need to take a sub-sample for analysis.

One way of taking samples is as follows: every 20–30 minutes, take a few handfuls of nuts and place them into a container (e.g. picking lug). From the lug you will take a sub-sample that you will analyse. Ensure that you get a representative mix of NIS for the batch you wish to analyse, taking nuts from the top, sides and bottom of the container.

A sample of 300 nuts or more is recommended for the analysis. You can vary the size of this sample, but remember that the greater the number of nuts you analyse, the more accurate the results.

The sample you analyse should be no less than 100 nuts, as this ensures some degree of accuracy.

Belt sorting

Sort the sample into 'visually good NIS' and 'visually bad NIS', and keep these two categories separate. Crack the NIS of each category, and separate the kernel into 'sound' and 'unsound' groups. Enter these results into the spreadsheet.

Belt and water sorting

Sort the sample into 'visually good NIS' and 'visually bad NIS', and keep these two categories separate. Crack the 'visually bad NIS' and sort the kernel into 'sound' and 'unsound' groups. Record these results in the spreadsheet.

Take the 'visually good NIS' and put them into a container of water. Separate the NIS into 'sinkers' and 'floaters'. Record the numbers of NIS in each category. Crack the 'sinkers' and 'floaters' (remembering to keep them separate) and sort the kernel into 'sound' and 'unsound'. Record these results in the spreadsheet.

Factors affecting the accuracy of the system

- *How representative the sample is of the batch* – the sample you take needs to come from the entire batch you wish to sort. To be consistent with the method used by processors, the initial sample size you take should be 2.5% of the total amount of NIS in the batch, and then a sub-sample should be taken from that. This requires multiple random samples to be taken over the day, which are added together and then sub-sampled. This will increase the level of accuracy.

- *Sample size* – the bigger the sample of nuts you analyse, the better. Initially taking 2.5% of the batch and then sub-sampling 300 nuts will improve the level of accuracy. This is in keeping with the Australian Macadamia Society's guidelines for kernel assessment.

- *Wet kernel analysis* – the kernel you will assess is wet kernel, while processors will perform their assessment on dry kernel. This can affect the results from the calculator. The differences are mainly due to traits such as discolouration or glassy kernel, which are difficult to remove as they do not present as NIS defects.

- *Commercial grade* – a determination of commercial grade kernel is not made by the calculator. This category was created for the use of kernel that was previously classified as unsound but had a commercial value. As a result, determining what kernel is classified as commercial grade depends upon the severity grading it receives for a particular defect. Because many of these traits (such as

Belt sorting method

Belt and water sorting method
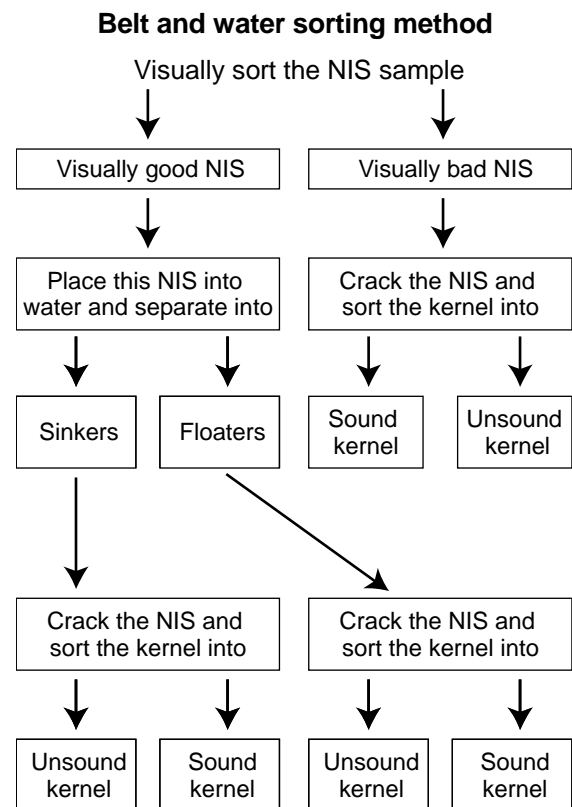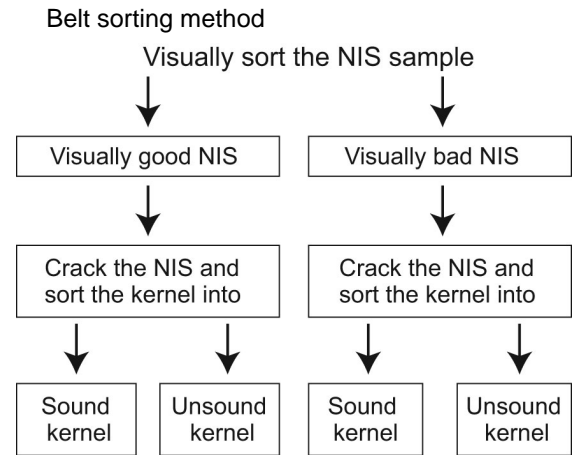
discolouration) are currently undetectable when working with NIS, it is difficult to calculate these values prior to a kernel recovery assessment. Therefore it is assumed the level of commercial grade kernel is the same before and after sorting.

How long does it take?

The entire process takes about one hour to complete. The biggest time factor is cracking the NIS to be able to complete the kernel assessment. The trade-off is that the one hour spent doing an assessment of quality may save you a day's work if you don't have to sort.

Acknowledgements

Check for updates of this Primefact at:
www.dpi.nsw.gov.au/primefacts

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (February 2009). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

Job number 8637