

## **QUALITY IN DISTANT MARKETS**

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### **Introduction**

Avocados have a limited storage life and with export to distant markets the majority of this storage life may be consumed by the long transportation times required to reach their destination. Transport to distant markets is also an expensive process, adding to the costs of production. To remain competitive, the exporting country must develop a reputation as a consistent supplier of high quality product. This poses a number of challenges since the fruit not only have to survive the transportation process but must also have sufficient remaining storage and shelf life to pass through the marketing chain and deliver fruit of high quality.

The development of most storage disorders is related to fruit age, that is the length of time since the fruit were picked. Fruit quality deteriorates as fruit age increases. Shorter storage times and transport distances are more forgiving of fruit quality, since fruit can be consumed before storage disorders have an opportunity to develop. For distant markets, however, short of reducing transport times, the only other approach to improve out-turn quality is to improve the inherent quality of the fruit.

Overcoming the quality problems associated with export to distant markets requires a multi-faceted approach. Production of high quality fruit is a continuous process throughout the production chain, with the quality of fruit entering this chain being the ultimate determinant of subsequent storage life. Systems need to be implemented and continually refined throughout the packing and coolstore chains to ensure that fruit quality is maintained.

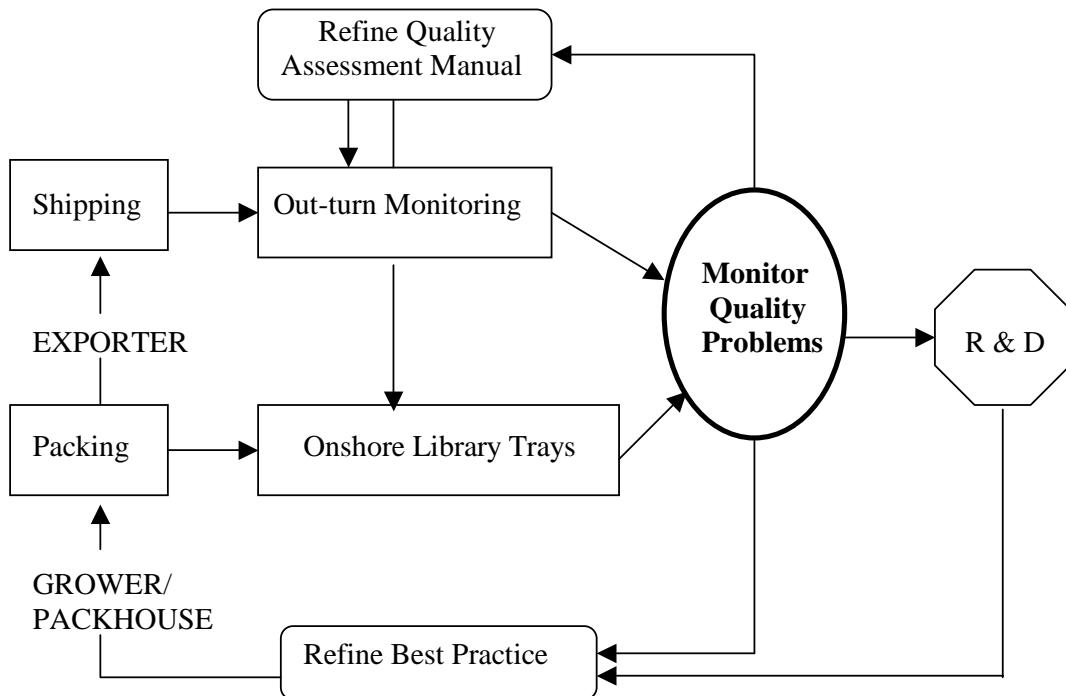
### **The New Zealand Solution**

Prior to the start of the 2000 export season the New Zealand industry had only minimal criteria to define fruit quality, a limited understanding of those factors determining fruit quality at out-turn, no methods for monitoring fruit quality through the production chain, and no methods for predicting likely out-turn losses. There has also been no financial incentive for growers to modify their orchard management, as there has been no way of tracking the quality of individual lines of fruit.

Given the limitations imposed by distance from market, and the lack of detailed information on quality problems in the market, the New Zealand Avocado Industry Council (AIC) commenced the 2000 export season on the basis that the better the quality of fruit that leaves New Zealand, the better the quality at out-turn.

The New Zealand industry has embarked on a process to continually improve fruit quality, which is illustrated schematically in Figure 1. A best practice manual has been prepared, which provides guidelines on management practices and handling systems that minimise fruit quality loss at each stage of the handling process from picking to loading on a ship. This manual is provided to all registered packhouses and exporters in New Zealand.

In addition, a library system has been established for monitoring fruit quality for individual growers. Samples are taken from lines of fruit as they are packed and are held in conditions simulating shipping before ripening and evaluation of fruit quality. Results from these library trays identify the quality problems inherent in the fruit or onshore handling systems before transport to distant markets. Comparison of library samples with samples taken at out-turn in the USA, serves to identify any problems which may have arisen as a consequence of the shipping or handling system, once the fruit has left the packhouse.



**Figure 1. Process for continuous improvement of export fruit quality utilized by the New Zealand industry.**

Together the information collected from the onshore library trays and the out-turn monitoring define the exact nature and extent of any quality problems. The stage in the production chain at which quality problems arise can also be determined. Once the nature of the problem has been defined, the R&D programme can be better targeted to develop more appropriate control strategies. Once implemented, these strategies can be continually refined with feedback from fruit quality evaluations.

### **Out-turn monitoring**

In order to develop appropriate control strategies, it is first necessary to clearly identify the quality issues that need to be targeted. Without good market intelligence it is difficult to obtain accurate information on the extent of any quality problems or their relative importance.

In order to obtain precise information on the quality of fruit arrivals and the extent of any quality problems the AIC implemented an out-turn monitoring programme in the USA. An AIC staff member was based in Los Angeles for a period of 4 months. Fruit samples were collected from the USA handlers once a week to monitor fruit quality. Digital photographs were sent back to New Zealand to enable immediate diagnosis of quality problems as they arose. Detailed information was fed back to each exporter on the state of their fruit.

The information gathered by the out-turn monitoring programme has allowed key issues to be identified that impact on fruit quality such as fruit age and shipping systems. For the first time exporters of New Zealand avocados have had detailed information on fruit quality from an independent, impartial source. This allowed the avocado industry and exporters to manage, in close to real time, fruit quality problems as they arose during the export season. Identifying the fruit quality issues and possible causes of quality problems as early as possible, by utilising a scientific approach to fruit quality measurement, has enabled detrimental effects on the market perception of fruit quality to be minimised.

### **Fruit quality assessment manual**

Assessment of fruit quality is central to the process outlined in Figure 1. For this reason, the AIC has developed a fruit quality assessment manual, which is provided to all registered packhouses and exporters. This ensures that all assessments of fruit quality throughout the industry are comparable. The manual is also updated on an annual basis to ensure thorough coverage of the quality disorders present.

### **Onshore library trays**

As part of the best practice manual all sheds were strongly encouraged to hold library trays for evaluation of fruit quality. The best practice manual provides a standard protocol for the collection, storage and evaluation of library trays. Training was provided to sheds on how to evaluate fruit quality, to ensure that assessments were standardized.

For most growers library tray information is the only feedback they receive of their fruit quality. It also provides a basis for comparison with shed and industry averages. For individual growers, information provided on their fruit quality can provide the stimulus to improve orchard management systems. Once changes have been implemented, the feedback on fruit quality allows growers to determine whether the additional expense has been warranted. This is especially true of preventative fungicide control programmes, where the benefit is not immediately obvious and cannot be determined from packout rates or reject analyses provided by the shed.

### **Best Practice manual**

At no stage during the handling chain is it possible to improve fruit quality after the fruit has been picked. Instead, the best that can be achieved is to prevent deterioration in quality. Therefore, the best strategies to adopt for improving fruit quality at out-turn is to ensure that only the best quality product enters the distribution chain, and to minimize the opportunities for deterioration in fruit quality at each stage of the fruit production and handling chain. In New Zealand this has been achieved by providing information to packhouses on procedures for handling fruit to minimise harmful practices that impact on fruit quality.

A best practice manual has been developed to highlight those factors throughout the fruit production and handling chain from the orchard to the market shelf, which impact on fruit quality. The cumulative effect of these small improvements in maintaining fruit quality can lead to large gains in fruit quality in the market.

The best practice manual has identified a number of key areas where improvements in practice can be made such as harvesting and handling procedures. The manual is revised yearly incorporating results from the industry R&D programme. The information contained within the fruit quality database, generated from both the onshore library tray evaluations and out-turn monitoring, can be used to measure individual shed or grower performance. This information can be used to identify which fruit production and handling practices are beneficial for maintaining avocado fruit quality and that could be implemented throughout the industry.

### **R&D programme**

The R&D programme for the 2000 season was focused strongly on the issue of post-harvest fruit quality, especially on rots. Major emphasis was placed on the issue of rots developing on green fruit while still in coolstore, a disorder commonly referred to as "measles". Out-turn monitoring and onshore library tray results clearly show "measles" was not a major fruit quality issue during the 2000 season.

The results obtained from the fruit quality database from the 2000 season have highlighted other specific issues that need to be addressed in the 2001 R&D programme. An example is the high incidence of stem-end rots that were recorded in the 2000 season. Priority will be given to developing new control strategies to overcome this disorder.

### **Summary**

The quality improvement process implemented this past season has undoubtedly been a success. Both the industry structure and the active participation of all the sectors have been major contributing factors to this success. However, the real benefits will accrue in the following seasons, with the systems now in place to capture information on fruit quality and relate this back to handling practices.