

Is the quality of South African avocados improving?

The 2005 export season – how fruit quality compared with previous seasons' results

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ABSTRACT

In view of the several years' worth of comparable avocado quality data that SAAGA now possesses, it is possible to reflect on whether there has been an improvement in the quality of South Africa's exported avocados.

There has been a marked improvement in avocado quality over the past decade – specifically in terms of soft deliveries and the associated quality defects associated with in transit ripening of sea-freight avocados. Certain quality defects such as brown cold injury and rots are now very rarely seen at delivery to the European markets.

Despite the above-mentioned positive trends, the incidence of softer deliveries remains an area of concern – especially since technological advances have made it considerably easier to transport avocados to the European market place with minimal breaks in the cold chain.

This article also discusses other quality defects which continue to cause marketing difficulties and compares the quality data results for the 2005 export season with the results for previous seasons. 'Hass' lentidamage remains a quality defect which continues to cause marketing difficulties. It has been noted that the incidence of 'Fuerte' grey pulp has continued to increase year on year, especially for end of season fruits, indicating that the industry is continuing to harvest a high percentage of very physiologically mature 'Fuerte' fruit. The incidence of grey pulp for 'Fuerte' during 2005 was the highest in a number of years and has the potential to cause severe marketing difficulties if this negative trend is not reversed.

Some information is provided on new technologies (e.g. 1-MCP) now being used by the industry, as well as on the European avocado market during 2005.

INTRODUCTION

SAAGA now has several years' worth of comparable data collected by the Overseas Technical Officer (OTO). These data allow us to judge whether or not there has been an improvement in the quality of South African avocados sold in the traditional export markets. One would expect the answer to this question to be affirmative, since there have been numerous technological advances since the situation of ten years ago, when the overwhelming majority of exported South African avocados were transported to Europe under regular atmosphere conditions in "port-hole" containers.

We can confidently confirm that there has been a considerable improvement compared with the European deliveries prior to the mid-1990s, when "soft arrivals" (fruit having softened in transit) and severe quality defects were very common (Leclercq, 1989). The first South African commercial trials using Controlled Atmosphere (CA) were conducted in 1995 and the results were so successful that by the end of the decade the industry was almost exclusively making use of CA (Eksteen *et al.*, 1998; Nelson *et al.*, 2001). With the advent of CA, soft arrivals virtually became a thing of the past and many of the quality disorders associated with softer arrivals ("brown cold injury" and rotten fruit at delivery) practically disappeared. Subsequently, other alternatives to CA (e.g. 1-MCP) for controlling in transit ripening have become available. Despite these technological advances, there remain an unacceptably high number of warm deliveries to the South African ports and soft deliveries to the overseas markets.

Other quality defects which continue to cause marketing dif-

iculties include lentidamage (on 'Hass'), rots on ripe fruits, black cold injury and grey pulp. The OTO data for the 2005 season are presented and compared with the data for previous seasons. Quality data are only discussed in detail for 'Fuerte' and 'Hass' avocados, since insufficient data were collected to allow for conclusions to be drawn as to the quality of other cultivars during 2005.

Comment is provided on the market situation in Europe during the 2005 season. The European avocado market is becoming increasingly competitive, especially during the European summer months, when South African avocados compete for market share with avocados from Peru, Kenya, Chile and Mexico. South Africa thus needs to ensure that the avocados which she exports are of superior quality if the long-term survival of the industry is to be assured.

COMMENTS ON THE EUROPEAN MARKET SITUATION DURING 2005

The 2005 European avocado market was one in which – whilst very high prices were rare – prices were acceptable to good for most of the season. The major exception was in early June, when a temporary oversupply resulted in poor prices (especially for greenskins) for a number of weeks. This oversupply situation was partially due to larger volumes of South African, Kenyan and Peruvian avocados being delivered in a concentrated period. The South African supply was further disrupted by vessel delays and other shipping problems, which resulted in consignments which were originally scheduled to be delivered over a period of a few

weeks, all being delivered in the space of a few days – hence an oversupply situation. There was also a second dip in market prices from August onwards, when larger volumes of Chilean ‘Hass’ were received. However, the European agents importing South African avocados were able to manage the situation, thereby usually avoiding being obliged to pay their South African suppliers unacceptably poor prices. Nevertheless, it should be noted that the trend of larger volumes of Chilean avocados from August onwards is likely to continue during the forthcoming seasons and this should be taken into account when planning South Africa’s end of season avocado export volumes.

Despite the occasional peaks in volume mentioned above, supplies of avocados to the European market were fairly well co-ordinated during 2005. It is encouraging to note that the international co-operation initiated by SAAGA a few years ago, is becoming increasingly successful. Most producer countries are now sharing information on their shipping volumes in an effort to minimise the risk of oversupply situations. The result of this is that avocado supplies are now better co-ordinated, which decreases the risk of oversupply situations. This is to the benefit of all, since poor European avocado prices are disadvantageous to all avocado producers who market their fruits there.

OTO SAMPLING PROCEDURES

The OTO was based in Rungis, France between March and October 2005, his primary role being to monitor the quality of South African avocados both upon delivery and when ripe. Quantitative “arrival” and “ripe” quality reports were provided to the industry on a weekly basis. Arrival quality was gauged by inspections of pallets on the day of delivery to the importers’ warehouses; ripe quality data from ripened fruits originating from sample cartons collected during arrival inspections. The majority of arrival inspections were carried out at Rungis; more rarely warehouses in Rotterdam and England were venues for arrival inspections. Details on sampling procedures are provided in Nelson *et al.*, 2001.

QUALITY DEFECTS AFFECTING SOUTH AFRICAN AVOCADOS DURING 2005, AND HOW THESE COMPARE WITH PREVIOUS SEASONS (RESULTS FROM POST-SEASON ANALYSES OF OTO DATA)

1) Breaking to soft deliveries

Whilst the vast majority of fruits were received in a firm to hard condition during 2005, there were occasional cases of breaking to soft consignments. The OTO’s quality data recorded 0.3% of ‘Fuerte’ deliveries and 0.6% of ‘Hass’ deliveries to have arrived in a breaking to soft condition. This might not sound like a high percentage, especially since when soft consignments are received it is usually a matter of not more than a couple of pallets at a time, so the importing agents are usually able to find suitable markets for this fruit without adversely affecting market prices. However, were the majority of the (for example) 0.5% of softer arrivals in a season all to be delivered in the space of a couple of weeks, this would equate to 50 000 cartons for a seasonal export volume of 10 million cartons! Such a large volume of softer fruit within a short space of time would have a devastating effect on market prices. It remains a matter of grave concern that – despite the considerable technological advances of the past decade – a significant proportion of South African avocados are still delivered to the overseas markets in a softer condition. It is considered likely that the majority of soft consignments are a result of inadequate maintenance of the cold chain. This hypothesis is supported by numerous in-season PPECB reports (“PPECB Statements of Facts”) of warm avocado deliveries (fruit pulp temperature above specification) to the South African ports. The issue of soft arrivals is being addressed as a matter of priority by the Cold Chain Ac-

tion Group, which was formed at the November 2005 meeting of the SAAGA Post-harvest Committee.

2) ‘Hass’ lentidamage

‘Hass’ lentidamage remains a marketing problem in those markets such as France where ‘Hass’ fruits are mainly marketed when still hard and green. Naturally, in markets such as the United Kingdom – where most ‘Hass’ fruits are pre-ripened prior to sale – lentidamage rarely poses a marketing problem since it is not visible on the ripened fruits. When compared (Figure 1) with industry averages for previous seasons, the 4.11% incidence of lentidamage for 2005 seems to be acceptable, if not an improvement over some of the more recent seasons. In general, this is true – in fact, the 2005 industry seasonal average is actually slightly inflated due to the fact that severe lentidamage was largely confined to fruit from a few specific growers. If the data for these growers’ fruits are removed from the industry data, the 2005 ‘Hass’ lentidamage incidence for the industry becomes even lower. The relevant growers have been informed of the lentidamage problem on their fruits and SAAGA’s technical staff has been investigating the factors which make those growers’ fruits more susceptible to lentidamage. It is important that all growers’ fruit is of good quality, since the reputation of South African avocados as a whole can be negatively affected by the markets receiving large volumes of problematic fruit – regardless of whether these problems are common across the industry or are confined to a few growers’ fruits.

It is known that picking avocados during or shortly after it has rained, increases the likelihood of lentidamage. Equally, it is understood that during lengthy periods of wet weather the fruits remain susceptible to lentidamage; even short periods of dry weather between consecutive rain showers are often inadequate to lessen the risk of lentidamage. As a consequence, extra care should be taken when picking and packing the fruits shortly after periods of inclement weather.

3) Incidence of rots

The incidence of rots does not seem to have changed significantly from year to year – in any one year the incidence of

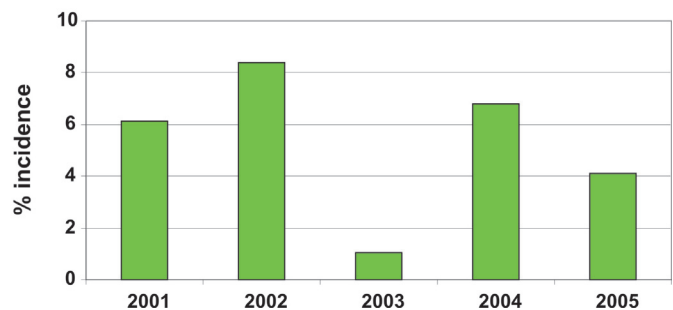


Figure 1. Industry ‘Hass’ lentidamage 2001 to 2005.

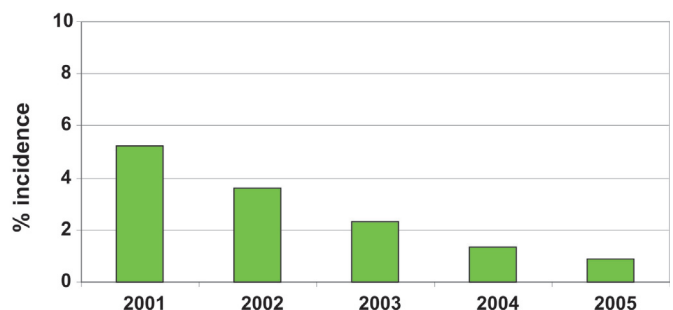


Figure 2. ‘Fuerte’ anthracnose: 2001 to 2005.

anthracnose might be higher than was the case for the previous season whilst the incidence of stem-end rot might be higher, but the following season one often finds that the incidence of rots is again similar to what it was two or three seasons previously. Certainly, “wet” versus “dry” seasons and “on-years” versus “off-years” have an influence on the incidence of rots. The one notable (and encouraging!) exception to this generalisation is for anthracnose on ‘Fuerte’. The OTO seasonal quality data show that the incidence of anthracnose on ‘Fuerte’ has decreased every season since 2001 (Figure 2). It is hoped that this positive trend will continue. However, it should be noted that South Africa has experienced relatively dry seasons in most of the avocado production areas over the past few seasons and that the incidence of rots tends to be lower during drier seasons. Fungal infections should be carefully monitored during wetter seasons.

4) Black cold injury

The industry will recall that several years ago black cold injury was very common in early season ‘Fuerte’, decreasing to acceptable levels as the season progressed. This high incidence of black cold injury caused severe marketing difficulties and impacted negatively on early season prices. A very positive development in recent years is that this trend of early season black cold has no longer been seen. The reasons for this are most

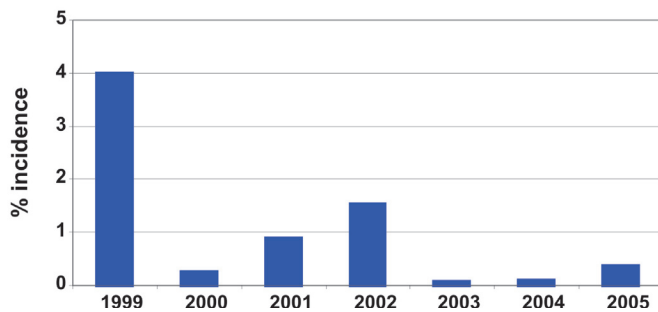


Figure 3. ‘Fuerte’ black cold injury: 1999 to 2005.

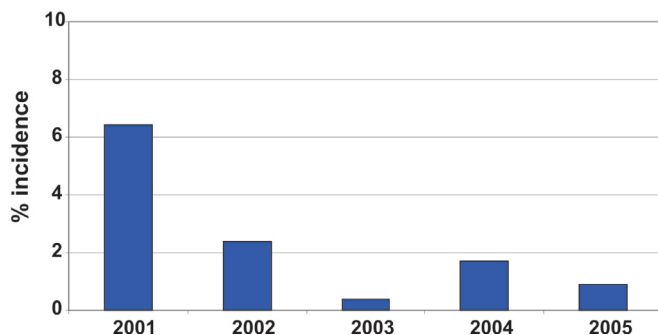


Figure 4. Industry ‘Hass’ grey pulp: 2001 to 2005.

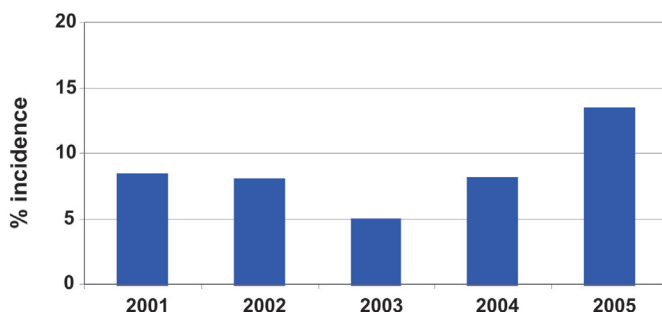


Figure 5. ‘Fuerte’ grey pulp: 2001 to 2005.

likely the following: Firstly, the South African avocado season is starting a couple of weeks later in the year than was the case a few years ago (during the 1990s, significant volumes of South African avocados were already present on the European markets by the end of March, whereas in more recent years larger volumes of South African avocados have only been present from mid-April onwards).

Naturally, this would suggest that the first fruit have been more physiologically mature (and thus less prone to developing black cold injury) when harvested. Secondly, the in transit temperature regimes are certainly being well managed and the appropriate regimes being selected, which has reduced the incidence of black cold injury.

The incidence of black cold injury in ‘Fuerte’ remained lower in 2005 than had been the case in previous seasons (4% during 1999). However, the 2005 figure of 0.36% was higher than was the case for 2004 and 2003, and for the past two seasons there has been a trend of a slight increase in black cold injury (Figure 3). Thus far, the incidence of ‘Fuerte’ black cold injury has remained within acceptable levels, but any significant increase in black cold injury could have a negative impact on the market and on the Europeans’ perceptions as to the quality of South African avocados.

During 2004, ‘Hass’ had an uncharacteristically high incidence of black cold, 0.58% for the season as a whole (Nelson, 2005; Lemmer *et al.*, 2005). This incidence of black cold injury was considerably higher than that seen during previous seasons. It was encouraging to note that during the 2005 season the incidence of black cold injury on ‘Hass’ was much lower – 0.19% industry average; more in line with figures for previous seasons.

As for ‘Hass’ lenticidamage (see above), the incidence of severe black cold injury on ‘Hass’ was mainly confined to fruits from a few specific growers. The symptoms of black cold injury and lenticidamage are closely related in ‘Hass’ and are often difficult to distinguish. In ‘Hass’ the “black cold” lesions are commonly small areas of blackened peel surrounding the lenticels – where present, one may find several such small lesions on a single fruit.

In contrast, for greenskin varieties (especially ‘Fuerte’, ‘Edranol’ and ‘Pinkerton’) the “black cold” lesions tend to be larger, irregularly shaped, slightly sunken areas of blacken peel – these lesions do not appear to be obviously associated with specific lenticels, are invariably found at or close to the bole (distal) end of the fruit and it is rare to find more than a single “black cold” lesion on greenskin varieties. During 2005, the growers whose ‘Hass’ fruits were more susceptible to black cold also had a higher incidence of lenticidamage on their Hass. As mentioned under ‘Hass’ Lenticidamage (above), SAAGA’s technical staff are investigating the matter.

5) Grey pulp

The incidence of grey pulp during 2005 was not a problem for ‘Hass’ – 0.88% (Figure 4) – which is considerably lower than that for 2004 (1.69%) and only moderately higher than the lowest incidence of grey pulp seen in ‘Hass’ in recent years (0.4% for 2003).

Note that during the 2001 season, the incidence of ‘Hass’ grey pulp was more than 6%. This illustrates that the internal quality of South African ‘Hass’ has improved considerably over the past few seasons.

The incidence of grey pulp in ‘Fuerte’ during 2005 – 13.4% – is the highest in several years (Figure 5). This is extremely worrying, since technological advances should mean an improvement in fruit quality.

During 2005, the incidence of grey pulp increased markedly during the second half of the season (Figure 6) – a trend which is seen every season (Figure 7). This clearly emphasises once

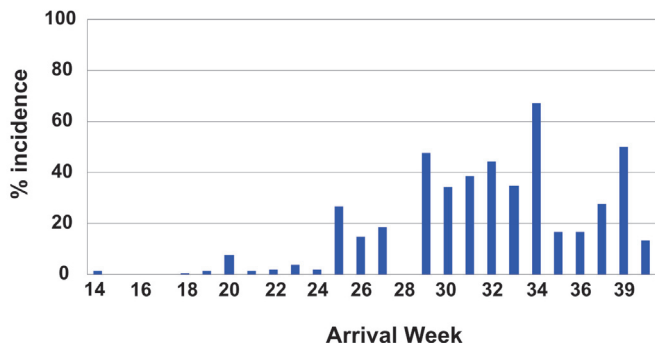


Figure 6. 2005 Industry 'Fuerte' grey pulp per week.

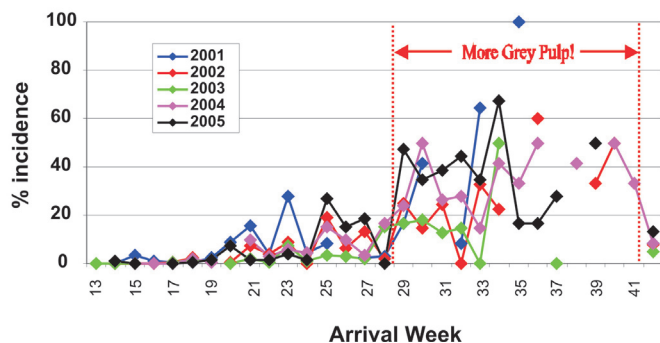


Figure 7. 'Fuerte' ripe grey pulp per week: 2001 to 2005.

again that later season fruits are more susceptible to developing grey pulp, and that it is highly risky to harvest physiologically overmature fruits for export.

COMMENTS ON NEW TECHNOLOGIES

1) 1-MCP

An increasing percentage of South African avocados destined for the European market are being treated with 1-MCP as an alternative to Controlled Atmosphere as a means of delaying in transit ripening of the fruit. During the 2005 season the OTO received no reports of 1-MCP treated fruit arriving in a soft condition.

These positive results contrast sharply with the situation experienced during the 2004 export season (Nelson, 2005) where there were numerous reports of soft deliveries of 1-MCP treated fruit. However, during the 2004 season it was almost exclusively fruit which had been transported to Europe in regular atmosphere "port-hole" containers and had been treated with 1-MCP several days after packing, which were soft upon delivery to Europe.

During 2005 (to the best of the author's knowledge) all 1-MCP treated fruits were transported in either integral containers or in breakbulk holds (see below), and the 1-MCP treatments were applied within the 1-MCP supplier's recommended time after harvest.

There have previously been reports of UK importers experiencing difficulties in trigger-ripening 1-MCP treated avocados. Some encouraging results have been obtained by the ITSC in trials to address these difficulties, such as by subjecting 1-MCP treated fruits to 10 hours under 35°C following 28 days of cold storage at 5°C (Lemmer *et al.*, 2005).

2) Breakbulk and citrus

During 2005, Westfalia continued their trial shipments (first trials during 2004) of 1-MCP treated avocados ('Hass' and 'Ryan' varieties) in breakbulk holds together with Valencia oranges at 4.5°C. The results of these trials were successful (J Bezuidenhout, pers. comm.).

3) AFAM (Applied fresh air management)

This technology is not readily available in South Africa; this is apparently due to resistance from the shipping lines to provide the appropriate containers. In contrast, during 2005 the Chileans conducted successful AFAM+ trial shipments of avocados to Europe. The Kenyans are now also making use of AFAM+, with successful results. (SAAGA Post-harvest Committee meeting minutes, 2005).

4) X-tend bags

During 2005, Koelthof packhouse made extensive use of X-tend technology. Reports had been received that the results were far less favourable during 2005 than had been the case during 2004 and 2003, with such treated fruit developing a high incidence of black lesions on the fruit peel (symptoms looked like black cold injury) and also a high incidence of rots. However, the majority of the X-tend treated fruit was the cultivar Edranol, which is very prone to development of such quality defects.

It is thus difficult to ascertain whether or not the X-tend bags had any influence on the ripe quality of this fruit. During 2003, the OTO was involved in a trial of X-tend treated 'Ryan' avocados, which arrived in a firm condition and ripened without developing significant quality defects, once the bags were opened at room temperature (SAAGA Post-harvest Committee meeting minutes, 2005).

CONCLUSION AND RECOMMENDATIONS

Despite occasional oversupply situations, South Africa enjoyed a relatively trouble-free market during the 2005 export season. This is in part due to the international co-operation programme initiated by SAAGA a few years ago. The European market is becoming increasingly competitive and South African avocado producers need to ensure that their fruits are of superior quality in order to survive and prosper in these markets.

Despite significant progress in improving the quality of South African avocados exported to Europe, our fruits still experience some quality defects which cause marketing difficulties and negatively impact on our clients' perceptions of South African avocado quality.

In particular, the incidence of softer deliveries – while much improved compared with the situation of a few years ago – remains a matter of grave concern. Large volumes of softer fruits can cause severe marketing difficulties, especially in a slow market.

It is considered that the majority of soft deliveries are a result of inadequate or incorrect maintenance of the cold-chain, or the use of incorrect temperature regimes. The Cold Chain Action Group is addressing this problem as a matter of priority.

Lentidamage on 'Hass' remains a problem but it has been observed that many cases of severe lentidamage is often confined to specific growers' fruit, indicating that these problems can be identified and dealt with at source. The same appears to apply for 'Hass' black cold injury. The incidence of black cold injury on 'Fuerte' is considerably improved compared with the situation of a few years ago.

This does, however, need to be carefully monitored, because a slight increase in the incidence of 'Fuerte' black cold injury has been observed since 2003.

The incidence of rots has remained fairly constant, but at acceptable levels, for the past few seasons. The one exception to this generalisation is for 'Fuerte' anthracnose – the incidence of which has decreased steadily since 2001.

Grey pulp remains the most worrying quality disorder of 'Fuerte' – the incidence of grey pulp during 2005 was the highest in several years.

The percentage of grey pulp increased dramatically during the latter half of the season, which is a trend that has been seen

for several successive seasons. Clearly, numerous growers are allowing their 'Fuerte' to hang too late in the season; physiologically overmature fruits are increasingly prone to grey pulp.

1-MCP has been used successfully for a few years now; other techniques such as X-tend bags have also been used. Controlled atmosphere plus refrigeration remains the most commonly used method of delaying in transit ripening of avocados exported to Europe from South Africa.

It is clear that the South African avocado industry possesses the experience and knowledge to produce and export top quality avocados.

The quality of our avocados has improved considerably yet we need to continue to strive towards further improvement if the export industry is to survive in an increasingly competitive market.

It should not be forgotten that our competitors are also making use of technological advances and improving the quality of their fruits. We should not be "caught napping"!

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