

Making the grade – are we still exporting good quality avocados?

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ABSTRACT

Over the past couple of years, there have been increased complaints from the European market place that the quality of South Africa's avocados has deteriorated. In order to determine whether this is indeed the case, this article compares quality data obtained over the past decade and concludes that although some of the European complaints might be due to an evolving and increasingly competitive market, there is indeed a need to improve the quality of South Africa's avocados.

Notable improvements in South African avocado quality since the late 1990s have included a reduction to negligible levels of the number of soft avocados received in Europe (thanks to the use of Controlled Atmosphere and 1-MCP technology). As a result there was a reduction in the percentage of quality defects associated with soft deliveries (Stem-end Rot, Brown Cold Injury, Dusky Cold Injury). Black Cold Injury in 'Fuerte' has decreased, thanks to appropriate temperature management for early season exports, and the incidence of Grey Pulp in later season 'Fuerte' has been reduced as a result of the use of 1-MCP. There has also been an improvement in the incidence of lenticel damage due to careful handling of 'Hass' during picking and packing.

Unfortunately, the overall quality of South Africa's 'Fuerte' was below standard during 2013, primarily because it was a low production year and also because adverse climatic conditions made this thin-skinned cultivar more prone to packing and picking injuries, as well as to Brown Cold Injury peel discolourations. South Africa's 'Pinkertons' have also come in for increased criticism over the past couple of years and the incidence of 'Pinkerton' Black Cold Injury has indeed increased. Some of this poor quality is certainly due to more of the exported 'Pinkertons' having originated from young trees – which tend to be more prone to developing quality defects. Exporting avocados from young 'Pinkerton' trees should be avoided. Growers are advised to follow SAAGA's Pinkerton Best Agricultural Practices Guidelines.

The European avocado market has become extremely competitive and buyers will only accept top-quality fruits. Survival in the global market requires that we are able to deliver such avocados.

INTRODUCTION AND BACKGROUND

This paper critically analyse the quality of South African avocados exported to Europe over the past several years – specifically comparing the fruit quality of South Africa's 2013 avocado exports with the quality for previous seasons. These comparisons are primarily based on analytical data obtained by SAAGA's Overseas Technical Officer (OTO). There was a marked improvement in the quality of South Africa's avocados from the late 1990s until the first years of the 21st century. However, in more recent years South African avocado quality has often been less than ideal, whilst the quality of the avocados from competitor countries (e.g. Peru, Chile) has improved. The European trade has become increasingly discerning, with many buyers preferring to choose avocados originating from countries other than South Africa, whose fruits are perceived as being of better

and more reliable quality. This presumption is often not completely justified, but it illustrates that only the best quality avocados are acceptable.

Since the general perception in Europe is that the quality of South African avocados has deteriorated in recent years, the 2013 quality data are compared with quality data collected by the OTO during previous South African avocado export seasons. Only 'Hass', 'Fuerte' and 'Pinkerton' are discussed in this report. As has been the case for the past several years, no major quality defects were observed for South Africa's 2013 'Ryan' exports. The 2013 export volumes for other export cultivars were too low to allow for meaningful data collection and comparisons with previous seasons.

OTO SAMPLING PROCEDURES

The South African avocado fruit quality data on



which this report is based – for the 2013 avocado export season, but also for previous export seasons – were collected by the OTO between late March and mid- to late October annually. The industry is supplied with quantitative “arrival” and “ripe” quality reports on a weekly basis. Arrival quality was gauged by inspections of pallets on the day of delivery to

Figure 1.
'Fuerte' Black
Cold Injury.

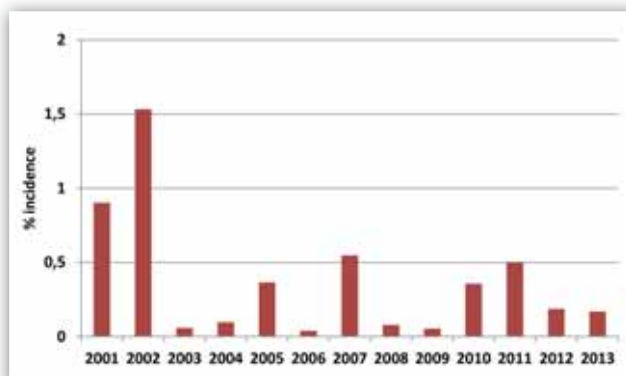


Figure 2. Industry 'Fuerte' Black Cold Injury 2001 to 2013.



Figure 3. 'Fuerte' Brown Cold Injury.



Figure 4. Dusky Cold Injury.

the importers' warehouses; ripe quality data were obtained from fruits (ripened at room temperature) that originated from sample cartons collected during arrival inspections. Arrival inspections were carried out at importers' warehouses in Rungis (France) and in Rotterdam (the Netherlands). The road distances between the various UK centres receiving large volumes of South African avocados, makes it impractical to inspect or sample representative volumes of avocados delivered to that country. Regardless, the OTO interact regularly with UK receiving agents and make a point of meeting with them in person a couple of times a year. The nature of the avocado trade in the United Kingdom – being largely centred on the “pre-ripened” market – means that the type of customer feedback differs considerably from that received from continental Europe. The percentage of avocados that are pre-ripened in continental Europe is increasing from year to year, but communication from the market place regarding customer concerns remains more sporadic and less detailed than is the case for UK customer feedback. Details on sampling and data collection procedures are provided in Nelson *et al.*, 2001.

RESULTS AND DISCUSSION

'Fuerte' quality

Up until the first couple of years of the 21st century, Black Cold Injury (Fig. 1) was considered to be the most problematic of the quality defects affecting South African 'Fuerte'.

There has been a marked improvement in the incidence of Black Cold Injury lesions in 'Fuerte' from 2003 onwards, with the results in 2013 continuing to be good (0.168% incidence, compared with more than 1.5% incidence in 2002) (Fig. 2). This positive result is no doubt due to exporters paying particular attention to the shipping temperatures used for early season 'Fuerte'.

In contrast to the decreased incidence of Black Cold Injury, 2013 saw a marked increase in Brown Cold Injury (Fig. 3) and Dusky Cold Injury (Fig. 4) on 'Fuerte'.

Dusky Cold and Brown Cold symptoms do not usually affect the internal appearance or eating quality of avocados, but such fruits are unsightly and cause marketing difficulties. These quality defects were common on South African avocados up until the late 1990s when Regular Atmosphere “port-hole” shipping containers were used to transport South African avocados by sea to Europe. However, these symptoms largely disappeared once the industry moved to using Controlled Atmosphere integral containers or more recently treating fruits with 1-MCP instead of using Controlled Atmosphere. It is unclear why there was such a marked increase in the incidence of these symptoms during the 2013 export season. It was even reported that the symptoms were seen on fruits that were not exported (i.e. no lengthy cold chain), but were marketed in South Africa. The most widely supported explanation is that there were some un-



usual climatic conditions in South Africa during the 2012/13 growing season, which made some avocados more susceptible to developing Brown Cold Injury / Dusky Cold Injury. It should also be noted that 2013 was a low-production season (an "off-year") for many growers and fruit quality tends to be compromised during low production seasons.

Grey Pulp (a grey discoloration of the mesocarp tissue – Fig. 5) commonly develops in later season 'Fuerte'. The symptom is often exacerbated by shipping temperatures, but that is primarily because lower carrying temperatures are required for more mature fruits in order to lessen the risk of them ripening in transit.

Up until 2007, a marked increase in the incidence of Grey Pulp was observed in South African 'Fuerte' received in Europe from mid-July onwards. An example of this trend (2001 export season) is shown in Figure 6.

From 2008 onwards, there has been far less Grey Pulp in later season South African 'Fuerte' and the 2013 results shown in Figure 7 are typical of what has been seen in recent years.

Figure 8 compares the incidence of Grey Pulp in South African 'Fuerte' from 2001 to 2013.

While the incidence of Grey Pulp remains too high, from 2008 it has been consistently below 10%. The main reason for this improvement is that from 2008 onwards most of the industry players who export late season 'Fuerte' have been using 1-MCP to delay in transit ripening of such fruits. It has long been ascertained that 1-MCP decreases the risk of Grey Pulp in mature avocados; my QC data confirms this.

'Hass' quality

The most common complaint received from Europe regarding the quality of South African 'Hass' is related to Lenticel Damage. With the development of the "ripe and ready" market in the United Kingdom and more recently increasingly in continental Europe, this is becoming less of a problem – since when the peels of 'Hass' avocados darken upon ripening, lenticel damage is masked. Regardless, not all 'Hass' avocados sold in Europe are pre-ripened and Lenticel Damage on hard, green 'Hass' is unsightly – making such fruits difficult to sell. Secondly, even for 'Hass' fruits that are destined to be pre-ripened, receivers control fruit quality upon reception – when fruits are usually still hard and Lenticel Damage thus visible.

Figure 9 compares the incidence of Lenticel Damage on South African 'Hass' from 2001 to 2013. Although between 2008 and 2011 there was an increase following a couple of years of relatively low lenticel damage incidence, in 2012 and 2013 there was relatively little lenticel damage on South African 'Hass' exported to Europe. These results are no doubt partially related to climate – wet and cold conditions at harvest time making 'Hass' avocados more prone to developing lenticel damage if not handled with care. However, in recent years SAAGA has also repeatedly emphasised to growers and pack houses the need to take measures to limit 'Hass' lenticel damage. My ar-



Figure 5. 'Fuerte' Grey Pulp.

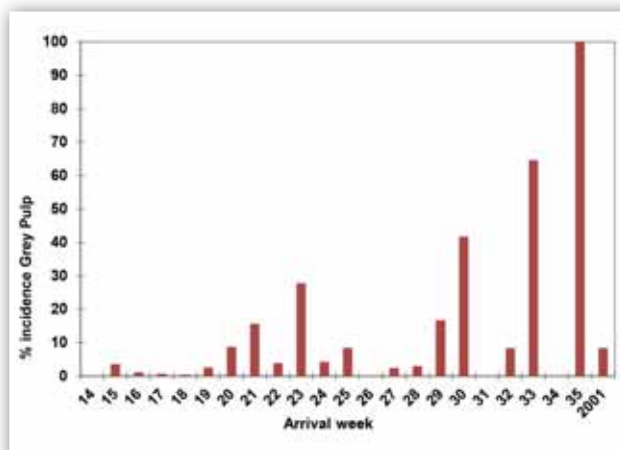


Figure 6. 2001 'Fuerte' Grey Pulp – industry.



Figure 7. 2013 'Fuerte' Grey Pulp – industry.

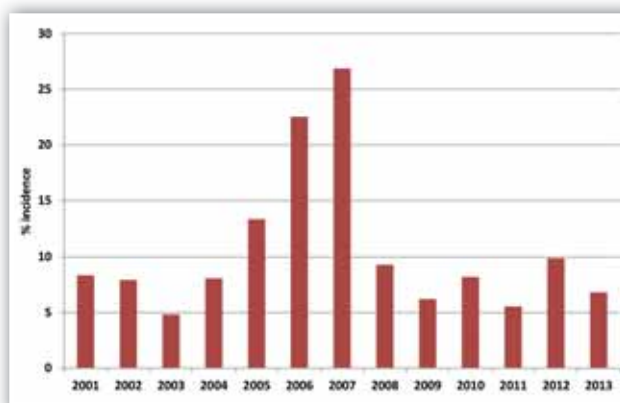


Figure 8. Industry 'Fuerte' Grey Pulp 2001 to 2013.



rival quality data for 2012 and 2013 indicate that this advice has been followed by the majority of growers and pack houses. In a wet season, 'Hass' fruits need to be picked and packed with care, otherwise they are highly likely to develop lentidamage.

The other "quality defect" that has been noted for 'Hass' and also for 'Malumas' in recent years, is that the peels of these cultivars do not always darken cor-

rectly upon ripening (Fig. 10). This phenomenon can cause marketing difficulties in Europe – especially where the selling technique has been to explain to the consumer that these avocados are ready to eat when the fruit peel has darkened. It is hard to quantify this, but it would appear as if there has been an increase in the incidence of this "problem" on South African 'Hass', but also for 'Hass' from other origins such as Peru. European pre-ripeners are increasingly vocal in their complaints about this. It may well be that the phenomenon has always existed to a greater or lesser degree, but that it went largely unnoticed when the overwhelming majority of 'Hass' were sold hard (and thus green).

The cause of this phenomenon is unclear – there is a belief amongst many South African growers that it is only early season (physiologically immature) 'Hass' fruits which do not colour up correctly. It is certainly true that some early season 'Hass' do not colour up correctly. However, my observations have been that this is not always the case – with (for example) early season 'Hass' from a particular grower darkening properly, yet later season 'Hass' from the same grower not darkening. Or, fruits from one grower not darkening yet fruits from a neighbouring farm colouring up correctly (thus not exclusively a climatic phenomenon). The issue of the peels of 'Hass' and 'Maluma' not darkening upon ripening was discussed at length at the annual SAAGA Postharvest Workshop held in Nelspruit in November 2013. The meeting concluded that while it was preferable to have 'Hass' and 'Maluma' that darkened upon ripening, it was not crucial, since the external colour of the fruit does not affect the internal eating quality. It was decided that it was not necessary to allocate SAAGA research funds to studying the phenomenon. The European trade should be informed that fruit peel colour is not the only criterion for determining avocado ripeness and should be encouraged to adapt their marketing strategies accordingly.

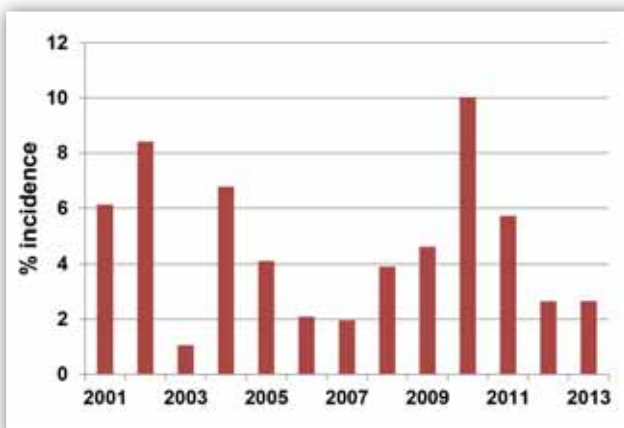


Figure 9. Industry 'Hass' Lenticel Damage 2001 to 2013.



Figure 10. Ripe 'Hass' fruits with green and patchy green / brown peels.



Figure 11. 'Pinkerton' Grey Pulp.

'Pinkerton' quality

The main quality defects associated with 'Pinkerton' are (and have always been) severe internal greying of the fruit pulp (Grey Pulp – Fig. 11) and black blemishes on the fruit peel (Black Cold Injury – Fig. 12).

The severe Grey Pulp found in 'Pinkerton' is mainly due to the multiple fruit-sets common to this cultivar – with it being difficult to distinguish between the first fruit set (over-mature) and the later fruit set(s)



Figure 12. 'Pinkerton' Black Cold Injury.



(less physiologically mature) at time of harvest.

In recent years, the European trade has been complaining that there has been a marked deterioration in the quality of South African 'Pinkerton'. If one looks at the incidence of Grey Pulp in South African 'Pinkerton' since 1999 (Fig. 13), one can see that Grey Pulp incidence has varied from year to year, but has never disappeared completely. It is thus not true that the internal, eating quality of 'Pinkerton' is worse than it was in the first years of the 21st century. It is, however, true that the incidence of Grey Pulp was worse in 2012 and in 2013 than was the case for the 2011 South African 'Pinkerton' export season.

Far more problematic, however, is the increased incidence of Black Cold Injury in 'Pinkerton' in recent years (Fig. 14). During the late 1990s and up until the year 2000, the incidence of 'Pinkerton' Black Cold Injury was extremely high, and there was thereafter a marked improvement for several years. From 2010 onwards, more Black Cold Injury has been observed, so the Europeans are correct in their belief that South African 'Pinkerton' quality has deteriorated in recent years. Following the severe quality defects seen in 'Pinkerton' during the 1990s, there were very few new plantings for several years. However, since 2007 there have been increased plantings and these young trees have started to come into production over the past few years. It is the fruits from young 'Pinkerton' orchards that have the most mediocre quality. Ideally such fruits should not be exported since they have a greater risk of developing quality defects. 'Pinkerton' requires special treatment and care if it is going to be exported successfully. It is suggested that some 'Pinkerton' growers have not been following SAAGA's Pinkerton Best Agricultural Practices Guidelines.

The Subtrop technical staff has been mobilised to inform 'Pinkerton' growers and their pack houses as to the appropriate steps to take to minimise the risk of Black Cold Injury and Grey Pulp on 'Pinkerton'.

SUMMARY AND RECOMMENDATIONS

Although the South African avocado industry has over the past couple of decades made considerable progress in improving the quality of avocados marketed in Europe, in recent years the quality has compared less favourably with that of their competitors' fruits. Unquestionably, the largest improvement in the quality of export avocados was achieved once the industry started using Controlled Atmosphere technology. This had the immediate effect of drastically reducing the percentage of over-ripe, poor quality avocados that were delivered to the European marketplace. More recently, there has been an increased use of 1-MCP instead of CA, which also delays in transit ripening and which has been found to have the beneficial effect of reducing the severity of Grey Pulp in late season avocados.

Insuring that avocados are harvested at the correct maturity levels is probably the most certain way of minimising the risk of avocados developing quality defects. Under-mature avocados are more prone to developing Stem-end Rot, are often bland in taste,

can be difficult or slow to ripen and are more prone to developing black cold injury lesions. In addition, under-mature 'Hass' may be more likely to colour-up poorly.

Avocados should be picked and packed with care in order to minimise injuries such as bruises and scratches which make the fruits unsightly and difficult to sell. 'Hass' avocados are particularly susceptible to developing lenticel damage, especially during cold and wet weather. The SAAGA website provides recommendations on ways to minimise 'Hass' lenticel damage during picking and packing operations.

The quality of South Africa's 'Pinkerton' exports has deteriorated during recent years. A major contributing factor has been the increased percentage of 'Pinkerton' exports originating from young trees. Fruits from young 'Pinkerton' trees are more likely to develop quality defects and should ideally not be exported. In addition, growers are advised to follow SAAGA's Pinkerton Best Agricultural Practices Guidelines and to seek guidance from their Subtrop technical advisors.

It is imperative that the South African avocado industry insures that exports are of good quality. The European market is increasingly competitive and demanding and avocados from a variety of source countries are available year-round. In other words, the European buyer is not obliged to accept substandard fruits. South Africa remains a world leader (but perhaps no longer *the* world leader) in terms of avocado research, production and long-distance sea-freight. We need to be rigorous in the application of

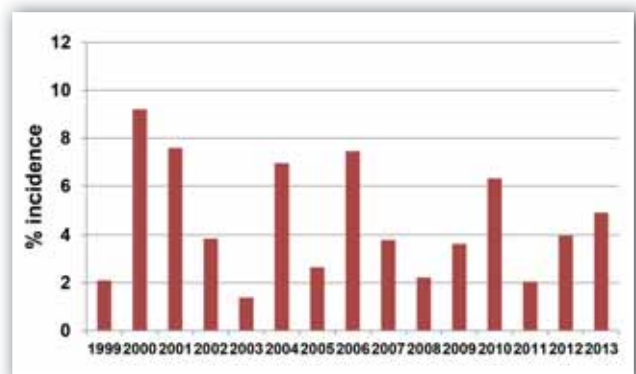


Figure 13. Industry 'Pinkerton' Grey Pulp 1999 to 2013.

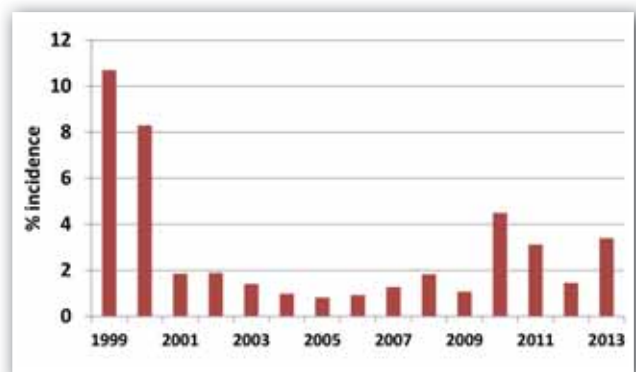


Figure 14. Industry 'Pinkerton' Black Cold Injury 1999 to 2013.



the knowledge and expertise if the long-term future of the avocado industry is to be assured.

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