

Trends in the quality of exported avocados: Report on the quality of fruits exported to Europe during the 2002 export season and comparisons with previous seasons

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ABSTRACT

2002 was a high production season for many South African avocado producers and large volumes of South African avocados were exported to the traditional export markets of the United Kingdom and continental Europe. Prices were good for much of the season and most growers received good returns for their exported avocados. It is noted that the good prices were due more to a well co-ordinated supply of fruits rather than to South African avocados being of significantly better quality than has been the case during previous (and, more particularly, "high-production") seasons.

Nevertheless, fruit quality has an influence upon market prices and it has been encouraging to note that the quality of South African avocados was generally good during 2002. Comparisons are made with avocado quality during previous export seasons. There has been an improvement in fruit quality over the past few seasons – the incidence of deliveries of softer fruits has decreased, as has the incidence of Brown Cold Injury, Dusky Cold Injury and some internal defects. There was a marked improvement in the incidence of Grey Pulp for Pinkerton fruits during 2002. Comparisons are also made of the incidence of various quality defects for the different production regions.

The two most common quality defects during 2002 were Black Cold Injury (especially for Fuerte and Pinkerton) and Grey Pulp (all cultivars); although the incidence of the latter defect was lower during 2002 than was the case during 2001. The incidence of Black Cold is worrying as SAAGA data records show that there has been a trend of increasing Black Cold over the past couple of years. Fruit physiological maturity levels should be rigorously monitored – especially for early season fruits (known to be more susceptible to Black Cold injury) – and appropriate temperature regimes selected. Fruits originating from specific growers have been found to be particularly prone to Black Cold injury, such cases should be investigated in further detail (e.g. fruit maturity at time of harvest, orchard condition, soil nutrient levels). As has been the case during past seasons, later season fruits were more prone to Grey Pulp and fruit maturity levels should be carefully assessed prior to harvest.

The incidence of fungal rots was lower for all cultivars except Pinkerton, where the high incidence caused significant marketing difficulties. The susceptibility of Pinkerton to fungal disease needs to be addressed as a matter of urgency.

INTRODUCTION

The 2002 South African avocado export season will be remembered as one in which high volumes were exported to Europe and yet (in contrast to the two previous high-production years – 1998 and 2000) returns to the grower were good for most of the export season. The better prices received for South African avocados during 2002 are largely attributable to better co-ordination of fruit supply to the traditional markets – whereby oversupply situations were avoided, thus allowing marketers to maintain good prices. There were relatively few reports by importing agents of quality defects during 2002, but such reports always tend to be correlated with the current market situation and, since the market was good for much of 2002, stock tended to move quickly, hence fewer complaints about “poor quality fruits”. It is true that during high-production seasons, fruit quality tends to be good and in general this was the case for South Africa’s 2002 avocados. The quality data results obtained by the SAAGA Overseas Technical Officer (“OTO”) indicate that (despite few complaints from the European agents) there were a number of quality defects during 2002 although the fruit quality was in gen-

eral good. Details of quality defects during the 2002 export season are provided below. Comparisons are made between various production regions and also of the results for 2002 compared with previous seasons, so that it can be determined whether the South African avocado industry is now exporting better quality fruits than was the case a few years ago. Results are presented according to quality defects which can cause marketing difficulties, comparing the main export cultivars’ susceptibility to each defect. Only Fuerte, Hass and Pinkerton are discussed in any detail, since insufficient data was obtained for the other export cultivars to allow for meaningful conclusions to be drawn.

OTO SAMPLING PROCEDURES

The OTO was based in Rungis, France between late March and mid-October 2002, his primary role being to monitor the quality of South African avocados both upon arrival 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 fruits in sample cartons col-

lected during ripe inspections. The majority of arrival inspections were carried out at Rungis; more rarely warehouses in Benelux and England were venues for arrival inspections. Details on sampling procedures are provided in Nelson *et al.* 2001.

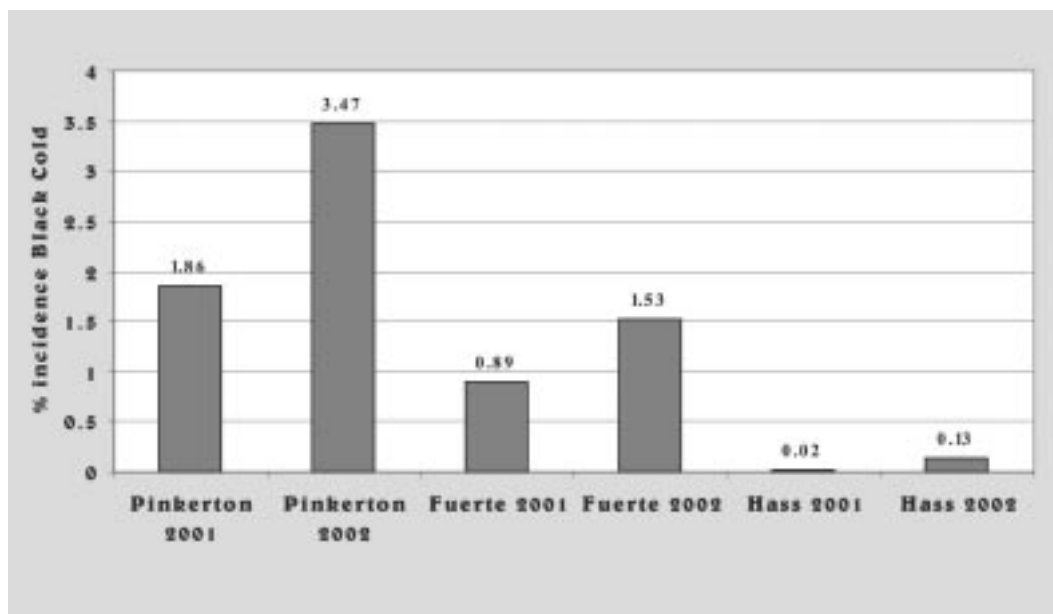


Figure 1. Black Cold 2001 versus 2002.

Post-season data analyses concentrated

on the following:

- 1) Percentage incidence at delivery of breaking to soft fruits.
- 2) Percentage incidence at delivery of external chilling injury ("Black Cold").
- 3) Percentage incidence of Anthracnose and / or Stem-end Rot (ripened sample fruits).
- 4) Percentage incidence of internal disorders (e.g. "Grey Pulp") for ripened sample fruits.
- 5) Regional and seasonal differences in percentage incidence of quality defects.

BLACK COLD INJURY

As is shown in Figure 1, the incidence of Black Cold injury was higher during 2002 than was the case for 2001. This result is unusual, since the incidence of Black Cold tends to be lower during a high production season (such as 2002) than during a lower production season (such as 2001). Pinkerton was the cultivar which showed the highest incidence of Black Cold injury, followed by Fuerte and Hass, but for all three cultivars the percentage incidence was higher during 2002 than for 2001.

Figure 2 compares the incidence of Black

Cold for Fuerte since 1997. It can be seen that in 2000 (which was a high production year) the incidence of Black Cold was lower than was the case for either 1999 or 2001 (both low production years); in contrast for 2002 the incidence of Black Cold was higher than for the two preceding seasons.

Black Cold symptoms are often triggered by low storage temperatures, especially early in the season when the fruit is less physiologically mature. In some cases, Black Cold in-

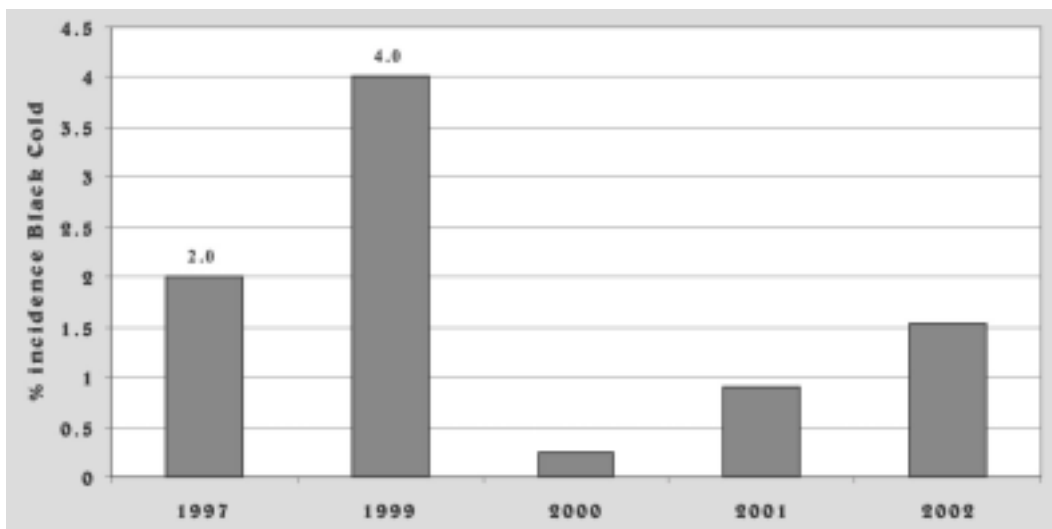


Figure 2. Black Cold Fuerte per season.

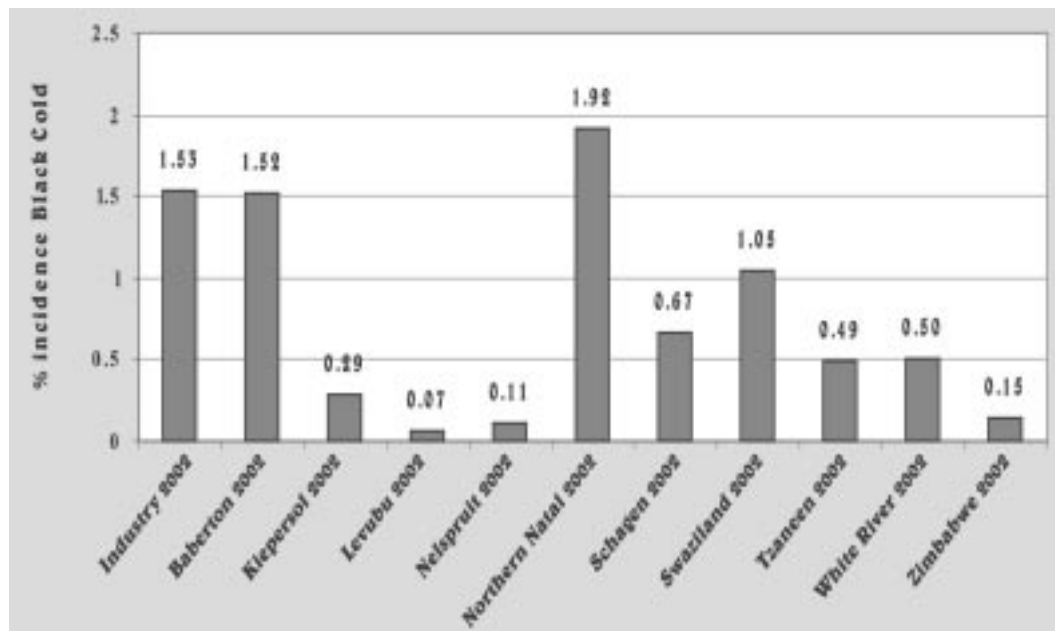


Figure 3. Black Cold 2001 versus 2002.

cidence is found to be higher in the upper layers of cartons in pallets stacks – this would indicate that cold air from either a lorry en route to the harbour from a packhouse, or cold air from a cooling unit in a packhouse adversely affected these fruits (in both cases the cold air tends to be delivered to the upper layers of pallets, hence fruits in the upper cartons would be more exposed to cold air and hence more prone to chilling injury). It is important to note that Black Cold injured fruits are not always confined to or more prevalent in upper carton layers. In numerous instances the OTO observed fruits with

Black Cold injury throughout pallet stacks. As was observed during the 2001 export season (Nelson *et al.*, 2002), it was again noted during 2002 that specific growers' fruits were more susceptible to Black Cold injury. SAAGA technical staff observed that some of these growers were also growers whose fruits had been identified as being prone to Black Cold injury during the 2001 export season (pers. comm.). This indicates that orchard conditions may influence the susceptibility of avocados to Black Cold Injury.

Figure 3 compares the incidence of Black Cold in Fuerte fruits per region during the 2002 export season.

It is clear from the graph that there are differences in the percentage incidence of Black Cold for the various regions. However, it should be noted when interpreting these results that the sample size for some of the production regions was quite small (this

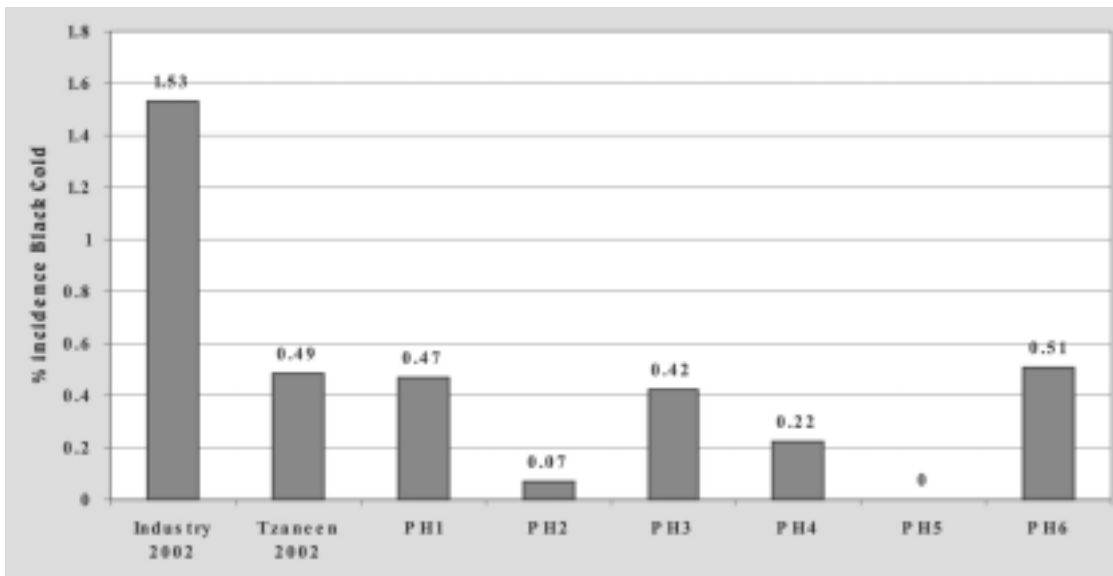


Figure 4. Tzaneen Packhouses Black Cold Fuerte.

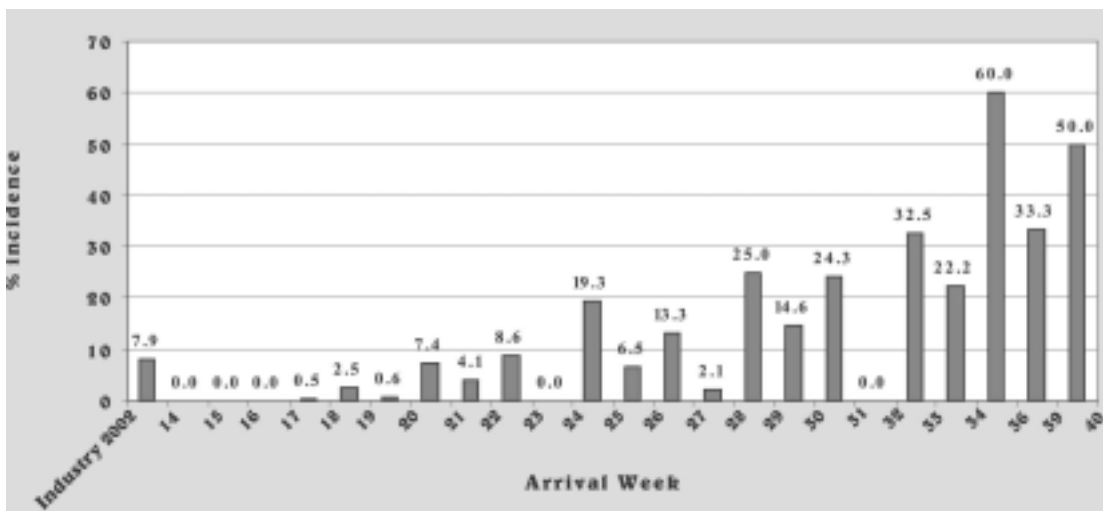


Figure 5. 2002 Fuerte Grey Pulp Industry.

was specifically the case for Kiepersol, Nelspruit, Schagen, White River and Zimbabwe) and as such the averages for these regions may not be truly representative of general fruit quality. The regions where few pallets were inspected thus also have little influence on the percentage incidence of Black Cold for the industry as a whole – it can be seen that only two areas (Barberton and Northern Natal) had an incidence of Black Cold equal to or higher than the industry average; sec-

ondly it was noted that for Northern Natal Fuerte it was mainly fruits from one specific grower that were prone to Black Cold (this same grower's fruit has also had a high incidence of Black Cold injury during previous seasons). Within different production regions fruit from specific packhouses was seemingly more prone to Black Cold Injury (an example of this is shown in Figure 4), but these problems could also often be traced back to specific growers.

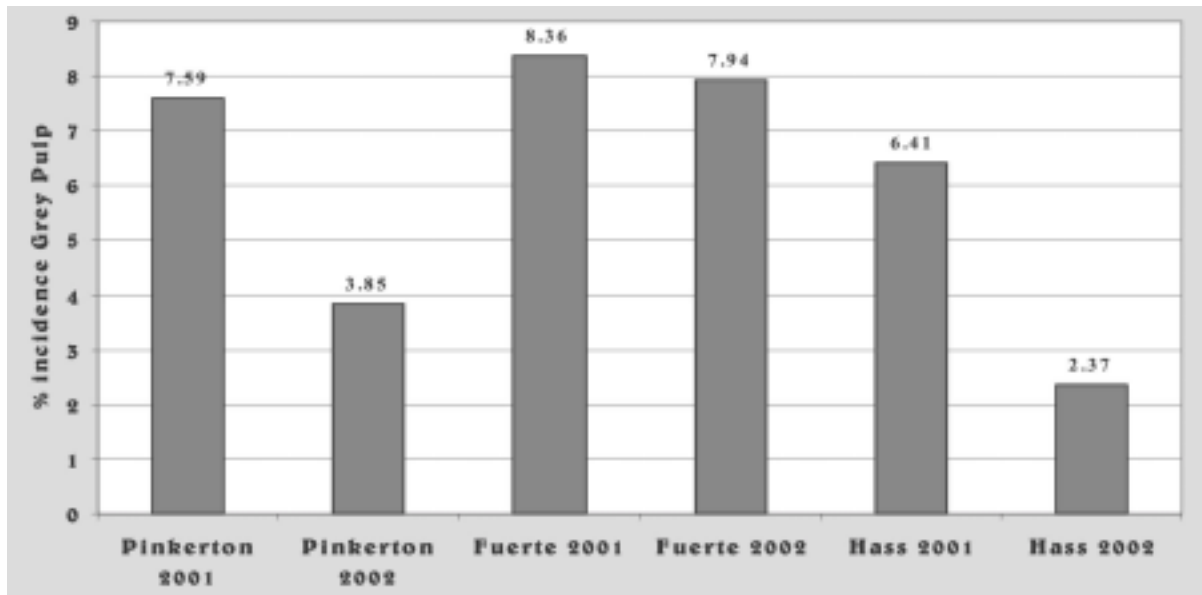


Figure 6. Grey Pulp 2001 versus 2002.

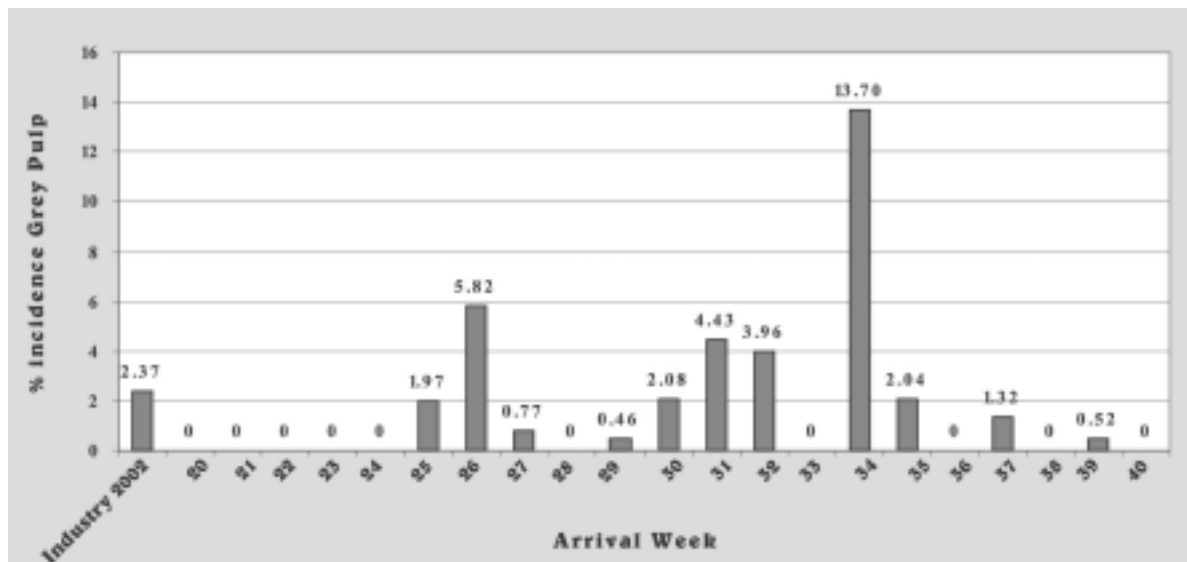


Figure 7. Ripe Hass Grey Pulp Industry – per week.

GREY PULP

The incidence of internal Grey Pulp tends to be more common in later season fruits, i.e. more physiologically mature fruits are more prone to Grey Pulp. This trend was clearly seen during 2002 in Fuerte (Figure 5) and indicates that fruit maturity levels need to be carefully monitored as the season progresses in order to avoid increased incidences of Grey Pulp.

The incidence of soft arrivals was quite rare during 2002. Nevertheless, when fruits arrive in a breaking to softer condition it is more common to find Grey Pulp in such fruits than

in fruits which arrive in a hard condition. The incidence of Grey Pulp in Hass, Fuerte and Pinkerton was lower during 2002 than during 2001 (Figure 6).

Specifically, a marked improvement in the incidence of Grey Pulp was noted for Hass and Pinkerton during 2002 compared with 2001. It was expected that the internal quality of fruits would be better during a high production season such as 2002. Additionally, since it is known that more physiologically mature avocados are more prone to Grey Pulp, and that many growers have been following SAAGA's recommendations regarding

maximum harvest maturity for export, it is apparent that this practice has resulted in better quality Hass and Pinkerton fruits being delivered to the European market during 2002. In contrast, the incidence of Grey Pulp in Fuerte was only marginally better than was the case for 2001 and in both seasons Fuerte Grey Pulp incidence was considerably higher than for either Hass or Pinkerton. This would indicate that in 2002 many Fuerte fruits were at an advanced stage of physiological maturity when

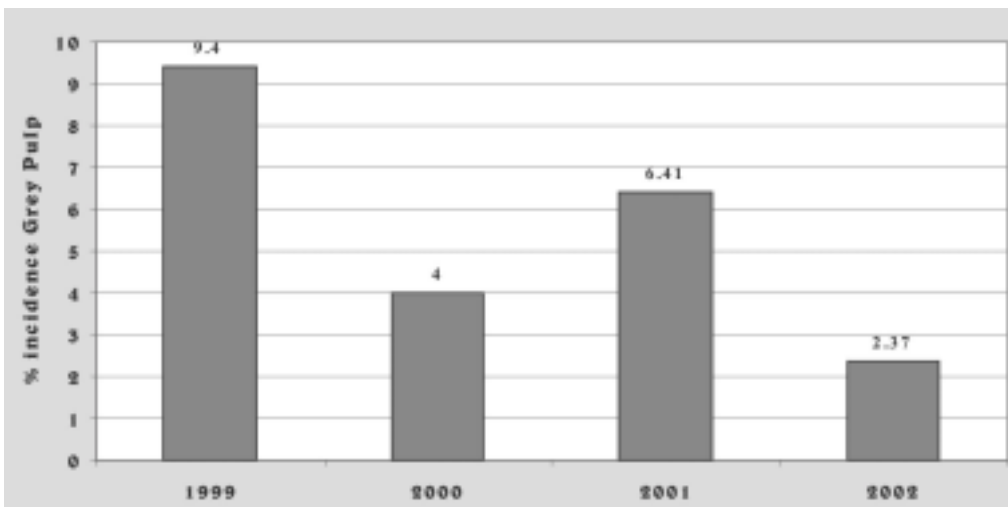


Figure 8. Hass Grey Pulp 1999 – 2002.

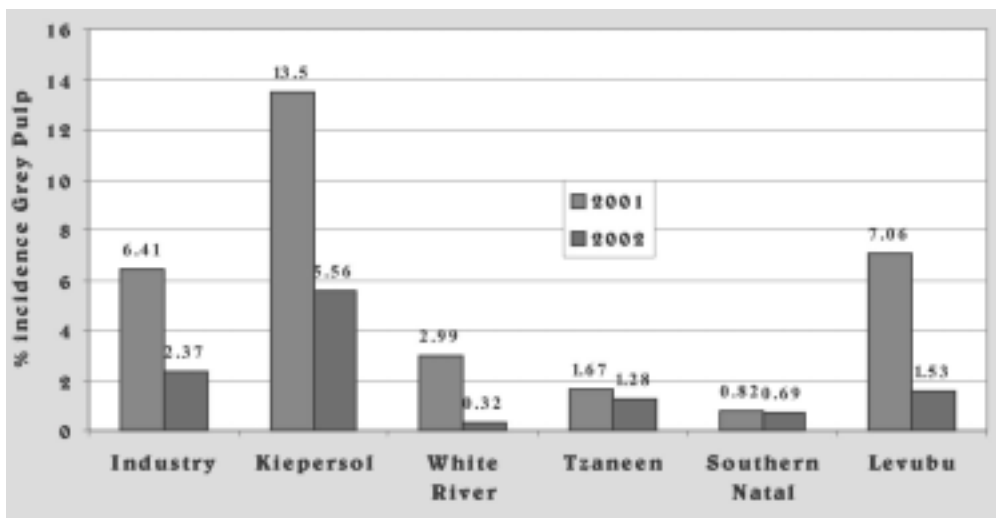


Figure 9. Hass Grey Pulp per region 2001 versus 2002.

harvested, and were hence prone to Grey Pulp. It will be recalled that Pinkerton fruits have in the past been extremely prone to Grey Pulp (e.g. Leclercq 1989, Nelson *et al.*, 2001, 2002); the 2002 results for Pinkerton are thus very encouraging. This statement should not be interpreted as meaning that the “Pinkerton problem” has been fully resolved. During 2002 there were again a number of reports of Pinkerton fruits which “cut black”

(i.e. had severe Grey Pulp); nevertheless the overall quality of Pinkerton was better during 2002 than during previous seasons. The Grey Pulp seen in Fuerte during 2002 was rarely as severe as the more extreme cases of Grey Pulp seen in Pinkerton (or, to a lesser extent, in Hass). The Fuerte Grey Pulp was, however, severe enough to be noticeable to the untrained eye and thus severe enough to be commercially unacceptable, especially in

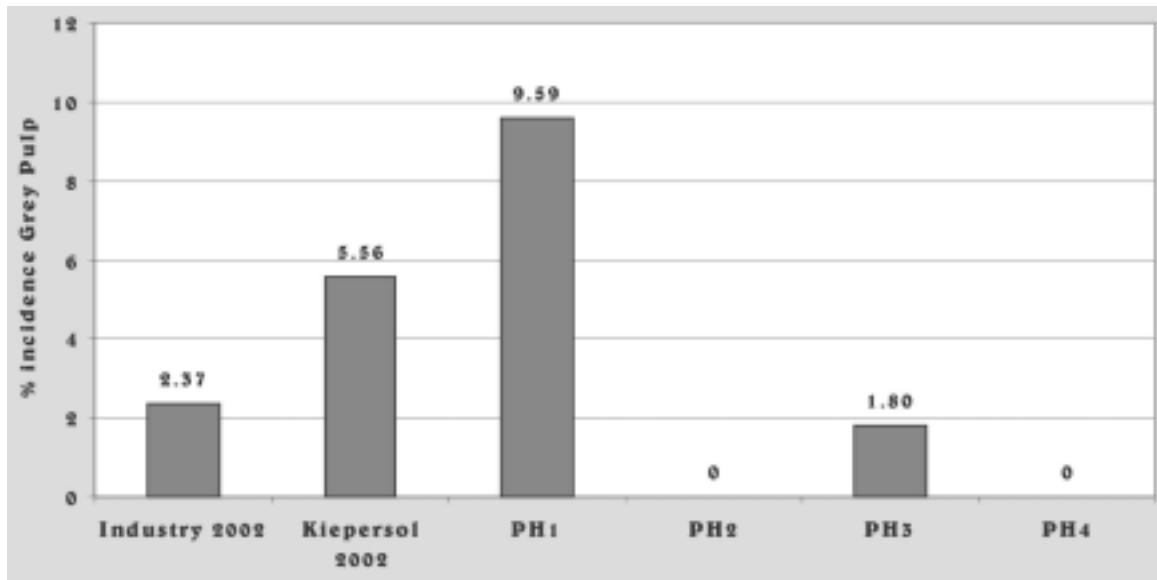


Figure 10. Kiepersol packhouses Grey Pulp Hass.

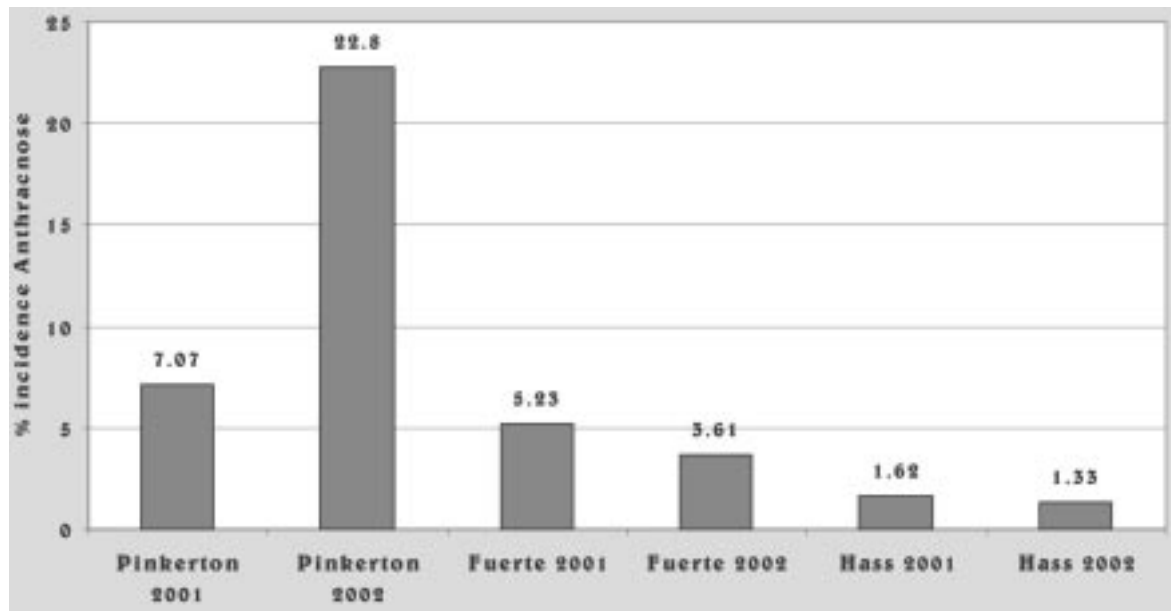


Figure 11. Anthracnose 2001 versus 2002.

an oversupplied market.

While the trend for Hass Grey Pulp was less clear during 2002 than was the case for Fuerte, it can be seen from Figure 7 that Hass fruits had a higher incidence of Grey Pulp during the latter part of the season. Again, this indicates that fruit physiological maturity has an influence on Grey Pulp incidence.

It was encouraging to note (Figure 8) that there has been a trend of decreasing incidence of Grey Pulp in Hass over the past four seasons.

Hass Grey Pulp for the various production regions were compared for the 2001 and 2002

seasons (Figure 9).

For all regions, the incidence of Grey Pulp was lower in 2002 than in 2001 although regional differences were similar for the two seasons. It was also observed that within individual production regions there were differences in Grey Pulp incidence according to packhouse of origin. An example hereof is provided in Figure 10. In some cases it appeared that it was fruits from specific growers that were more prone to Grey Pulp, rather than fruits from specific packhouses *per se*.

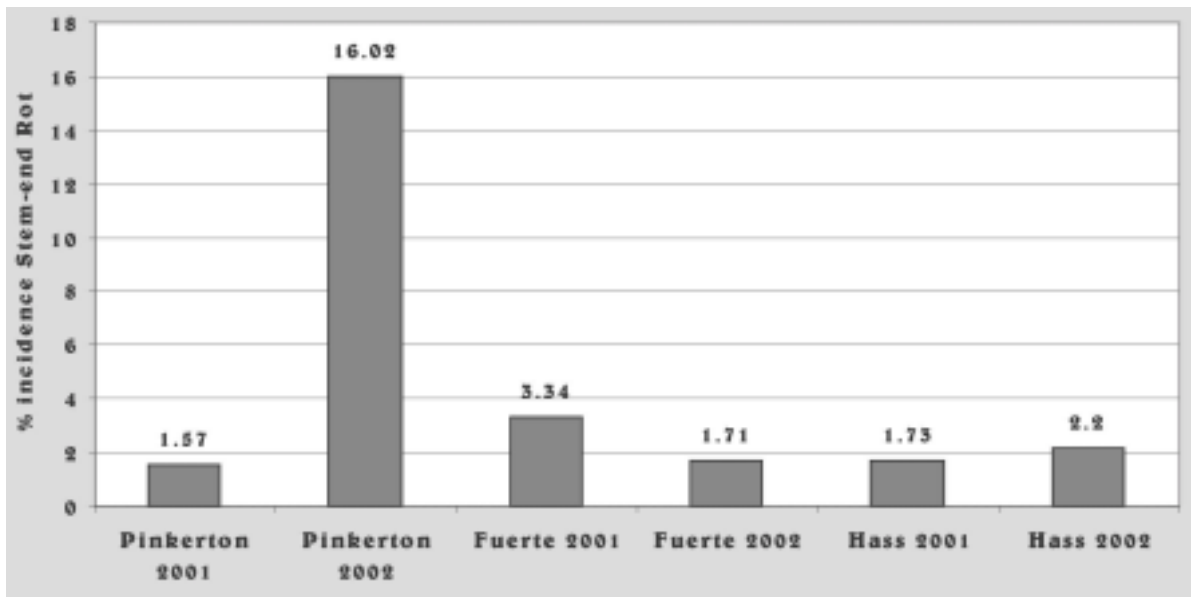


Figure 12. Stem-end Rot 2001 – 2002.

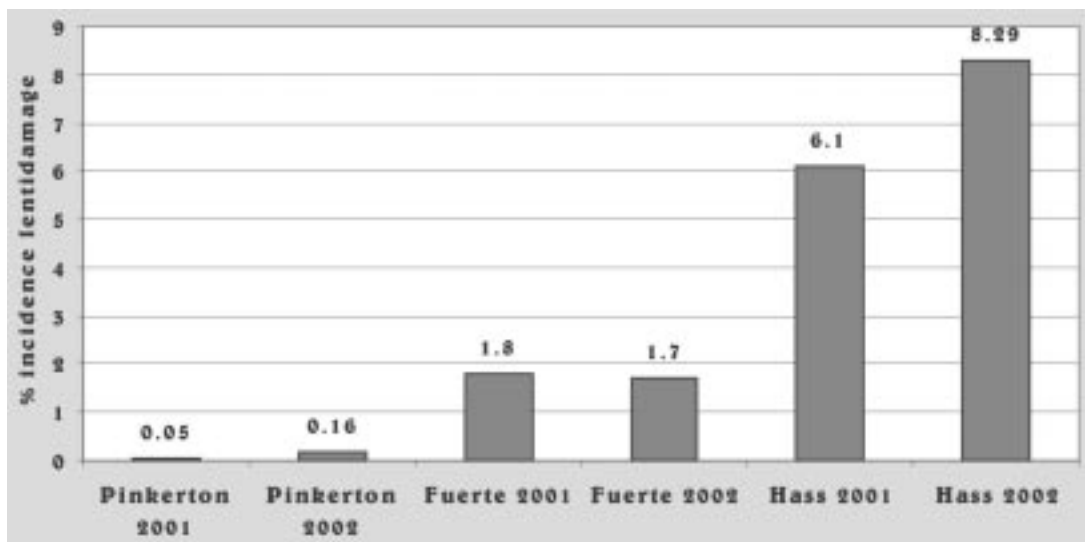


Figure 13. Lentidamage 2001 versus 2002.

DISEASES

There were fewer cases of rots in Fuerte and Hass during 2002 than during 2001. In contrast, there were more cases of rots for Pinkerton during 2002 than during 2001 (Figures 11 and 12).

A possible explanation for the high incidence of rots in Pinkerton is that the majority of the fruits sampled by the OTO during 2002 originated from a region (Kiepersol) which experienced severe hail storms in the months immediately preceding the 2002 harvest. According to Dr Frans Kruger (pers. comm.), hail damaged fruits are often more prone to disease due to the hail-caused injuries being sites for pathogen infection.

LENTIDAMAGE

Lentidamage was only a significant quality defect on Hass fruits during 2002 (Figure 13), but this did not result in severe marketing difficulties since the European market was undersupplied with Hass fruits during the major part of the South African Hass export season and demand was good. There was a higher incidence of Hass lentidamage during 2002 than in 2001.

BROWN COLD INJURY AND DUSKY COLD INJURY

Brown Cold injury and Dusky Cold injury were not significant quality defects in any exported cultivar during the 2002 season, and have in fact not been significant quality problems for a number of years. Up until the mid-1990s, Brown Cold injury was regarded as being one of the most severe quality problems facing the South African avocado industry (e.g. Leclercq, 1989). Cases of Brown Cold injury have diminished markedly since the industry started exporting the majority of avocados under controlled atmosphere ("CA") conditions. Invariably, CA fruits are delivered in a hard condition. In contrast, prior to the advent of CA, fruits were often breaking to soft upon delivery – it was usually these fruits which displayed Brown Cold injury and / or

Dusky Cold injury. This is significant and important progress which the industry has made towards improving the quality of avocados exported to Europe. Apart from the now negligible percentage of fruits with Brown Cold / Dusky Cold (i.e. unmarketable fruits), deliveries of firm fruits has allowed European marketing agents considerably more lee-way in their marketing programmes (for example, being able to store fruits for longer prior to sale if this would allow eventual sale in a stronger market).

GENERAL COMMENTS ON OTHER CULTIVARS

Too few fruits of other cultivars were inspected by the OTO during 2002 to allow for meaningful data analyses. However the following observations were made:

Ryan: The incidence of *Cercospora* infection was often quite high on Ryan fruits, although this rarely resulted in marketing difficulties. End of season Ryan fruits were quite prone to Grey Pulp infection, indicating that the maturity levels of Ryan fruits likewise need to be carefully monitored.

Edranol: Some Edranol fruits were observed to have Black Cold injury and Grey Pulp. Seemingly, Edranol fruits were often also quite prone to fungal disease. It is unknown whether the quality defects were related to specific growers' fruits, or whether this was a more general phenomenon.

CONCLUSIONS AND RECOMMENDATIONS

A general improvement in the quality of South African avocados exported to Europe has been noted over the past few seasons. In particular, the industry has made significant strides forward in reducing the incidence of riper fruits being delivered to the European markets. It is likely that improvements in the cold chain and general utilisation of controlled atmosphere technology has contributed to the overwhelming majority of South African avocados reaching the overseas markets in a hard condition. Coupled

to this, there has been a decrease in the incidence of quality defects commonly associated with avocados which ripen in transit and / or under lengthy refrigeration – namely Dusky Cold and Brown Cold injury, fungal disease (anthracnose and stem-end rot) and internal disorders such as Grey Pulp and Pulp Spot. An improvement in the quality of Pinkerton fruits has been noted – especially a lower incidence of Grey Pulp following stricter monitoring of fruit maturity levels prior to harvest.

Despite these successes, a number of quality defects remain, and the industry needs to work together to address and overcome these problems:

- Fuerte and Pinkerton fruits remain especially prone to Black Cold injury. Postharvest cooling and temperature regimes can certainly influence the susceptibility of fruits to Black Cold, but research has also shown that orchard nutrition plays an important role. Growers should interact with SAAGA technical staff in this regard.
- Later season fruits of all cultivars are more prone to Grey Pulp (senescence) and growers should carefully monitor the fruit maturity levels of later season fruits prior to harvest. Physiologically over-mature fruits ripen more quickly, have a shorter shelflife, and are more prone to developing Grey Pulp upon ripening.
- Pinkerton fruits are especially prone to fungal rots. Rigorous application of spraying programmes and possibly postharvest fungicidal treatments should lessen the incidence of rot development.

A particular success worth noting during the 2002 export season, is the orderly and disciplined way in which the industry regulated the supply of avocados to the traditional European markets, in co-operation with other supplying countries. This managed supply ensured a regular supply of avocados to the market and during much of the 2002 season. European market prices were high, translating into good returns to growers. Similar co-operation on a technical level will surely re-

sult in a further improvement of avocado fruit quality, contributing to better market prices and ensuring the long-term survival of the South African avocado export industry.

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