Strawman for a modified Taste System for 2021

Taste Working Group:

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Summary
This paper makes a series of recommendations to modify aspects of the Zespri Taste Programme for the 2021 season based on the recommendations of a Taste Working Group and is currently being considered by the IAC Taste sub-committee.

The objective of these changes is to balance maintaining Zespri's in-market reputation for taste, a fundamental driver of OGRs, with the need to:

1. Encourage growers to harvest when fruit is considered to have sufficient dry matter (not chase dry matter that may have little perceived added value).
2. Encourage growers to harvest fruit before it becomes too mature and creates diminishing utility for the postharvest sector and Zespri.
3. Bring the harvest forward to utilise packing capacity of the industry without harvesting too much fruit in an undesirable condition.

Changes are proposed in the following areas:

- The introduction of a TZG 'cap' and modifications to the TZG curve
- The introduction of a capital utilisation incentive
- The introduction of a storage utility incentive
- The introduction of a stop-testing rule, based on a minimum pressure metric

The following elements of the Zespri Taste Programme will stay the same:

- Minimum Taste Standard
- Retain the concept of TZG
- Retain the concept of a Maximum Taste Payment (although indirectly modified as a result of proposed changes)

Contextual requirements for 2021

- In field sampling. Any alternative considerations such as in-packhouse sampling would require significant trialling and may also require capital investment to ensure independence.
- Independence of sampling for any tests with distribution of money from the national pool *(IAC Sub-Group requested to provide definition of "independence")*
- Blind lab testing (where the lab is not independent)
- Implement an education programme (via grower roadshow, supply entities, other) for the new system to socialise the concepts, explain the options that could be considered in Low and High DM years, to reiterate the sharpness of the Minimum Taste Standard etc.

The Taste Working Group have developed 9 principles that are presented in this paper. It was a strong imperative of the group that preservation of the drive for delivery of great tasting fruit was maintained. In addition, there was a desire to reduce impediments to harvest and optimise industry resources to test, harvest and pack the crop. It is acknowledged that any system that will bring forward harvest in a season may reduce overall dry matter for the entire crop, but that this can be balanced with approaches that in totality, deliver greater value to the industry (such as through utilising packing capacity and reduced fruit loss).

Principle 1: MTS – AGREED BY GROUP

The minimum taste standard (MTS) will not change:

	HAYWARD (HW CK)	HAYWARD ORGANIC (HW OB)	GREEN 14 (HE)	GOLD 3 (GA)
MTS	15.5% Dry Matter Threshold	15.5% Dry Matter Threshold	16.8% Average Dry Matter	16.6% Dry Matter Threshold (size 39 only) 16.1% Dry Matter Threshold (all other sizes)

Principle 2: TZG Concept – AGREED BY GROUP

Retain the concept of TZG as it is now well established.

Principle 3: Base Taste Incentive – AGREED BY GROUP

Retain the base incentive for achieving the MTS (currently approximately $2.70 for Gold3 and $1.26 for Hayward).

Principle 4: TZG CAP for Gold3 – 2 OPTIONS

The objective of a TZG cap is to modify the current taste incentive programme to encourage growers to optimise Dry Matter in balance with harvest decisions. In a high-Dry Matter year, growers tend to continue testing to try to achieve higher TZGs while the fruit becomes over mature impacting storage performance and not fully utilising packing capacity. The objective of the TZG cap is to encourage growers to stop testing while the fruit has good storage potential. It is important to note that this concept has little impact in a low Dry Matter year as many growers are focused on achieving the Minimum Taste Standard.

There is a split view on where that cap should be set. The majority view of the working group being moving the cap down and setting it at an average DM of 18.5% (TZG 0.78) from the current average DM of 19.5% (TZG 1.00). The Zespri preferred option is moving the cap down to an average DM of 19.0% (TZG 0.86) in year 1, gaining confidence through consumer insight work and market out-turn before moving to 18.5% in year 2 should there be confidence the change will not negatively impact the market offering.

OPTION 1: Majority on Working Group preferred option

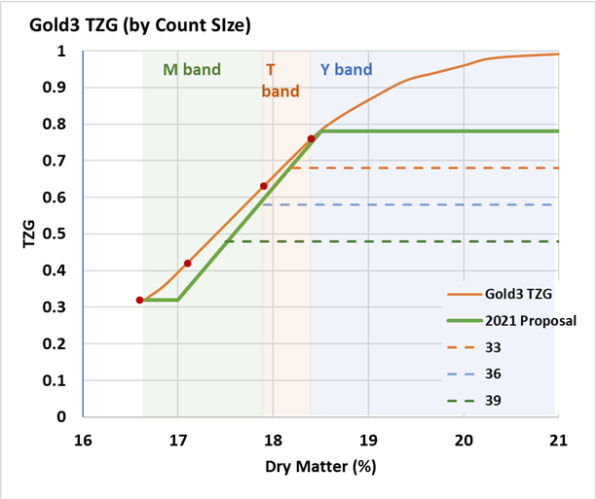
There are 4 components to the proposed changes to the TZG scale:

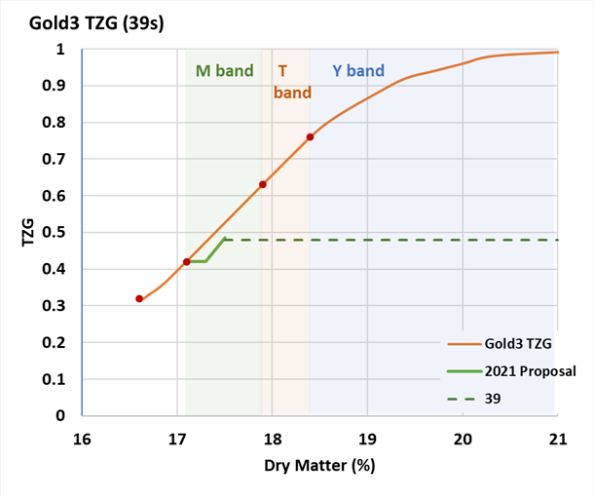
- Cap the TZG at 18.5% DM (TZG 0.78)
- Pay only the Base Taste Incentive up until a count size average reaches 17.0%
- Use a straight-line relationship between the average 17.0% and 18.5% DM
- Recognise that, in general, small sizes of Gold3 do not achieve high DM and so apply a sliding scale for small Gold3 count sizes with a lower cap for each count size.

The Cap for Count sizes 30 and larger is made when TZG ≥ 0.78. For Count size 33, the Cap is set when TZG ≥ 0.68. For Count size 36, the Cap is set when TZG ≥ 0.58. For Count size 39, the Cap is set when TZG ≥ 0.48. An alternative is that the Count 39 cap is set at the same level as that for Count 36.

The graphic below shows that the maximum taste for Count 30 and above is in the current 'Y' band, maximum taste for Counts 33 and 36 are in the 'T' band, and the maximum taste for

Count 39 is in the mid-point of the 'M' band. Note also that the MTS for Gold3 Count 39 is higher at TZG = 0.42 (right hand graph).





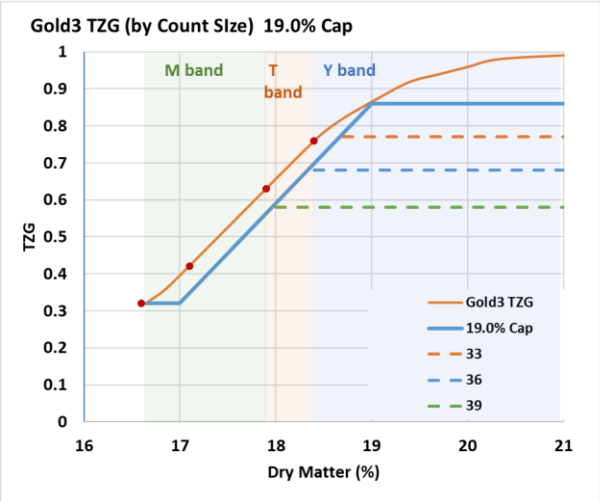
OPTION 2: Zespri favoured option

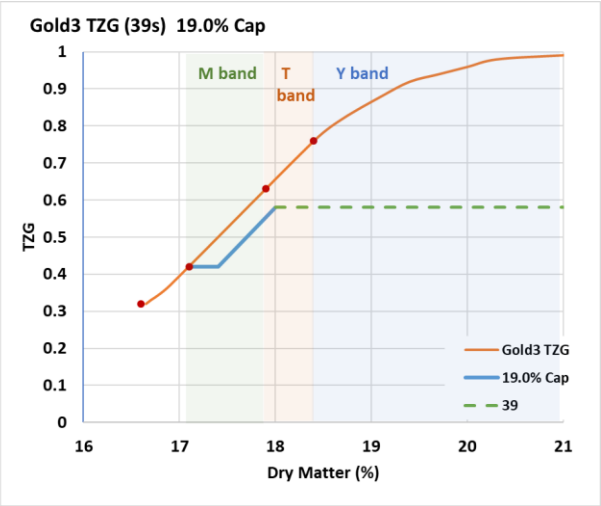
There are 4 components to the proposed changes to the TZG scale:

- Cap the TZG at 19% DM (TZG 0.86)
- Pay only the Base Taste Incentive up until a count size average reaches 17.0%
- Use a straight-line relationship between the average 17.0% and 19% DM
- Recognise that, in general, small sizes of Gold3 do not achieve high DM and so apply a sliding scale for small Gold3 count sizes with a lower cap for each count size.

The Cap for Count sizes 30 and larger is made when TZG ≥ 0.86. For Count size 33, the Cap is set when TZG ≥ 0.78. For Count size 36, the Cap is set when TZG ≥ 0.68. For Count size 39, the Cap is set when TZG ≥ 0.58.

The graphic below shows that the maximum taste for Count 36 and above is in the current 'Y' band, and the maximum taste for Count 39 is in the 'T' band. Note also that the MTS for Gold3 Count 39 is higher at TZG = 0.42.





Implementation of Option 2 will give Zespri time to gather further sensory and likely purchase behaviour data to support (or otherwise) any further reduction in the TZG cap. Zespri is proposing a two-stage process:

- Move to 19.0% in 2021

- Conduct relevant consumer response research to establish value of higher taste fruit
- Possible move to 18.5% in 2022 or 2023 contingent on results of in-market research

The pro's and con's of the general principle, highlighting the differences between the options, are listed below:

Pro's:
- In a High Dry Matter year, this principle is expected to encourage fruit to be harvested in line with storability and reduce repeat testing (Option 1 will have more influence than Option 2 – *see Appendix 1.0*).
- In a High Dry Matter year, this principle should see harvest brought forward to some degree (Option 1 will have more influence than Option 2 – *see Appendix 1.0*).

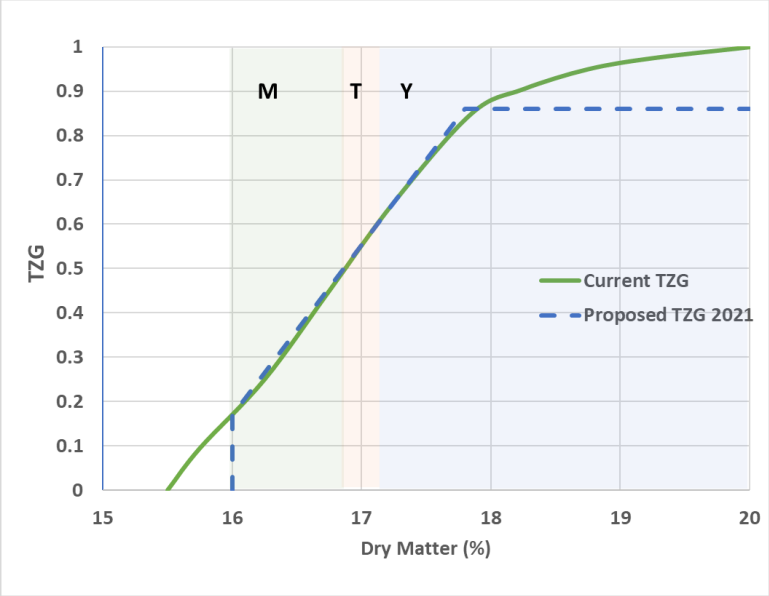
Con's:
- In a Low Dry Matter year, this system, and both options, will have little impact.
- There is a risk that some growers see this as a 'dumbing down' of taste and they may respond thinking that loading up vines with higher volume is an option. Education will be required to remind them that failure to make the MTS results in fruit being dumped.
- Growers will not get paid a higher TZG above the Cap even if their Dry Matter is high.
- Less reward, but no less risk.
- Without a change to growing practices, the bringing forward of harvest will see an overall lower average taste.
- Added complexity with the introduction of TZG caps by size.

Note that implementation of either of these options indirectly reduces Maximum Taste Payment.

The current concept of the grower being paid on the best taste result is retained.

Principle 5: Cap TZG at 17.8% Dry Matter (TZG of ~0.86) for Hayward also – AGREED BY GROUP

The capping of taste for the Hayward sample average at 17.8% will have similar impacts as that for Gold3 (though with far less complexity).



Principle 6: Introduction of a capacity utilisation incentive for Gold3

The working group felt that something was needed in ISO weeks 15 and 16 that would enable the smooth transition for post harvest between Kiwistart and the Main Season, utilising packing facilities that are typically idle at this time. It is suggested that there is a payment made in Weeks 15 and 16 that encourages Gold3 fruit to be harvested (quantum of at least ~$0.65) and that Weeks 15 and 16 would not be eligible for the storage utility incentive.

Principle 7: Payment of a storage utility incentive for Gold3 – 2 OPTIONS

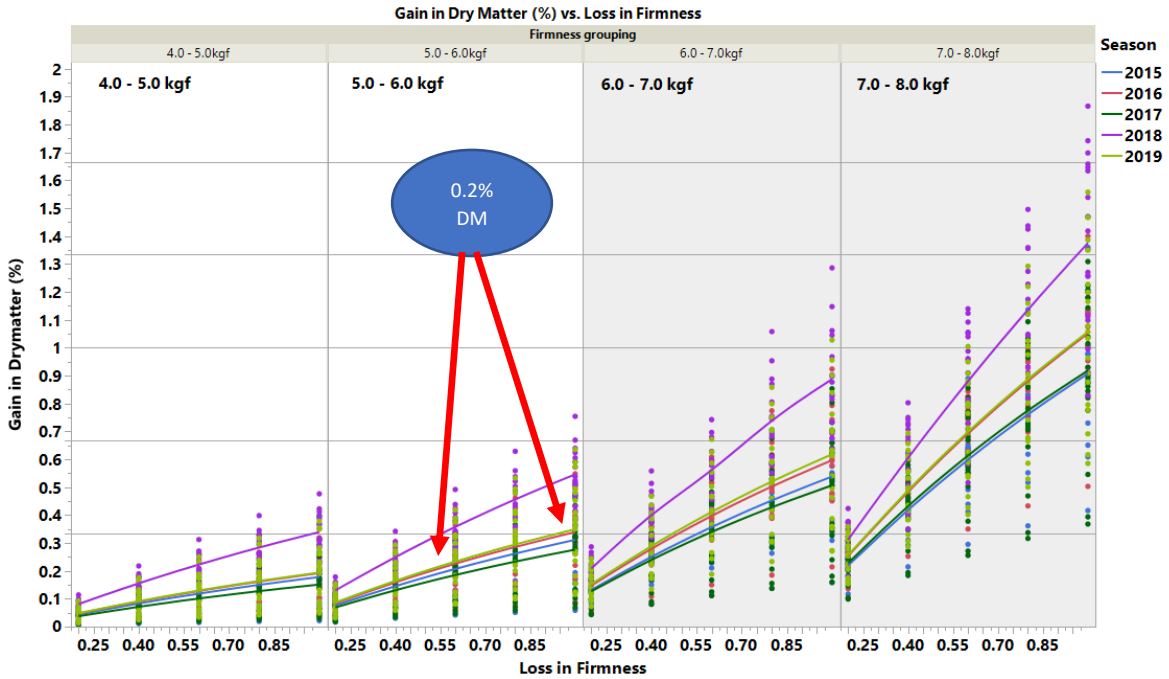
This measure is based on the observation that firmness is a good indicator of fruit storability potential and that incentivising growers to harvest at more optimum storage will improve the overall quality of the crop and better smooth the flow of fruit into inventory and maximise the value of the crop.

This proposal was the only approach considered which was able to achieve the earlier harvesting of fruit in a low Dry Matter year.

OPTION 1:

The concept of a 'storage utility' incentive for Main Season fruit of ~$0.65 per TE is proposed for a final maturity clearance average pressure of ≥ 6.0kgf decreasing linearly to $0.00 per TE as average pressure declines to ≤5.5kgf *(see discussion in Appendix 4.0)*.

This proposal is based on the premise that firmness is a good indicator of fruit storability potential. It is intended that this incentive would only apply post-Week 16 (noting the proposal for incentives in Week 15/16 earlier in this document). The data presented suggests that fruit with average pressure below 6.0kgf has a reduction storage utility. To add to the picture, on average after 6.0kgf, a 0.5 kgf reduction in pressure on the vine will result in a small increase in Dry Matter of 0.2%. The basis for the recommendation of $0.65 per TE is that the value of the 0.2% Dry Matter increase equates to a TZG value of $0.65.



This change would make available approximately 20% of Main Season volume 1 week earlier using a 6.0kgf incentive (*see Appendix 1.0)*.

It is recommended that this is a direct-to-grower payment, and that this metric would be based on the latest test.

Pro's:
- Assists in bringing forward harvest and compensates for some of the Dry Matter that would otherwise be chased. Approximately 8-10M TE of fruit would be available in Week 17 (slightly more effect in high Dry Matter years).
- Works in a similar manner in both high Dry Matter and low Dry Matter seasons.
- Provides postharvest with greater volume to choose from for harvest in the optimum storage window, thereby reducing total fruit loss, improving returns, reducing waste and reducing carbon footprint.
- Rewards a grower for providing fruit that has greater storage utility and as it is a **direct to grower payment** (via entity pools), ensures that the decision is personally rewarded rather than pooled/shared.
- Puts greater focus by some growers onto storage performance

Con's:
- A grower who is willing to harvest but is in the queue for their postharvest facility and is unable to test again without risking losing a payment. They forego any accumulated dry matter and could perceive that they are being disincentivised for waiting patiently.
- Potential conflict between the grower and their postharvest operator if a line drops below 6.0kgf prior to being tested.
- Adds complexity.
- Fruit firmness during this period is typically different in differing regions and growers in some regions will have a lower chance of being eligible for this incentive.

OPTION 2:

An alternative to the introduction of this principle is to add more money into the time pool.

Principle 8: Updated measurements prior to harvest – AGREED BY GROUP

Where an Maturity Area passes more than 1 week in advance of harvest, a supplier-conducted/initiated test will be completed to give an updated inventory view, and revised Taste Band (by size for Gold3).

Principle 9: Introduction of a stop testing rule for Gold3 and Hayward

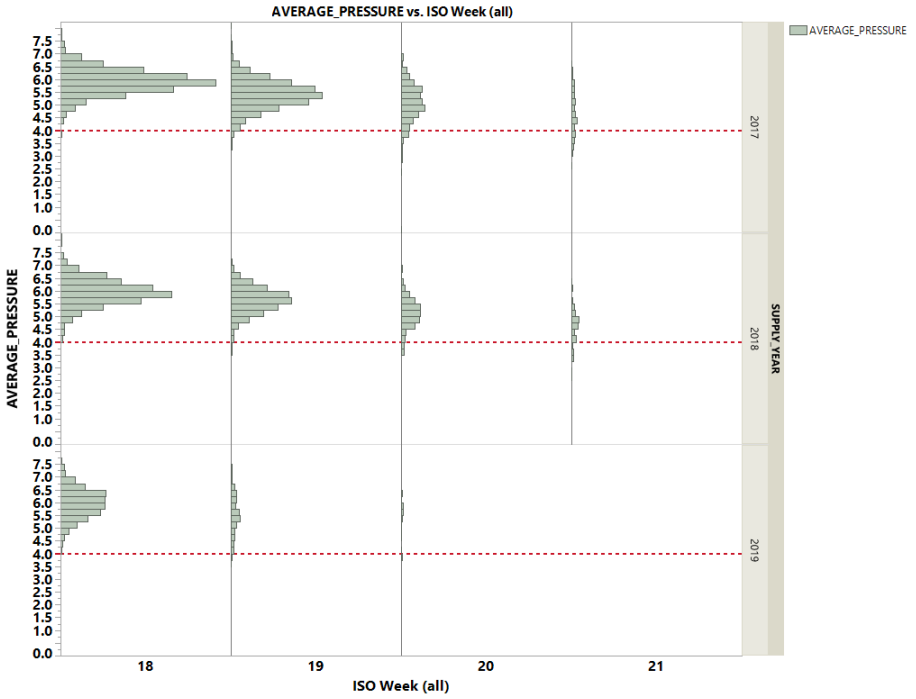
In low Dry Matter years there are a small number of growers who will be caught trying to achieve clearances for one or more of their sizes. In past seasons these growers will continue to test over a long period of time. Their fruit quality will deteriorate to the point where it is virtually impossible to handle through the supply chain.

The objective of this rule is to prevent growers getting further tests on an Maturity Area once the average pressure for the sample falls below 4.0kgf.

The proposal is that once a grower has a test below 4.0kgf an automatic "final sample" will be triggered. This will likely be a much larger sample (maybe a 360-fruit sample) taken to confirm that the sizes that are failing are below the Minimum Taste Standard and confirming that the average firmness of the Maturity Area is below 4.0kgf. This will then be the grower's final test and the results of this clearance will stand. The only remaining recourse for these growers will be to NIR grade their lines.

Over the past 3 years, on average this rule would act on 2% of samples cleared in Week 19, 9% of samples in Week 20 and 26% of samples still testing in Week 21. It is recognised that where a grower is continuing to test to clear the MTS for a significant portion of their crop (in the case of Gold3) or all of their crop (in the case of Hayward) that intensive management of that line will be

required to ensure the grower has the opportunity to submit any fruit that meets the minimum standard.



OPTION 1: Majority on Working Group preferred option

Introduction of a rule that prevents growers getting further tests on an Maturity Area once the average pressure for the sample falls below 4.0 kgf. This may be subjected to a more rigourous Clearance test (larger sample).

OPTION 2: Zespri preferred option

The same as Option 1, but that grower's TZG is capped at the minimum but that a grower can continue to test to clear any sizes below the Minimum Taste Standard.

For this principle, the general pro's and con's are:

Pro's:
- Forces a decision on a grower, and will prevent endless testing.
- Works in a similar manner in both high Dry Matter and low Dry Matter seasons.

Con's:
- Grower can re-cut a maturity area to avoid the rule (or at least get a re-test).
- There is noise in the firmness metric based on a 90-fruit sample and so a subsequent test may be >4.0kgf (therefore the rule is open to challenge)
- Adds complexity.

Recommendations outside of the Immediate Scope of the Working Group:

Recommendation to the ISG KiwiStart and Time Subgroup

- The proposed new system will reduce the compensation for taste (due to the cap)
- Kiwistart growers should only be compensated to the cap, no more.

Recommendation to Zespri on Value of High Dry Matter Fruit

- Recommend that Zespri initiates relevant research as soon as practicable to establish the relative value of high levels of Dry Matter (i.e. 18.0%, 18.5%, 19.0%, 19.5% for Gold3).
- The research should be able to quantify what benefit Zespri derives from the higher Dry Matter fruit

- Use this data to inform the Working Group recommendation to move to the 18.5% Dry Matter cap (Principle 4, Option 1).

Background Information

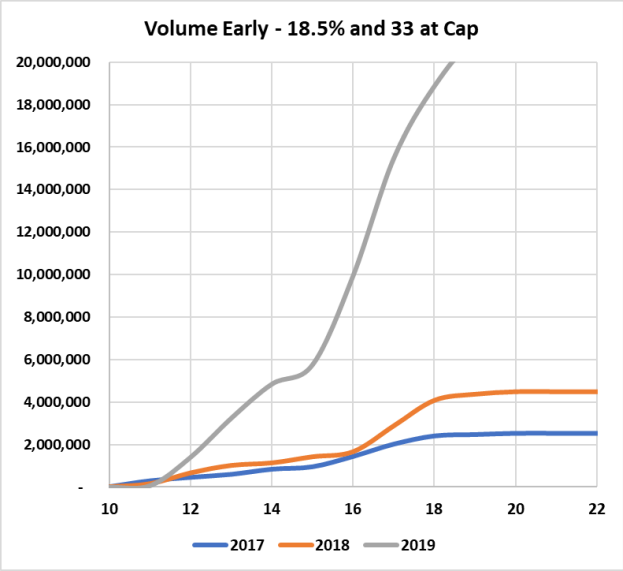
Appendix 1.0 Impact of different proposals on fruit flow for Gold3

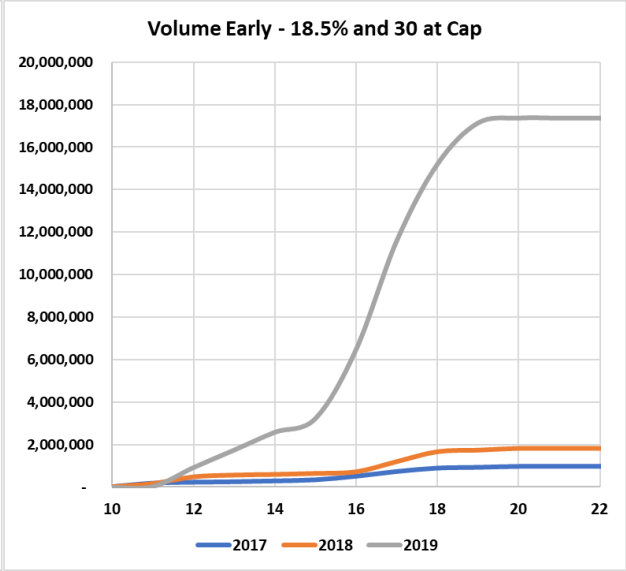
Based on the actual clearance data, the time at which every grower/MA first achieved the new criteria has been modelled. The following graphs show how much earlier and what volume of fruit would be available, graphed as cumulative volumes by week. There are two points to note when considering this data:

- Sample numbers during Weeks 14-15 are low due to the payments available to growers and do not reflect the true availability of fruit,
- The analysis assumes growers will harvest as soon as the criteria is met, whereas the current model is based off the last test a grower takes.

A 1.1 TZG Capped at 18.5% (TZG = 0.78)

If the TZG were capped at 18.5% (TZG 0.78) for large sizes and TZG 0.68 for the 33 then the volume of fruit available in an earlier week is shown below. Two scenarios are modelled; all growers picking once their 33s have achieved their maximum possible TZG and all growers picking once their 30s have achieved their maximum possible. In reality, the freed-up volume will likely fall between the two. Note in all graphs, 2019 is a high DM year, whilst 2017 indicates a lower DM year.



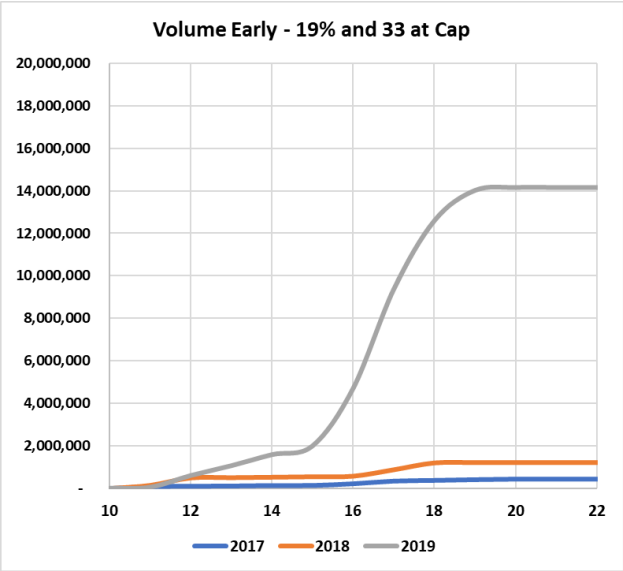


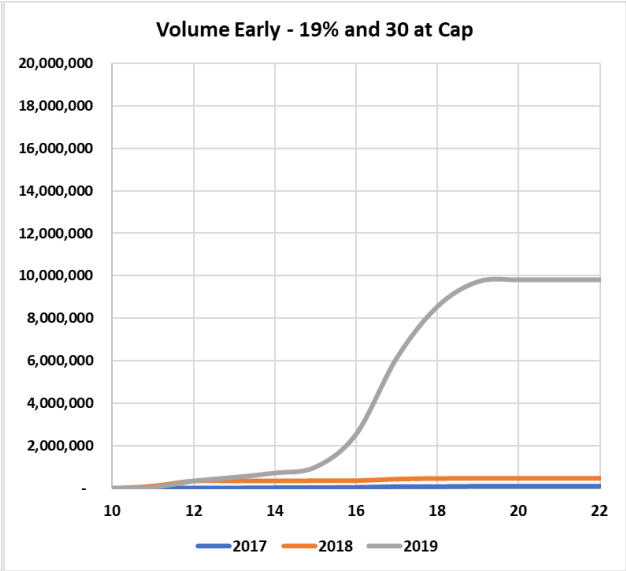
In a high DM year, large volumes of fruit will be available earlier. In a low DM year there is a small benefit (~2.0 M TE) if growers make the decision based on their 33s, but minimal if based on their 30s.

A 1.2 TZG Capped at 19.0% (TZG = 0.86)

If the TZG were capped at 19.0% (TZG 0.86) for large sizes and TZG 0.78 for the 33 then the volume of fruit available in an earlier week is shown in the following graphs.

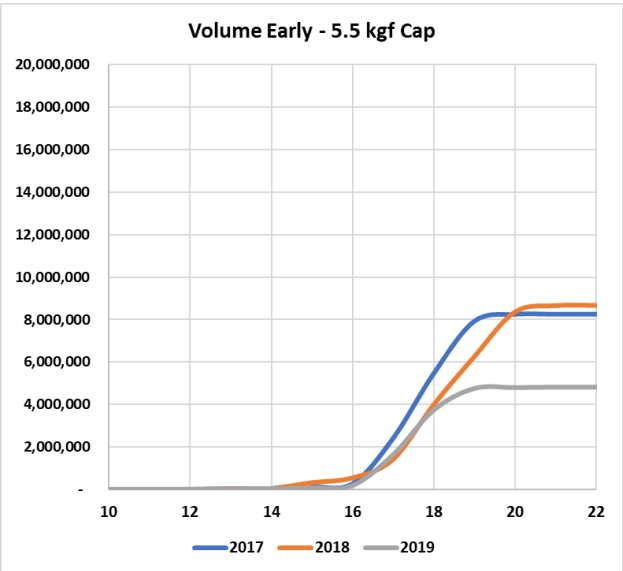
In a high Dry Matter year, useful volumes of fruit will be available earlier. In a low Dry Matter year there is no benefit.

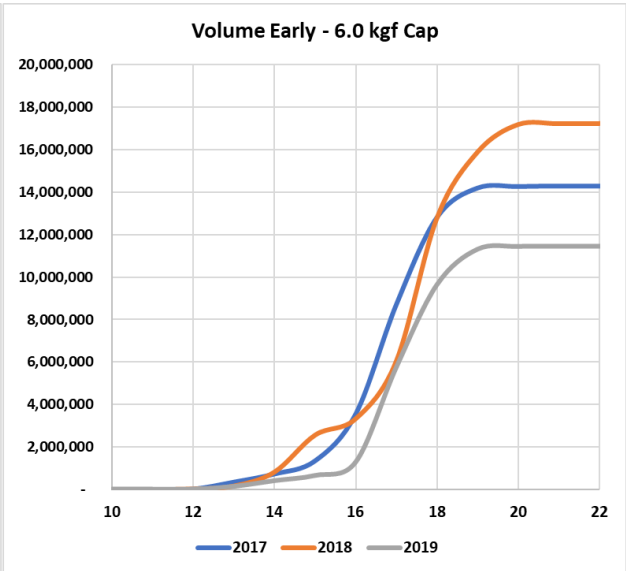




A 1.3 Storage Utility metric for Gold3

There have been two scenarios considered; a cap at >6.0 kgf and >5.5 kgf firmness. If the firmness cap is set at 5.5 kgf then growers will likely continue to test up until this time, at which point the volumes that free up earlier are limited and occur too late.

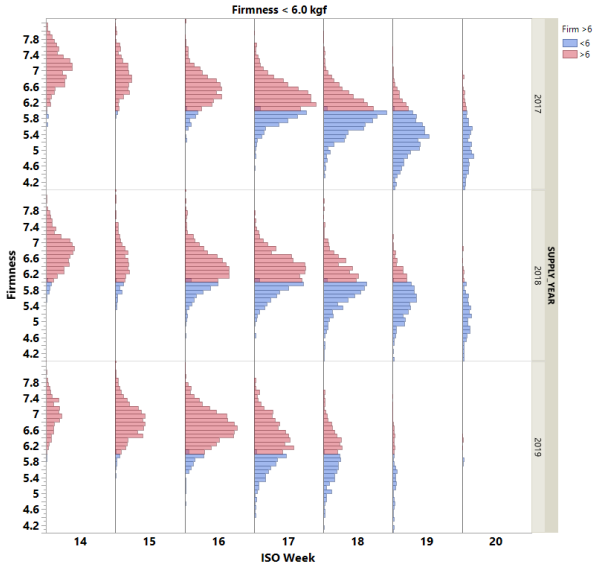




If the firmness cap is set at >6.0kgf then more fruit is available earlier (over 10M TE).

This is the only concept that pulls volume forward in any year, irrespective of Dry Matter. The effect in a high Dry Matter year will be assisted by the capping of the TZG should that part of the proposal be accepted.

The relative proportion of fruit available in any week that is below the 6.0kgf and 5.5kgf firmness thresholds are shown in the following graphs. Most lines are above 6.0kgf until Week 18.


Firmness < 6.0 kgf
Firm >6
<6
>6
Firmness
ISO Week
SUPPLY YEAR
2017
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14
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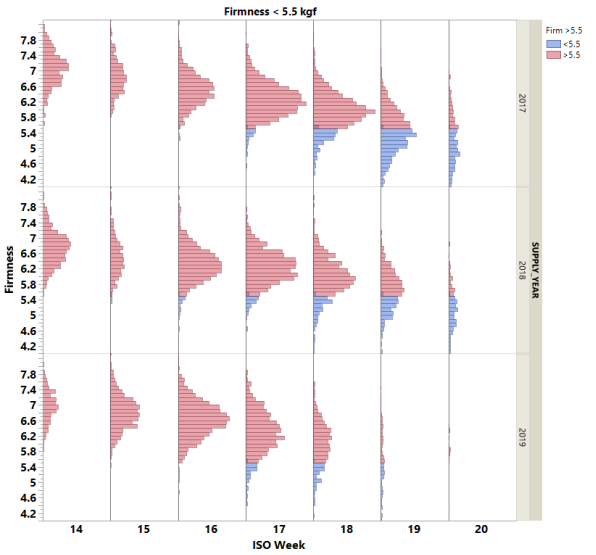
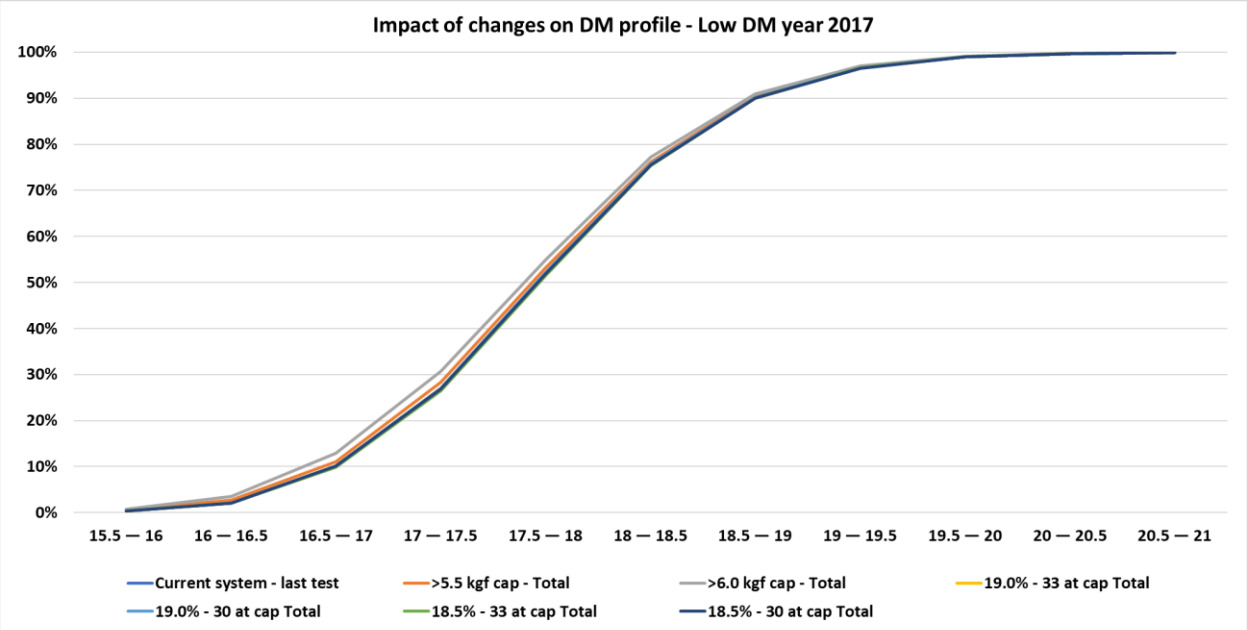
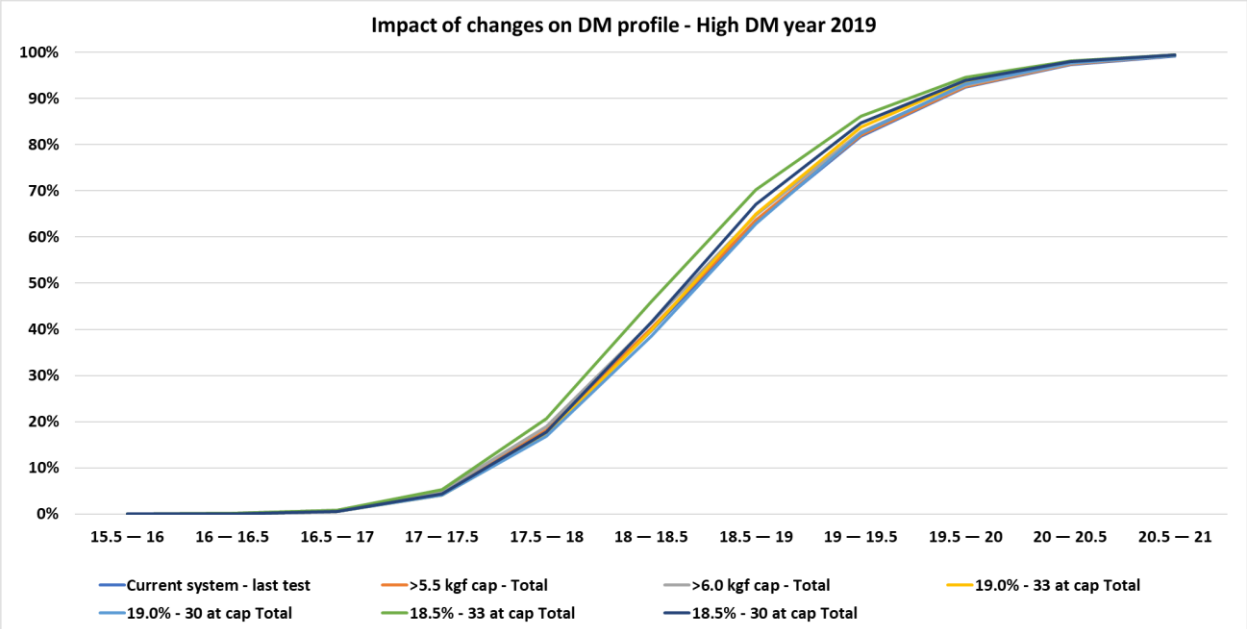

Firmness < 5.5 kgf
Firm >5.5
<5.5
>5.5
Firmness
ISO Week
SUPPLY YEAR
2017
2018
2019
14
15
16
17
18
19
20

Appendix 2.0 Impact on overall fruit taste profile for Gold3

The graphs below compare the impact of the various concepts on the overall Dry Matter profile. The analysis is based on the average Dry Matter by count size, weighted by submit. In a low Dry Matter year, none of the proposals has a significant impact on the **overall** Dry Matter profile. There is a small effect where the >6.0kgf firmness cap would likely result in 3-4% more fruit in the lower Dry Matter bands (16.5-17.0% Dry Matter and 17.0-17.5% Dry Matter).



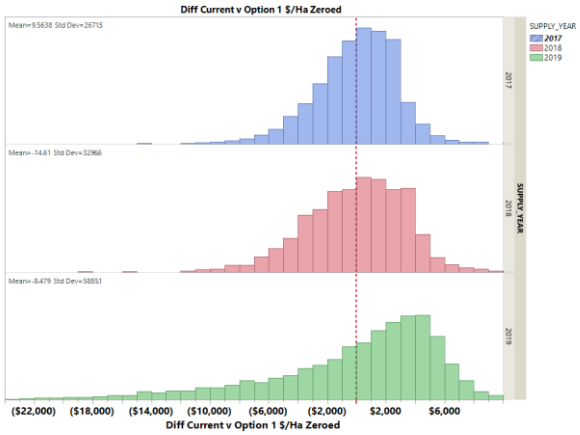


In a high Dry Matter year, there is a slightly larger effect (5-6%) in the mid Dry Matter bands between 18.0 and 19.5% Dry Matter. This is mainly seen in the 18.5% Dry Matter cap if growers respond once their 33s have achieved the maximum possible TZG. These movements in Dry Matter are all at relatively high Dry Matter levels and so would not be expected to impact as noticeably for consumers.

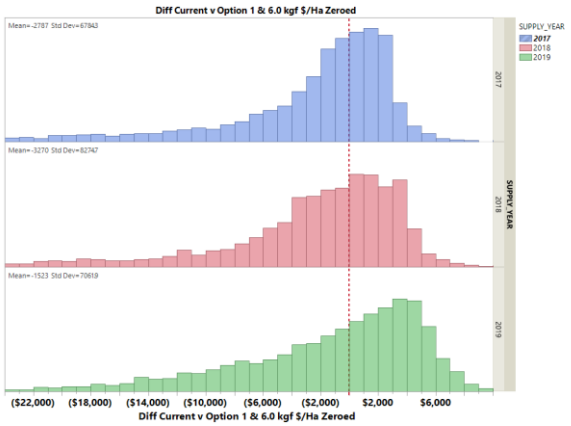
Appendix 3.0 Impact on grower taste returns for Gold3

The following graphs compare the impacts on grower returns – these are shown in terms of $/Ha relative to the current system. The graphs are useful to help understand the relative movements between growers. The shapes of the TZG curves introduce a small artefact to the payments which will require a balancing of the taste payments. These graphs are all based on the total taste money paid out being the same (average = 0 for each year).

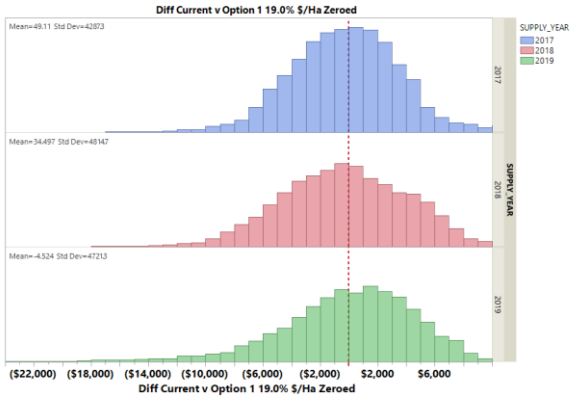
Option 1 Cap at 18.5%



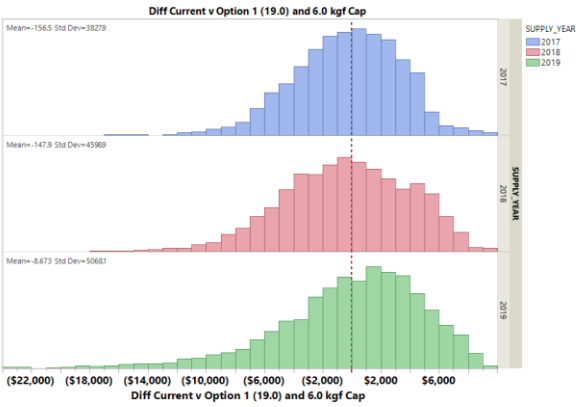
Option 1 Cap at 18.5% and the 6.0kgf Cap



Option 1 Cap at 19.0%



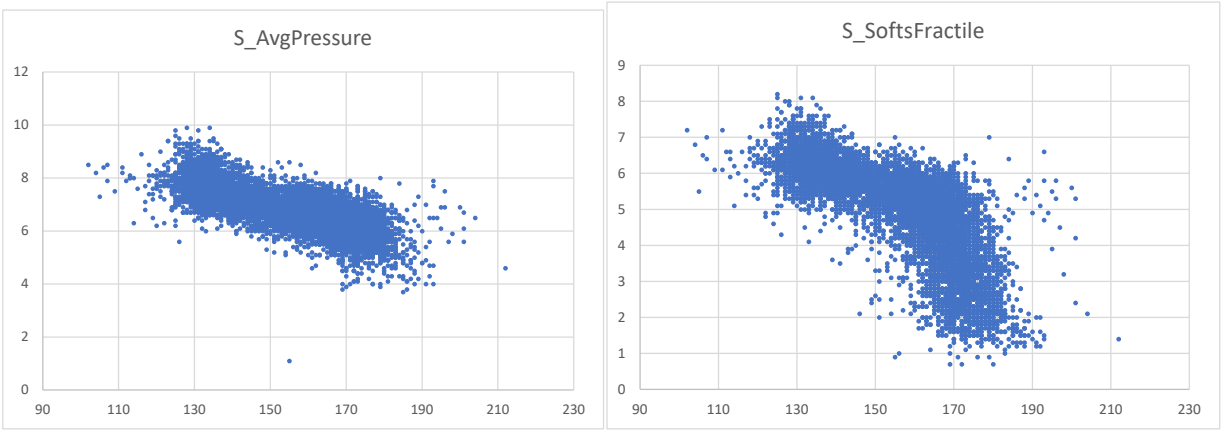
Option 1 Cap at 19.0% and the 6.0kgf Cap



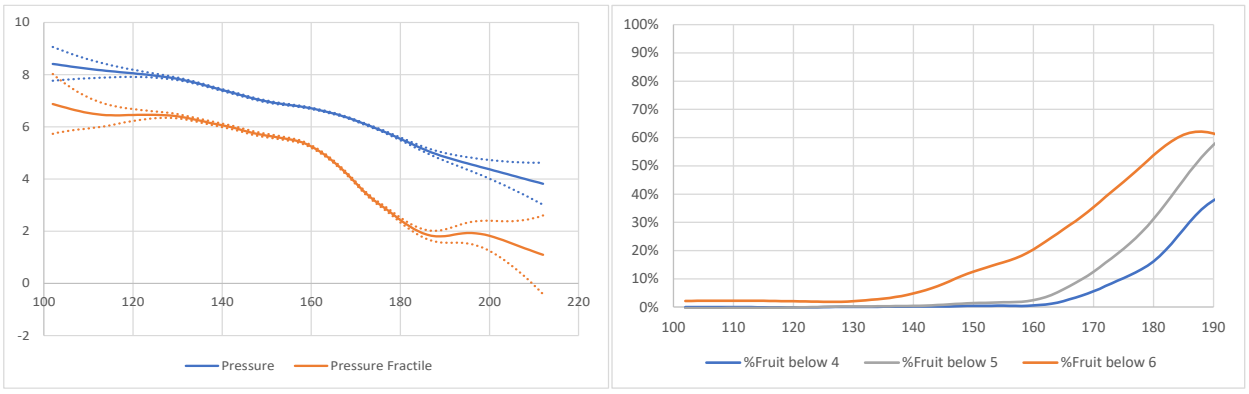
The graphs compare the two proposed Dry Matter/TZG cutoffs as well as the additional impact of the 6.0kgf cutoff. The 19.0% Dry Matter Cap shows a more uniform distribution than the 18.5% cap with a range of +/- $4,000/Ha movement for individual growers. The 18.5% cap produces a more skewed distribution with a small tail of growers being more severely impacted (these are growers with very high average Dry Matter and/or small fruit). The introduction of the 6.0kgf cap makes very little difference to the average grower result, due to the fact that Dry Matter accumulation in most lines has almost stopped. There is a small number of growers who are more significantly affected by the 6.0kgf cap ($20-25,000/Ha). These are generally growers who have continued to test until their fruit is soft.

Appendix 4.0 Rationale for a cap close to 6.0kgf firmness for Gold3

This section details the rationale for the use of firmness and the 6.0kgf point as a practical metric. The graphs below show the pattern over time of the sample mean firmness and firmness fractile for cleared samples. The x axis shows days from full bloom which shows a tighter pattern. 150 days is approximately equivalent to Week 15 for many orchards.

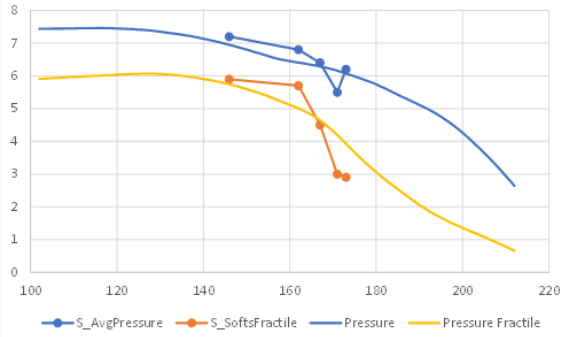


The firmness drop is relatively constant over the period when there are clearance samples being taken. The fractile is a good indicator of when a line is likely to have issues in the supply chain. To get a truer picture of the change in firmness over time a model has been fitted that includes a smooth trend (spline) over time with random orchards effects. The rapid drop-off of the fractile (orange line) between about 160 and 180 days from full bloom is very apparent (Weeks 16-19). ***The 6.0kgf cap is a lagging metric on changes in the fruit population, but it occurs early enough that the fruit is still generally in good condition.***

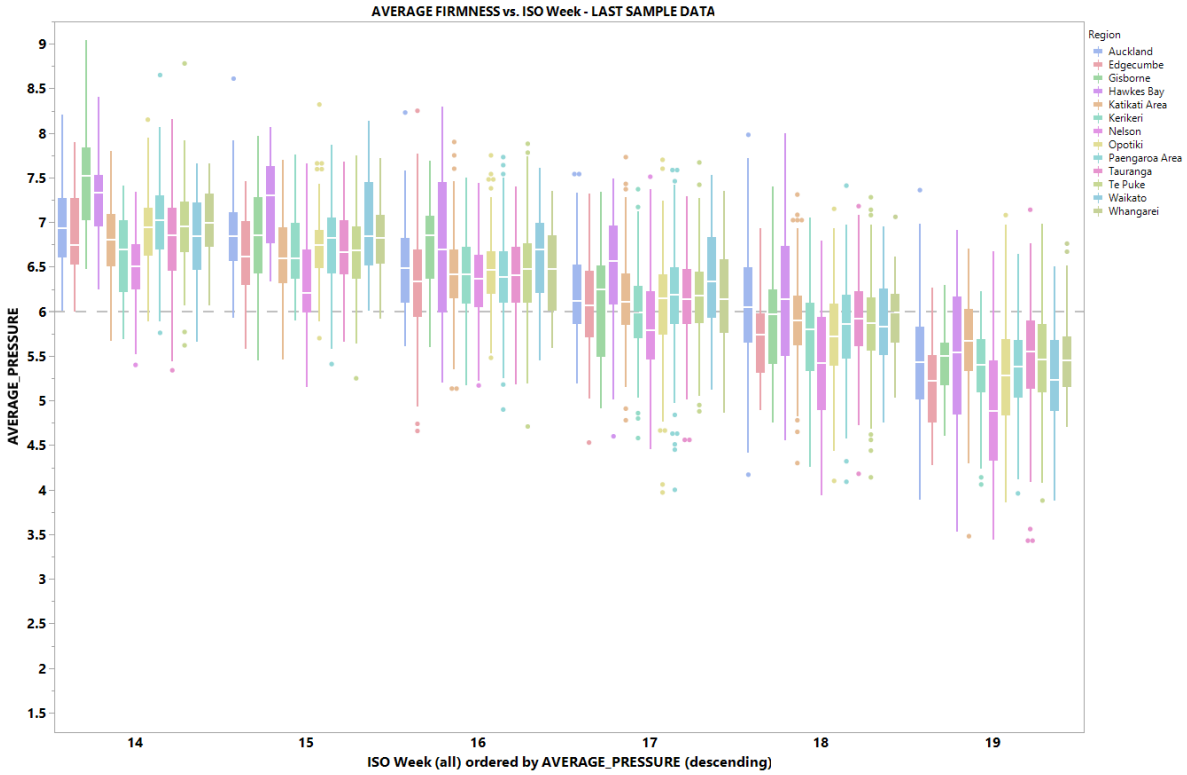


The second graph shows the same model prediction of the proportion of fruit below 4.0, 5.0 and 6.0kgf which also supports the setting of the metric close to 6.0kgf.

There is considerable noise in the average firmness metric and it is proposed that it will be necessary to have a sliding scale to still reward growers for a test which falls below the cap. See example, where the firmness drops below 6.0kgf to 5.4kgf and then the following sample is back above 6.0kgf.



It is also acknowledged that some regions will be more significantly impacted with this proposition than others, particularly due to being naturally earlier or the earlier onset of cold temperatures and consequential reduction in firmness.


AVERAGE FIRMNESS vs. ISO Week - LAST SAMPLE DATA
AVERAGE_PRESSURE
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
14
15
16
17
18
19
ISO Week (all) ordered by AVERAGE_PRESSURE (descending)
Region
Auckland
Edgecumbe
Gisborne
Hawkes Bay
Katikati Area
Kerikeri
Nelson
Opotiki
Paengaroa Area
Tauranga
Te Puke
Waikato
Whangarei