Apple water core – a seasonal problem

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Stanthorpe 14th June 2011

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SCORING AND MANAGING WATERCORE

Red Delicious

1. No visible watercore.

2. Vascular bundles swollen to between diameter of pencil lead to pencil eraser.

3. Vascular bundles swollen to the size of a pencil eraser and larger but nothing touches—not between vascular bundles nor between vascular bundles and the core.

4. Two vascular bundles touch each other or a vascular bundle connects with watercore expanding from core.

5. Pineapple type
Or
Several vascular bundles either touch each other or the core.

Fuji

1. No visible watercore.

2. Vascular bundles swollen to between diameter of pencil lead to pencil eraser.

3. Vascular bundles swollen to the size of a pencil eraser and larger nothing touches—not between vascular bundles nor between vascular bundles and the core.

4 S. Continuous areas of watercore resemble "star" shape.

4 C. Star shape disappears and watercore tends to become more of a full circle out from the core.

5. Pineapple type
Or
Watercore is showing in significant, heavy amounts all the way out to the peel.

Proposed Watercore Scoring Chart and Storing Apples with Watercore

In conjunction with several apple producers, AgroFresh is proposing a 1 to 5 watercore scoring system for Red Delicious and Fuji. In deciding whether to use SmartFresh technology on fruit with watercore, the following considerations should be taken into account:

- Washington state grade standards concerning watercore, especially Red Delicious, state that watercore becomes scorable after January 31.
- Fruit with slight to moderate watercore (one and two on the above chart) will usually store well in Controlled Atmosphere (CA) with SmartFresh technology, but watercore will dissipate at a slower rate and may not fully disappear by January 31.
- Grower lots scoring three or above on the charts, or expressing "core type" watercore are likely to have reduced storage potential.
- Several apple storage operators have found that using SmartFresh technology in Regular Atmosphere (RA) storage is a very effective method of maintaining condition while watercore gradually dissipates.
- Red Delicious with moderate to severe watercore (four and above on the scoring chart) stored with SmartFresh in RA was over two pounds firmer than untreated fruit when tested in early January. The rate of the watercore disappearance was comparable between SmartFresh and untreated apples, and no internal browning developed in either treatment.
- Similar results were obtained in Fuji held for approximately 7 months in RA storage. At the end of storage, the moderate and severe watercore had disappeared while the condition of the SmartFresh fruit was virtually unchanged from harvest pressure tests and two pounds firmer than comparable untreated apples.

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For more information talk with your AgroFresh Account Manager or call 1 866 206 1001.

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- Flooding looks water soaked.

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- Flooded air spaces between cells with sorbitol solution.
- Flooding looks water soaked.
- Starts around ‘plumbing’
- Red Dels and Fuji mainly, Sundowner and Granny Smith also

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- Water core fruit sensitive to CO_2, as internal air spaces full of liquid and CO_2 can't easily dissipate. Worse in CA.

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- Excess sorbitol from leaves in good seasons
- Advanced maturity & low night temps
- Early freezing (Washington State)
- Heat waves eg Southern Aust 2009
- Worse on low calcium fruit, trees with lighter crops and vigorous trees.
- Worse on fruit exposed to most heat and sunlight.

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How can I deal with water core ?

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- CA slows down apple's metabolism and re-absorption of sorbitol is slowed.
- Delayed cooling, warmer storage & no CA allows ethylene driven ripening - use SmartFresh to stop this.

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The AgroFresh protocol

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- Cool 1^{o} C per week
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- Hold at 1.5 – 2.0° C
- SmartFresh within 7 days of harvest
- Keep CO_2 < 1% and O_2 > 18% in regular air – not CA. Flush room daily.
- Monitor fruit each week for 6 – 8 weeks.
- If it clears it may be put under CA, if not then start selling

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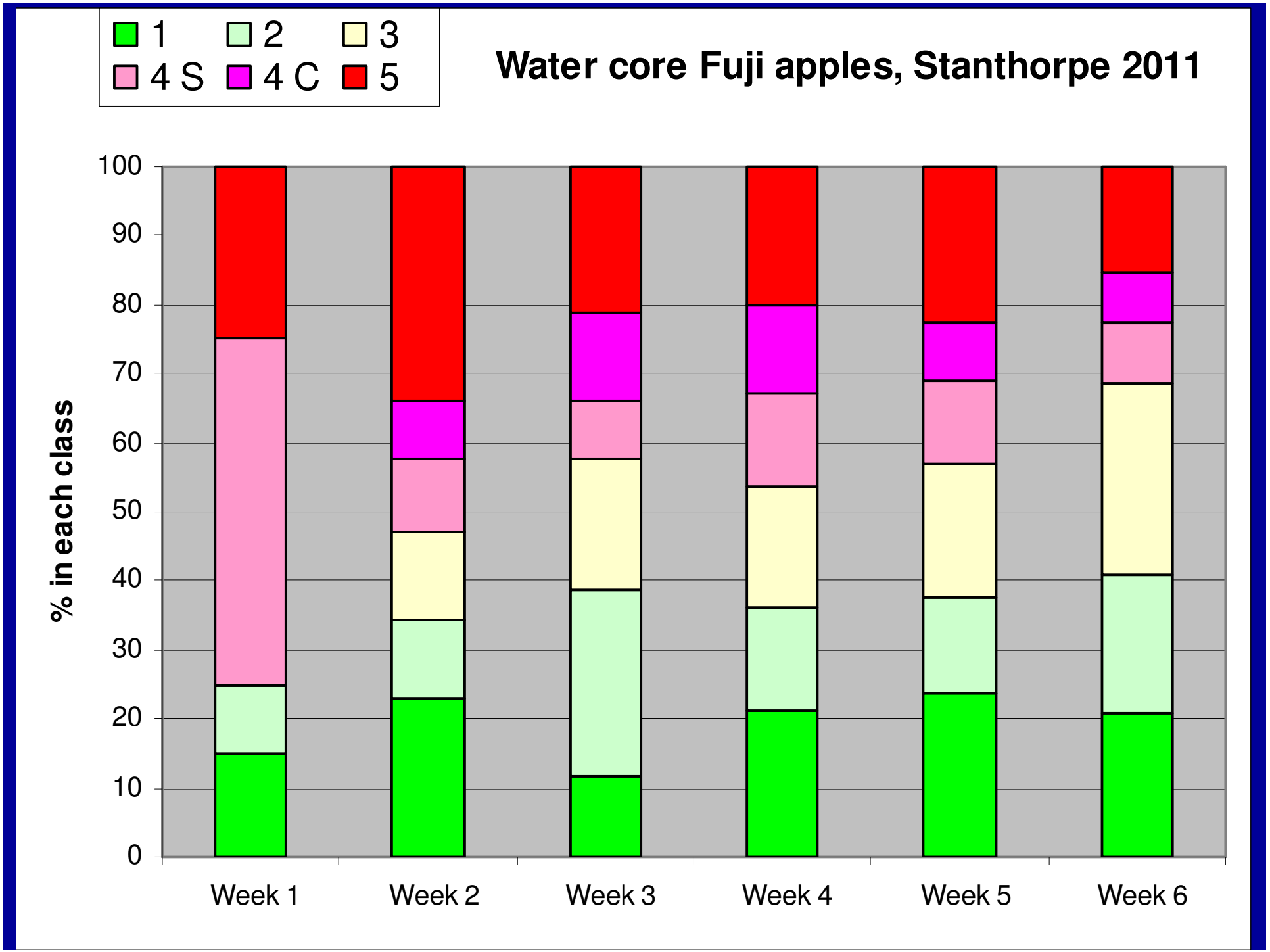
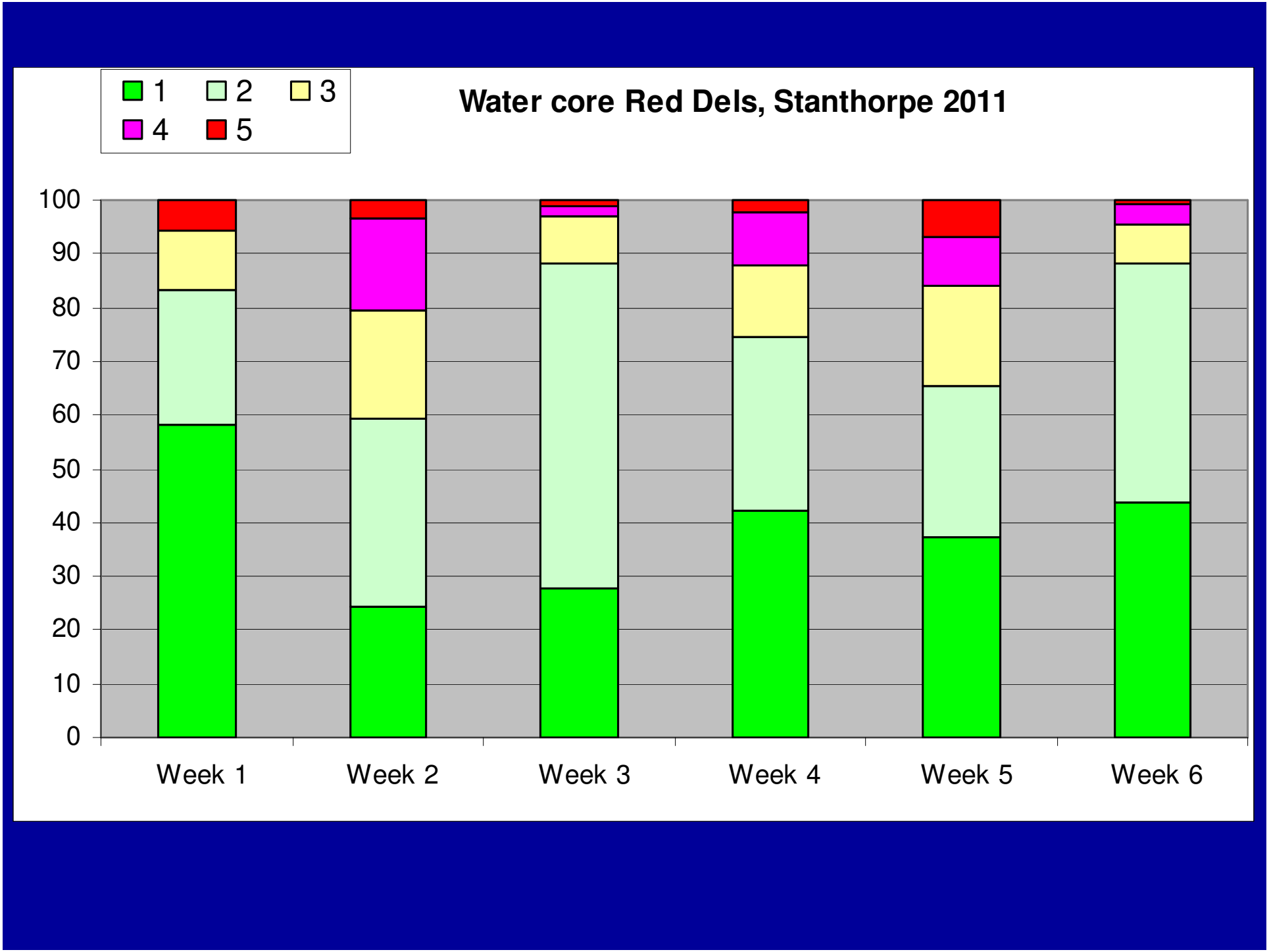

1
2
3
4 S
4 C
5
Water core Fuji apples, Stanthorpe 2011
% in each class
100
90
80
70
60
50
40
30
20
10
0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6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Week 6