

Table S1. Rating scale for Flesh Cavity with White Patches (FCWP) and flesh browning (FB) based on severity. Images on left panel show the rating scale for FCWP, and the right panel shows the rating scale for FB. Both disorders were rated on a 0 - 3 scale; 0: healthy, 1: slight, 2: moderate, and 3: severe.

Different severity of FCWP	Rating and description	Different severity of FB	Rating and description
	0: Healthy; no signs of cavity and starch lesions in mesocarp.		0: Healthy, no sign of brown discoloration in mesocarp.
	1: Slight; >0 - <25% area of mesocarp that cover the seed affected or any part of mesocarp.		1: Slight, >0 - <25% area of mesocarp with brown discoloration.
	2: Moderate: moderate, >25 - <50% area of mesocarp that surrounds seed affected.		2: Moderate, >25 - <50% area of mesocarp with brown discoloration.
	3: Severe, >50% area of mesocarp that surrounds seed affected		3: Severe, >50% area of mesocarp with brown discoloration

Table S2. Effect of +/- vapour heat treatment (VHT) on shelf-life (mean \pm SE) of 'B74' mango in nine case study supply chains during the 2020/21 harvest season. Shelf-life was calculated from the day of VHT to the fruit reaching hand firmness rating scale of 4. No data in supply chain seven as only VHT fruit was available during monitoring. In each supply chain, there were 102, evenly divided between 51 +VHT treatment and 51 -VHT.

Supply chain	Shelf-life (d)		Significance
	+VHT	-VHT	
1	12.3 \pm 0.7	15.6 \pm 1.3	NS
2	14.5 \pm 0.4	13.9 \pm 0.9	NS
3	13.7 \pm 0.3	16.3 \pm 1.2	NS
4	16.2 \pm 0.6	18.5 \pm 1.1	NS
5	16.7 \pm 0.7	17.5 \pm 0.9	NS
6	14.1 \pm 0.2	13.5 \pm 0.6	NS
7	-	-	-
8	11.0 \pm 0.7	12.8 \pm 0.6	NS
9	12.5 \pm 0.1	12.9 \pm 0.3	NS

Table S3. Effect of +/- vapour heat treatment (VHT) on shelf-life (mean \pm SE) of 'B74' mango in seven case study supply chains during the 2022/23 harvest season. Shelf-life was calculated from the day of VHT to the fruit reaching hand firmness rating scale of 4.

Supply chain	Shelf-life (days)		Sig.
	+VHT	-VHT	
1	19.65 \pm 0.31	19.24 \pm 0.57	NS
2	23.02 \pm 1.00	21.53 \pm 0.75	NS
3	18.61 \pm 0.63	19.07 \pm 0.49	NS
4	15.65 \pm 0.94 ^b	19.18 \pm 0.69 ^a	*
5	17.88 \pm 1.50	20.15 \pm 0.80	NS
6	22.16 \pm 0.11	22.87 \pm 0.36	NS
7	20.47 \pm 0.49	22.88 \pm 0.88	NS

VHT: Vapour heat treated; -VHT: Not vapour heat treated. Means followed by same letter in a row within incidence and severity are not statistically different. Significant codes *: 0.05, **: 0.01; ***: 0.001; NS: non-significant.

Table S4. Incidence and severity of Flesh Browning (FB) (mean \pm SE) in nine separate case study supply chains during the 2020/21 harvest season with +/- vapour heat treatment (VHT). The data were collected from two regions in Australia, Northern Territory (NT; supply chains 1 - 5) and North Queensland (NQ; supply chains 6 - 9).

Supply chain	FB incidence			FB severity		
	+VHT	-VHT	Sig.	+VHT	-VHT	Sig.
1	21.11 \pm 4.40	9.52 \pm 4.76	NS	0.26 \pm 0.06	0.09 \pm 0.05	NS
2	33.95 \pm 3.65	22.83 \pm 6.83	NS	0.39 \pm 0.08	0.40 \pm 0.08	NS
3	27.94 \pm 10.29	35.42 \pm 15.45	NS	0.27 \pm 0.13	0.46 \pm 0.16	NS
4	21.43 \pm 8.05	25.46 \pm 6.71	NS	0.25 \pm 0.09	0.36 \pm 0.14	NS
5	12.13 \pm 3.72	21.81 \pm 4.96	NS	0.15 \pm 0.04	0.29 \pm 0.06	NS
6	4.04 \pm 2.02	0.00 \pm 0.00	NS	0.06 \pm 0.04	0.00 \pm 0.00	NS
7	4.55 \pm 4.55	0.00 \pm 0.00	NS	0.06 \pm 0.06	0.00 \pm 0.00	NS
8	1.96 \pm 1.96	6.00 \pm 0.12	NS	0.02 \pm 0.02	0.06 \pm 0.00	NS
9	1.96 \pm 1.96	0.00 \pm 0.00	NS	0.04 \pm 0.04	0.00 \pm 0.00	NS

+VHT: Vapour heat treated; -VHT: Not vapour heat treated. Means followed by same letter in a row within incidence and severity are not statistically different. NS: non-significant.

Table S5. Incidence and severity of Flesh Browning (FB) (mean \pm SE) in twenty-seven separate supply chains during 2021/22 harvest season with +/- vapour heat treatment (VHT). The data were collected from two regions in Australia, Northern Territory (NT; supply chains 1 - 14) and North Queensland (NQ; supply chains 15 - 27).

Supply chain	FB incidence			FB severity		
	+VHT	-VHT	Sig.	+VHT	-VHT	Sig.
1	44.87 \pm 3.39	56.41 \pm 6.78	NS	0.53 \pm 0.07	0.59 \pm 0.08	NS
2	39.74 \pm 5.59	42.67 \pm 3.48	NS	0.51 \pm 0.03	0.44 \pm 0.12	NS
3	63.49 \pm 3.17	67.94 \pm 5.40	NS	0.62 \pm 0.16 ^b	1.14 \pm 0.05 ^a	*
4	49.84 \pm 5.20 ^b	70.32 \pm 3.02 ^a	*	0.67 \pm 0.08	0.92 \pm 0.11	NS
5	9.05 \pm 2.15	11.59 \pm 4.92	NS	0.07 \pm 0.06	0.10 \pm 0.00	NS
6	0.00 \pm 0.00	0.00 \pm 0.00	NS	0.00 \pm 0.00	0.00 \pm 0.00	NS
7	0.00 \pm 0.00	2.56 \pm 2.56	NS	0.00 \pm 0.03	0.03 \pm 0.00	NS
8	0.00 \pm 0.00	0.00 \pm 0.00	NS	0.00 \pm 0.00	0.00 \pm 0.00	NS
9	5.56 \pm 2.78	2.78 \pm 2.78	NS	0.06 \pm 0.03	0.03 \pm 0.03	NS
10	2.38 \pm 2.38	13.49 \pm 3.71	NS	0.02 \pm 0.03	0.09 \pm 0.02	NS
11	6.06 \pm 3.03	21.21 \pm 13.21	NS	0.03 \pm 0.16	0.23 \pm 0.02	NS
12	8.33 \pm 4.81	13.89 \pm 2.78	NS	0.08 \pm 0.03	0.11 \pm 0.05	NS
13	33.02 \pm 3.23	20.71 \pm 13.28	NS	0.33 \pm 0.17	0.27 \pm 0.03	NS

14	0.00 ± 0.00	0.00 ± 0.00	NS	0.00 ± 0.00	0.00 ± 0.00	NS
15	49.02 ± 1.96 ^b	84.31 ± 1.96 ^a	***	0.45 ± 0.02 ^b	0.90 ± 0.05 ^a	**
16	3.03 ± 3.03	-	-	0.02 ± 0.00	-	-
17	5.88 ± 0.00 ^b	54.60 ± 7.80 ^a	*	0.05 ± 0.08	0.49 ± 0.01 ^a	*
18	1.96 ± 1.96	33.33 ± 13.33	NS	0.02 ± 0.11 ^b	0.34 ± 0.02 ^a	*
19	1.96 ± 1.96 ^b	72.55 ± 1.96 ^a	***	0.01 ± 0.08 ^b	0.99 ± 0.01 ^a	**
20	0.00 ± 0.00 ^b	39.22 ± 8.55 ^a	*	0.00 ± 0.18	0.46 ± 0.00	NS
21	15.69 ± 3.92 ^b	80.39 ± 5.19 ^a	***	0.17 ± 0.22 ^b	1.77 ± 0.03 ^a	**
22	5.88 ± 5.88	29.41 ± 11.76	NS	0.09 ± 0.16	0.26 ± 0.09	NS
23	15.69 ± 7.07	29.41 ± 3.40	NS	0.17 ± 0.04	0.34 ± 0.09	NS
24	19.61 ± 7.07 ^b	50.98 ± 7.07 ^a	*	0.20 ± 0.09 ^b	0.55 ± 0.07 ^a	*
25	11.76 ± 5.88 ^b	66.67 ± 1.96 ^a	**	0.15 ± 0.15 ^b	1.16 ± 0.08 ^a	**
26	0.00 ± 0.00 ^b	7.84 ± 1.96 ^a	*	0.00 ± 0.03	0.06 ± 0.00	NS
27	1.96 ± 1.96 ^b	49.02 ± 8.55 ^a	*	0.01 ± 0.12 ^b	0.47 ± 0.01 ^a	*

+VHT: Vapour heat treated; -VHT: Not vapour heat treated. Means followed by same letter in a row within incidence and severity are not statistically different. Significant codes *: 0.05, **: 0.01; ***: 0.001; NS: non-significant.

Table S6. Incidence and severity of Flesh Browning (FB) (mean ± SE) in seven separate case study supply chains during the 2022/23 harvest season with +/- vapour heat treatment (VHT). The data were collected from two regions in Australia, Northern Territory (NT, supply chains 1 and 2) and North Queensland (NQ, supply chains 3 - 7).

Supply chain	FB incidence			FB severity		
	+VHT	-VHT	Sig.	+VHT	-VHT	Sig.
1	39.22 ± 10.38	23.53 ± 3.40	NS	0.75 ± 0.12	0.51 ± 0.14	NS
2	0.00 ± 0.00	0.00 ± 0.00	NS	0.00 ± 0.00	0.00 ± 0.00	NS
3	25.49 ± 5.19	44.36 ± 9.07	NS	0.25 ± 0.09	0.39 ± 0.05	NS
4	50.98 ± 1.96 ^b	5.88 ± 3.40 ^a	***	0.08 ± 0.02 ^b	0.84 ± 0.01 ^a	***
5	7.84 ± 5.19 ^b	75.98 ± 6.81 ^a	**	0.09 ± 0.06 ^a	1.44 ± 0.15 ^b	**
6	78.43 ± 5.19 ^a	75.61 ± 10.94	*	0.82 ± 0.12	1.09 ± 0.08	**
7	54.90 ± 7.84	92.03 ± 1.90	*	0.63 ± 0.07	1.48 ± 0.08	**

+VHT: Vapour heat treated; -VHT: Not vapour heat treated. Means followed by same letter in a row within incidence and severity are not statistically different. Significant codes *: 0.05, **: 0.01; ***: 0.001; NS: non-significant.

Table S7. Nutrient management plan adopted by a ‘B74’ mango grower who exports ‘B74’ mangoes. Export of ‘B74’ mangoes is from only two major growers in Northern Territory (NT) and in North Queensland (NQ), respectively. The ‘baseline’ data presented were collected in 2022 and reflect nutrient management practices over 3 years.

Region	Nutrient source	Available nutrients	Number of applications	Application month / stage	Application rate	N and Ca applied per tree (g or ml)
NT	Horti Trace	Mg: 2%, Zn-2.5%, Mn:3%, S:6.2%, Cu: 5%, Fe: 1%, B: 0.04%, and Mo: 0.05%	1	Jul: just before flowering	5 litres / ha	-
	CK 555	N: 12.8%, P: 14.2%, K: 11.9%, and S:6.4%	1	Dec: after harvest	1.3 kg / tree	N: 166 g
	Encal	N: 13%, Ca: 16%, Mg: 1.7%, Fe: 0.12%, B: 0.8%, Zn: 0.06%, Cu: 0.06% and Mn: 0.06%	5 (foliar)	Jul-Nov (1 application in each month)	2.4 litres / tree	N: 312 ml and Ca: 384 ml
	BioGyp	Ca: 20% and S: 15.31%	1	Jul: just before flowering	300 ml / tree	Ca: 60 ml
	Thio K	K: 30% and S: 25%	2 (fertigation)	Jul and Sep	186 ml / tree	-
Total N and Ca applied/tree						N: 478 and Ca: 444
NQ	Nitrophoska	N: 12%, P: 5.2%, K: 14.1%, S: 8%, Ca: 3.2%, Mg: 1.2%, B: 0.02%, and Zn: 0.01%	1	Apr	3.2 kg / tree	N: 384 g
	Gypsum	Ca: 23 % and S: 18%	1	Apr	1.5 kg / tree	Ca: 345 g

Calcium thiosulphate	Ca: 7.5% and S: 12.4%	4 (fertigation)	Jul - Oct	200 litres / ha	Ca: 42 ml
Boric acid	B: 16.5%	2	Jul and Sep		-
Zinc sulphate	Zn: 33%	2	Aug and Oct		-
Total N and Ca applied/tree					N: 384 and Ca: 387

Mg: Magnesium, Zn: Zinc, Mn: Manganese, S: Sulphur, Cu: Copper, Fe: Iron, B: Boron, Mo: Molybdenum, N: Nitrogen, P: Phosphorus, K: Potassium and Ca: Calcium.

Table S8. Soil test parameters of ‘B74’ growing blocks registered for export. Export of ‘B74’ mangoes is from two major growers in Northern Territory (NT) and in North Queensland (NQ), respectively. Only data from three registered blocks from each site are tabulated. They were collected in 2022.

Soil test parameters	Optimal range	Region					
		NT			NQ		
		B1	B2	B3	B5	B7	B4
pH	6 - 7	8.9	8.73	8.74	6.2	6.1	6.27
Potassium (ppm)	195 - 320	126	24.4	32.1	60.7	62.2	51.6
Calcium (ppm)	1300 - 2200	2106	1249	912	554	484	474
Zinc (ppm)	1.6 - 8	0.6	16.17	5.22	19.45	20.30	25.98
Boron (ppm)	1.7 - 4	0.4	0.42	0.47	0.31	0.28	0.19
Available N (kg / ha)	-	-	-	-	2.6	3.46	1.8
CEC (meq / 100g)	-	-	8.5	6.6	3.5	3.3	2.9
Base saturation (%)	80 - 87	-	100	100	-	-	-