

EFFECT OF INJURY ON STORAGE OF AVOCADOS

JT RAMATHOKA

WESTFALIA ESTATE

INTRODUCTION

It is accepted that injuries to avocados during picking, transportation and packing have detrimental effects on their storage and shelf life.

Most injuries are caused by:

Falling of fruit from the tree during picking.

Bruising — which is mainly due to high speed of tractors on uneven roads and careless handling.

These investigations were carried out to determine the effects of these injuries on the storage and quality of avocados.

MATERIALS AND METHODS

Four replicated experiments were conducted using the four commercial cultivars, i.e. Fuerte, Edranol, Ryan and Hass. Each cultivar was from the same orchard and the treatments entailed:

Dropping

Bruising

Cutting

Total removal of the peel

The last two experiments were treated with TBZ in wax. The fruits were packed in cellophane and kept at 6°C for 28 days and then evaluated for post-harvest disorders. In all cases there were 4 cartons of fruit per treatment. Two cartons per treatment of the last two experiments were treated with 0,4% TBZ in wax.

RESULTS

TABLE 1: The effect of various types of injuries on the quality of Fuerte avocados with an oil content of 24,4%

Disorders on ripe fruit rated 0–10	Untreated control 1	Fruit dropped 60 cm 2	Fruit dropped 90 cm 3	Bruised on cement floor 4	Peel removed 5 cm diam. 5	Complete removal of peel 6
External						
Dothiorella and Colletotrichum	1,38	0,93	1,16	0,47	1,72	0,02
Anthracoze	1,06	0,74	0,91	0,67	2,21	2,14
Stem-end rot	0,46	0,12	0,18	0,05	0,45	0,35
Internal						
Anthracoze	0,85	0,47	0,74	0,59	1,52	1,25
Stem-end rot	0,23	0,14	0,23	0,10	0,22	0,37
Pulp-spot	0,00	0,12	0,00	0,00	0,00	0,00
Vascular browning	0,08	0,07	0,04	0,05	0,03	0,04
Lead discolouration	0,35	0,22	0,47	0,16	0,03	0,18
Ripening time (days after storage)	4,4	4,9	4,9	4,8	5,0	3,9

TABLE 2: Effect of various types of injuries on the quality of Edranol avocados with an oil content of 18,4%

Disorders on ripe fruit rated 0–10	Untreated Control 1	Fruit dropped 60 cm 2	Fruit dropped 90 cm 3	Bruised on cement floor 4	Peel removed 5 cm diam. 5	Complete removal of peel 6
External						
Dothiorella and Colletotrichum	0,69	0,46	0,00	0,12	0,91	0,58
Anthracoze	0,75	0,58	0,96	0,94	1,45	5,96
Stem-end rot	0,25	0,10	0,22	0,51	0,14	0,19
Internal						
Anthracoze	1,19	0,71	1,26	0,98	2,07	4,94
Stem-end rot	0,31	0,23	0,46	0,69	0,25	0,19
Pulp-spot	0,00	0,00	0,08	0,00	0,16	0,00
Vascular browning	0,00	0,00	0,00	0,00	0,00	0,06
Lead discolouration	0,00	0,00	0,00	0,00	0,00	0,68
Ripening time (days after storage)	3,0	3,0	3,0	3,8	2,9	2,0

TABLE 3: Effect of various types of injuries on the quality of Ryan avocados with an oil content of 15,9%

Disorders on ripe fruit rated 0—10	Control 1	Fruit dropped 60 cm 2	Fruit dropped 90 cm 3	Fruit bruised on cement floor 4	Peel removed 5 cm diam. 5	Peel removed completely 6	
External							
Dothiorella and Colletotrichum	T	0,19	0,79	0,46	0,12	1,00	0,00
	U	0,12	0,61	0,08	0,38	0,74	0,00
	A	0,15	0,69	0,29	0,24	0,88	0,00
Anthracnose	T	0,11	0,79	0,39	0,69	2,62	3,71
	U	0,04	1,32	0,25	0,18	2,04	3,77
	A	0,08	1,08	0,33	0,43	2,35	3,74
Stem-end rot	T	0,00	0,13	0,46	0,15	0,23	0,25
	U	0,00	0,43	0,17	0,43	0,00	0,83
	A	0,00	0,29	0,33	0,30	0,12	0,53
Internal							
Anthracnose	T	0,15	0,08	0,57	0,35	2,08	1,50
	U	0,00	0,89	0,08	0,25	2,00	1,50
	A	0,08	0,52	0,35	0,28	2,04	1,50
Stem-end rot	T	0,00	0,08	0,11	0,15	0,38	0,07
	U	0,00	0,50	0,13	0,36	0,09	0,47
	A	0,00	0,31	0,12	0,26	0,24	0,28
Pulp Spot	T	0,00	0,00	0,00	0,00	0,00	0,00
	U	0,00	0,00	0,00	0,00	0,00	0,00
	A	0,00	0,00	0,00	0,00	0,00	0,00
Vascular browning	T	0,00	0,00	0,00	0,00	0,00	0,04
	U	0,00	0,00	0,00	0,00	0,00	0,00
	A	0,00	0,00	0,00	0,00	0,00	0,02
Lead discolour- ation	T	0,00	0,00	0,00	0,00	0,00	0,00
	U	0,00	0,00	0,00	0,00	0,00	0,00
	A	0,00	0,00	0,00	0,00	0,00	0,00
Ripening time (days after storage)	4,5	4,1	4,1	4,00	3,5	3,0	

T = Treated with 0,4% TBZ in wax

U = Untreated

A = Average

Ripening time = after 28 days storage

TABLE 4: Effect of various types of injuries on quality of Hass avocados with an oil content of 22.1%

Disorders on ripe fruit rated 0—10	Control 1	Fruit dropped 60 cm 2	Fruit dropped 90 cm 3	Bruised on cement floor 4	Peel removed 5 cm diam. 5	Peel removed completely 6
External						
Dothiorella and Colletotrichum	T	0,00	0,00	0,00	0,00	0,00
	U	0,00	0,00	0,00	0,00	0,00
	A	0,00	0,00	0,00	0,00	0,00
Anthracnose	T	0,00	0,34	0,97	0,11	2,39
	U	0,10	0,44	1,02	0,31	0,72
	A	0,07	0,39	1,00	0,25	1,55
Stem-end rot	R	0,16	0,71	0,71	0,27	0,94
	U	0,15	0,00	0,30	0,55	0,28
	A	0,16	0,36	0,50	0,46	0,61
Internal						
Anthracnose	T	0,05	0,52	1,92	0,22	3,89
	U	0,15	0,36	1,61	0,36	1,17
	A	0,12	0,58	1,76	0,32	1,13
Stem-end rot	T	0,16	2,00	1,57	0,50	1,83
	U	0,21	0,00	0,69	0,92	0,67
	A	0,19	0,54	1,12	0,78	1,25
Pulp-spot	T	0,00	0,00	0,00	0,00	0,00
	U	0,00	0,00	0,00	0,18	0,00
	A	0,00	0,00	0,00	0,12	0,00
Vascular browning	T	0,11	0,00	0,00	0,00	0,00
	U	0,00	0,00	0,00	0,00	0,00
	A	0,03	0,00	0,00	0,00	0,00
Lead dis- colouration	T	0,00	0,00	0,00	0,55	0,00
	U	0,00	0,00	0,17	0,34	0,00
	A	0,00	0,00	0,09	0,41	0,00
Ripening time (days after storage)	4,1	4,7	4,2	4,1	3,2	0,0

DISCUSSION

Results are inconsistent. This may be attributed to some varietal differences: e.g. Hass is less susceptible to the *Dothiorella* and *Colletotrichum* complex than Fuerte and Edranol.

The untreated control fruits in Tables 1 and 2 gave poor results and were no better than the treated fruits of treatments 2, 3 and 4. The fruits were, however, better than the treated fruits of the last two treatments (Tables 5 and 6).

Dropping the fruits from a height of 60 cm and 90 cm respectively yielded slight differences only. With the exception of Table 3, all the other experiments showed that dropping the fruits from a height of 90 cm, had more effect on the storage life than dropping fruits from a height of 60 cm. Fruits of treatment 4 had a lower disease incidence than the fruits dropped, irrespective of the height. Treatments 5 and 6 gave the poorest results in all the experiments with both untreated and chemically treated fruits.

Anthracnose was mainly responsible for both external and internal disorders. The 0,4%

TBZ in wax applied to fruits in experiments 3 and 4 did not bring about any change in the condition of the stored avocados after injury as compared to fruits with no chemical applied. Some of the untreated fruits within the same treatment were less severely affected than the treated fruits.

According to our results, the shelf-life of these injured fruits was shortened. After 28 days of cold storage, approximately 97% of the fruit was covered with mycelial growth of *Colletotrichum gloeosporioides* and had more rots than the non-wounded fruit.