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STEM-END ROT AND OTHER POSTHARVEST DISEASES

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OPSOMMING

Die oorsaak van stingel-endbederf is vasgestel as Thyronectria pseudotrichia. *Nog negé ander swamme was betrokke by stingel-endbederf. Besmetting vind meestal in die boord plaas. Koue opberging van vrugte net stingel-endbederf laat verminder maar antraknose het toegeneem.*

An investigation on fungi associated with post-harvest diseases of avocados was initiated in 1977 and continued this past season. A survey of the causal organisms of stem-end rot and fruit rots as well as their.pathogenicity was made.

MATERIALS AND METHODS

Information was collected mainly from fruit used in experiments for the chemical control of post-harvest diseases. PDA was used for the isolation of fungi. For inoculation of fruit, spore suspensions of the pathogens were applied. Assessments of pathogenicity tests for stem-end rot took place 10 days after inoculation.

Fungi were tentatively identified by us and later confirmed or correctly identified by the Commonwealth Mycological Institute in England.

RESULTS

Untreated fruit was packed in cellophane, kept in cold store (6°C) for 28 days and evaluated for post-harvest diseases when soft. (Table 1)

TABLE 1: Damage caused by stem-end rot, anthracnose (conventional symptoms) and *Dothiorella-Colletotrichum* complex on cold-stored, untreated Fuerte fruit during 1978 picking season

Date	Total external & internal damage on ripe fruit (rated 0—10)		
	Stem-end rot	Anthracnose	*Dothiorella-Colletotrichum* complex
16.3.78	6,35	4,09	2,78
28.3.78	1,26	0,78	0,91
30.3.78	2,48	0,80	1,43
31.3.78	2,38	2,21	0,77
3.4.78	2,03	1,61	0,27
10.4.78	0,56	1,18	1,55
24.5.78	0,12	0,78	1,16
31.5.78	0,06	0,35	0,23
15.6.78	0,00	0,06	0,08

A large number of isolations were made from Fuerte fruit to detect the changes that take place in the frequency of occurrence of different stem-end rot pathogens after 28 days cold storage at 6°C (Table 2).

TABLE 2: Frequency of occurrence of various fungi in stem-end rot of Fuerte ripened at room temperature and after 28 days cold storage

Disease	% Occurrence	
	Ripened at room temp.	After 28 days cold storage
Thyronectria pseudotrichia	81	36
Colletotrichum gloeosporioides	7	28
Phomopsis perseae	3	12
Dothiorella aromatica	4	6
Fusarium decemcellulare	1	—
Fusarium sambucinum	—	2
Fusarium solani	—	2
Rhizopus stolonifer	—	8
Drechslera setariae	—	2
Undetermined	4	4

Isolations were also made from stem-end rot of Edranol fruits to determine the causal organisms (Table 3).

TABLE 3: Fungi isolated from stem-end rot of Edranol

Fungi	% Occurrence
Dothiorella aromatica	64
Colletotrichum gloeosporioides	18
Thyronectria pseudotrichia	9
Pestalotiopsis versicolor	9

The pathogenicity of the isolated fungi was tested on freshly picked Fuerte fruit inoculated and kept at room temperature (Table 4).

TABLE 4: Pathogenicity of stem-end rot fungi

Fungi	Average internal stem-end rot damage (rated 0—10)	
	Inoculated on to de-buttoned fruit at stem attachment	Inoculated on to 0,5 cm long fruit stem
Thyronectria pseudotrichia	7,2	2,8
Colletotrichum gloeosporioides	6,7	0,1
Phomopsis perseae	4,3	0,1
Dothiorella aromatica	6,0	5,1
Fusarium decemcellulare	3,1	0,2
Fusarium solani	4,7	0,3
Rhizopus stolonifer	8,9	0,0
Drechslera setariae	2,6	0,0
Pestalotiopsis versicolor	3,0	0,0

DISCUSSION

1. Stem-end rot

Organisms involved in stem-end rot

It is apparent from a large number of isolations that at least 10 different fungi are involved in the disease.

The highest incidence was recorded for *Thyronectria pseudotrichia* on Fuerte, followed by *Colletotrichum gloeosporioides, Phomopsis perseae* and *Dothiorella aromatica.* Later in the season there was a drop in the incidence of *T. pseudotrichia* and the relative frequency of the other organisms increased. In the stem-end rot of Edranol, however, *D. aromática* was the most common pathogen.

The effects of cold storage on stem-end rot

Fuerte fruit which was picked early in the season with low oil content during wet conditions, showed more severe stem-end rot after a 28 day cold storage period than

the fruit kept at room temperature. On the contrary, fruit picked after the rainy season exhibited about 50% less damage after cold storage.

The effect of cold storage on the incidence of various fungi

Cold storage had a pronounced decreasing effect on the frequency of *T. pseudotrichia.* There was an increase in the relative frequency of other organisms, mainly *C. gloeosporioides* and *P. perseae.* It is interesting to note that *Rhizopus stolonifer* appeared on cold stored fruit.

Pathogenicity of stem-end rots fungi

In Table 4 we listed all fungi which were pathogenic when inoculated onto fruit. They differ in their capability of inducing stem-end rot. *R. stolonifer* was the most destructive, followed by *T. pseudotrichia, C. gloeosporioides, D. aromatica, Fusarium solani, P. perseae, Fusarium decemcellulare, Pestalotia versicolor* and *Drechslera setariae* when inoculated through stem attachment of debuttoned fruit. Inoculations through 0,5 cm long fruit stems showed that *D. aromática* is a very effective invader via the stem and that *T. pseudotrichia* can also infect fruit in this way.

2. Anthracnose, caused by C. gloeosporioides

In Table 1 the anthracnose data represents only the typical symptoms which are easy to identify and early fungus sporulation is usually visible in the centre of infection. It was not reduced by cold treatment.

3. Dothiorella-Colletotrichum complex caused fruit rot

We have found the precise identification of this damage a difficult task. Fruit often showed symptoms similar to cold damage but this fruit rot differed from cold damage by the spots being lighter in colour (brown or purplish) and without sharply sunken edges. Usually the rot caused by *Dothiorella-Colletotrichum* complex is superficial, the *Colletotrichum* sporulation appears much later and covers large parts of the stem-end of the fruit while cold damage is usually confined to the widest diameter of the fruit. Isolations are, of course, necessary to confirm the presence of *Dothiorella* especially as the inciting organism of this complex.

SUMMARY

Stem-end rot is a very serious post-harvest disease of Fuerte fruit while wet conditions prevail. The main pathogen isolated from the disease was found to be *Thyronectria pseudotrichia* and further 9 fungus species were involved to a lesser extent in stem-end rot. They probably infect fruit in the orchard, except perhaps *Rhizopus stolonifer* which must be prevented from becoming a 'regular' inhabitant of the packhouse. Later in the picking season, the relative importance of *Colletotrichum gloeosporioides, Phomopsis*

perseae and *Dothiorella aromática* increased. Cold storage decreased the incidence of stem-end rot caused by *T. pseudotrichia.* Anthracnose caused by *C. gloeosporioides* and *Dothiorella-Colletotrichum* fruit rot was not reduced by cold storage.