

## PRE-HARVEST CHEMICAL CONTROL OF POSTHARVEST AVOCADO DISEASES

JM DARVAS

WESTFALIA ESTATE, DUIWELSKLOOF

### OPSOMMING

*Fuerte avokados was met verskillende chemikalieë voor-oes behandel en die uitwerking van hierdie behandeling teen na-oes siektes was ontleed. Dit was gevind dat Difolatan die mees effektiewe produk is gevolg deur koperhidroksied en Baycor. Goeie beheer was ook gekry deur Aliene, Benlate en koperoksichloried. Die eksperimentele B77 en PP266 het onvoldoende beheer gegee en die twee nuwe kleefmiddels, Plyac en Solvaïd was minder effektlef as Nu Film 17 in mengsels met Benlate.*

### SUMMARY

*Fuerte fruit were pre-harvest sprayed with various chemicals and their effect on post-harvest diseases was evaluated. Difolatan was found to be the most effective product closely followed by Cu-hydroxide and Baycor. Good control was also achieved with Aliette, Benlate and Cu-oxychloride. The experimental B77 and PP 296 gave unsatisfactory results and the two new stickers, Plyac and Solvaïd were inferior to Nu Film 17 when added to Benlate.*

### INTRODUCTION

Stevens (1922) obtained the first indications that anthracnose can effectively be controlled by spraying with Bordeaux-mixture. He summarized his findings by recommending two or three timely applications of Bordeaux mixture.

Copper fungicide sprays, primarily aimed at *Cercospora* Spot control were demonstrated to be effective in checking anthracnose (Ruehle, 1943).

Practical problems on the field aspect of anthracnose control was discussed by Allen (1977) in Australia. He remarked that copper sprays at monthly intervals from flower to harvest, yielded promising results in one of the experimental orchards, but at the same time it was unsatisfactory in another locality.

Techniques to evaluate fungicides for the control of anthracnose of avocados were investigated by Kotzé and Kuschke (1979).

On the chemical control of *Dothiorella* rot, Home (1932) wrote that repeated sprays with Bordeaux mixture controlled the disease.

Palmer (1932) in an orchard, where unsprayed fruit showed 80 percent *Dothiorella* infection, achieved a significant reduction in fruit symptoms with Bordeaux mixture spray programme.

A very comprehensive spray experiment was run by Home and Palmer (1935) in which various chemicals were tested. Bordeaux mixture and sulphur gave the best results followed by wettable sulphur alone against *Dothiorella* fruit rot.

No literature could be found on the pre-harvest chemical control of stem-end rot of avocados.

It was established in earlier investigations that there are three major pathological post-harvest problems on avocados at Westfalia Estate. They are stem-end rot, anthracnose and *Dothiorella* rot. The last mentioned is usually associated with a superficial form of anthracnose (Darvas, 1977; Darvas, 1978; Darvas and Kotzé, 1979).

The present study was designed to investigate the pre-harvest chemical control of these diseases on the Fuerte cultivar.

## **MATERIALS AND METHODS**

The experiment was laid out in block 34 of Westfalia Section on Fuerte trees. Eight trees were selected at random in each treatment. Chemical sprays were applied with a high volume ground sprayer and all treatments were sprayed twice; the first in mid-November and the second in mid-January. By end of the experiment, on 23 May 1980 one hundred fruits were picked from each tree and put into cold storage at 6° C for 28 days. After cold storage the fruits were ripened at room temperature and then evaluated for post-harvest diseases.

The following chemicals were tested: Benlate (50% Benomyl), Aliette (80% fosetyl-AI), Cupravit (85% Cu-oxychloride), Difolatan (80% captafol), Kocide 101 (77% Cu-hydroxide), Glyodin experimental material, Plyac exp. mat., Solvaid exp. mat., B77 exp. mat., Baycor exp. mat. and PP 296 exp. mat. A standard sticker, Nu Film 17 was used with some of the fungicides (Table 1) at a concentration of 0,02%.

## **DISCUSSION**

Results in Table 1 illustrate that fruit from the untreated control were the most severely effected by post-harvest diseases. Anthracnose and *Dothiorella/Colletotrichum* complex fruit rot were particularly abundant on non-sprayed fruit.

Nu Film 17 which is currently used as a standard sticker with Benlate at Westfalia for *Cercospora* spot control was compared with two experimental stickers, Plyac and Solvaid. Nu Film 17 enhanced the control of post-harvest diseases by Benlate to a greater extent than the two experimental stickers. Kocide 101, containing Cuhydroxide was superior to the Cu-oxychloride formulation in Cupravit. Both formulations controlled anthracnose and stem-end rot effectively.

Baycor sprays resulted in a considerable reduction of stem-end rot and anthracnose and Aliette also showed a substantial control of post-harvest diseases.

B77 and PP 296 showed little activity against post-harvest diseases.

The best control of post-harvest diseases was obtained with Difolatan. It reduced *Dothiorella/Colletotrichum* complex fruit rot and anthracnose to a lower level than any of the other chemicals tested. Its effect on stem-end rot was also impressive. This chemical also gave the best results against *Cercospora* spot disease and intensive studies are planned with it for the next season.

## RESULTS

TABLE 1: Post-harvest diseases of Fuerte avocado sprayed pre-harvest with various fungicides

Treatment	Diseases on ripe fruit (rated from 0 to 10)								
	External				Internal				
	Chilling injury	Doth./Coll. complex	Anthr-nose	Stem-end rot	Anthr-nose	Stem-end rot	Pulp spot	Vascular browning	Lead dis-colouration
1. Benlate 0,025% a.i. + Nu Film 0,02%	0,00	1,00	0,36	0,33	0,25	0,36	0,25	0,12	0,02
2. Benlate 0,025% a.i. + Plyac 0,03%	0,00	1,23	0,51	0,36	0,44	0,53	0,51	0,44	0,06
3. Benlate 0,025% a.i. + Solvaïd 0,03%	0,03	1,29	0,42	0,31	0,36	0,49	0,45	0,36	0,10
4. Kocide 101 0,2% + Nu Film 0,02%	0,00	0,60	0,09	0,13	0,12	0,18	0,03	0,06	0,00
5. Aliette 0,3% a.i. + Nu Film 0,02%	0,00	1,11	0,19	0,19	0,17	0,25	0,13	0,09	0,02
6. Difolatan 0,2% + Nu Film 0,02%	0,00	0,19	0,11	0,15	0,08	0,19	0,22	0,06	0,05
7. Cupravit 0,3% + Nu Film 0,02%	0,02	1,07	0,49	0,27	0,38	0,25	0,47	0,22	0,12
8. Baycor 0,1% + Nu Film 0,02%	0,00	0,87	0,18	0,07	0,11	0,04	0,21	0,01	0,00
9. B 77 0,15% + Nu Film 0,02%	0,00	1,72	0,62	0,94	0,56	1,07	0,26	0,31	0,03
10. PP 296 0,08% + Nu Film 0,02%	0,00	1,69	0,59	0,40	0,53	0,45	0,35	0,10	0,08
11. Control	0,00	2,57	1,02	0,54	0,69	0,60	0,35	0,14	0,16

## REFERENCES

- ALLEN, RN. 1977. Field aspects anthracnose control. Proceedings Australian Avocado Research Workshop. Binna Burra Lodge. Oct. 1977: 91 - 92.
- DARVAS, JM. 1977. Control of post-harvest diseases on avocado fruit by fungicides with special emphasis on Tecto and Benlate. SAAGA Proceedings of the Technical Committee 1: 11 - 13.
- DARVAS, JM. 1978. Stem-end rot and other post-harvest diseases. SAAGA Research Report for 1978 Vol. 2: 49-50.
- DARVAS, JM and JM KOTZÉ. 1979. Stem-end rot and other postharvest diseases. SAAGA Research Report for 1979 Vol. 3: 41 - 43.

- HORNE, WT. 1932. Pests and diseases. Latest development in avocado disease control. California Avocado Society Yearbook 1932: 33 - 36.
- HORNE, WT and DF PALMER. 1935. The control of Dothiorella rot on avocado fruits. University of California Berkeley California Bull. 594. 16 pp.
- KOTZÉ, JM and EILEEN KUSCHKE. 1979. Control of anthracnose of avocados: techniques to evaluate fungicides. SAAGA Research Report for 1979 Vol. 3: 45 - 46.
- PALMER, DF. 1932. Description of spraying experiments. California Avocado Society Yearbook 1932: 44 - 46.
- RUEHLE, GD. 1943. Cause and control of Cercospora spot and of anthracnose of the avocado. Univ. Florida Agric. Exp. Sta. Press Bull 583.
- STEVENS, JE. 1922. Avocado diseases. Florida Agr. Exp. Sta. Bull. 161 23 pp.