

CERCOSPORA SPOT

J.M. DARVAS

Westfalia Estate

INTRODUCTION

Cercospora spot is an important disease of avocados, particularly in tropical humid area. It is mentioned as one of the most serious problems in Martinique, French West Indies, Cameroon and Florida (Gustafson, 1976). Turu (1969) referred to *Cercospora* spot as the second most common disease of avocados in Mexico. According to Brodrick, Pretorius & Frean (1974) this disease was first noted in South Africa in the Tzaneen area. It has since spread throughout the Northern Transvaal and now also occurs in the Nelspruit district.

The economic importance of the disease is illustrated by Brodrick *et al.* (1974) who, reported that untreated orchards produced only 20% exportable fruit, while 85-90% of the fruit was exportable from trees regularly sprayed with fungicides.

SYMPTOMS

Lesions on fruit appear as small, scattered, brown, slightly sunken spots that have a definite outline but irregular shape. Greyish spore-bearing structures of the fungus appear on the spots, which are 3 to 6 mm in diameter, later develop cracks, which permit the entry of other fungi which cause fruit decay. The *Cercospora* fungus also causes small angular spots on leaves (Zentmyer, 1953). Brodrick *et al.* (1974) described disease symptoms on the fruit as minute, raised, black, shiny spots which do not exceed 3 mm in diameter and are frequently associated with a cracking and corking at the lenticels. The final stage is probably the easiest to detect and this is where other fungi gain excess to cause rapid rot of fruit. The typical brownish cracking and surrounding tissues usually turn black, hence the misleading name "black spot" used for *Cercospora* spot in Tzaneen and other areas.

THE PATHOGEN

There are two distinct *Cercospora* species namely *C. perseae* and *C. purpurea* which are capable of parasitising *Persea* trees. From preliminary studies of the fungi involved in fruit and leaf spot it appears that *C. purpurea* Cooke is predominant. This theory was proved by several experiments in which typical symptoms were induced by inoculating fruit and leaves with spore suspension of the organism followed by successful re-isolation.

C. purpurea produces relatively short conidiophores in compact to spreading fascicles. Conidia are long, 1-9 septate, straight to curved, measuring 2-4,5 x 20-100 μ (Chupp, 1953). Average measurements of conidia trapped in our orchards were 68,8 x 3,1 μ mostly with 7 septae. In pure cultures, especially on rich media, conidia are much longer, often with 11 or more septae. Cultures grow very slowly but sporulate abundantly under near UV treatment.

ISOLATION FROM PLANT TISSUES

The success of the isolation of *C. purpurea* from infected tissues depends on the media used and whether the *Cercospora* spot is invaded by secondary organisms or not. The fungus grows satisfactorily on PDA and other non-synthetic media. On media supplemented with vitamins (thiamine, biotin, riboflavin, etc.) the growth is more vigorous, therefore, more suitable for isolation. Isolations frequently fail because of the secondary organisms, such as *Colletotrichum gloeosporioides* which overruns the slow growing *C. purpurea*.

Isolations from *Cercospora* spots of Fuerte avocados yielded 37% *Cercospora*, 30% *Colletotrichum* and 33% other fungi (*Cladosporium*, *Alternaria*, etc). When isolating on V-8 agar from leaf spots typical for *Cercospora* the following results were obtained: 30% *C. purpurea*, 20% *Epicoccum nigrum*, 19% *Colletotrichum* and 40% others.

DISTRIBUTION OF CERCOSPORA SPOTS ON TREES

A short study was undertaken to investigate the distribution of *Cercospora* spot on fruit from different parts of the trees.

Distribution on Fuerte trees at "Eldorado" on 29.4.77:

East side of the tree	– 3,8 <i>Cercospora</i> spot per fruit
West side of the tree	– 5,6 <i>Cercospora</i> spot per fruit
Inside part of the tree	– 3,1 <i>Cercospora</i> spot per fruit
Top part of the tree	– 6,4 <i>Cercospora</i> spot per fruit

Distribution on Fuerte trees at Westfalia (11A) on 31.5.77:

East side of the tree	– 3,1 <i>Cercospora</i> spot per fruit
West side of the tree	– 6,3 <i>Cercospora</i> spot per fruit
Inside part of the tree	– 6,3 <i>Cercospora</i> spot per fruit
Top part of the tree	– 3,2 <i>Cercospora</i> spot per fruit

Table 1

Distribution of Cercospora spot on fruit from various positions on trees at Westfalia Estate (Eldorado)
The fruit was kept at 5,6°C for 28 days and then ripened at room temperature before assessments were made.

Origin	Cercospora spots	Chilling injury	Diseases on ripe fruit (rated from 1 to 10)				Pulp spot	Vascular browning	Lead discolour
			External		Internal				
			Anthrac-nose	Stem-end rot	Anthrac-nose	Stem-end rot			
East side	3,8	2,08	1,34	0,55	0,62	0,76	0,33	0,29	0,00
West side	5,6	1,45	0,49	0,15	0,35	0,18	0,14	0,01	0,00
Inside part	3,1	2,36	1,54	0,56	1,01	0,83	0,61	0,26	0,00
Top part	6,4	2,10	1,49	0,57	0,73	0,70	0,59	0,28	0,00

Table 2

The incidence of Cercospora spot and Anthracnose on Fuerte fruit at Westfalia on 31.5. 77

	Average number of Cercospora spots/fruit	Average number of Anthracnose/fruit
Eastern side	3,1	0,0
Western side	6,3	0,12
Inside part	6,3	0,2
Top part	3,2	0,0

Table 3

*Effect of various fungicidal treatments on the control of Cercospora spot and Anthracnose.
(Assessments made on 22.4. 77)*

Treatments	Average Number of Cercospora spots/fruit	Average Number of Anthracnose/ fruit
Aliette 0,3%	2,48	0,014
Benlate 6 oz/100 g	0,93	0,003
Benlate 8 oz/100 g	0,58	0,009
Topsin 12 oz/100 g	1,10	0,08
Topsin 16 oz/100 g	0,99	0,054
Control	5,19	0,14

Table 4

*Effect of various fungicidal treatments on the control of Cercospora spot and Anthracnose.
(Assessments made on 15.6. 77)*

	Average Number of Cercospora spot/fruit	Average Number of Anthracnose/ fruit
Aliette 0,3%	4,32	0,03
Benlate 6 oz/100 g	1,17	0,06
Benlate 8 oz/100 g	1,30	0,02
Topsin 12 oz/100 g	3,31	0,20
Topsin 16 oz/100 g	2,06	0,06
Control	8,27	0,42

CHEMICAL CONTROL OF THE DISEASE

Three different chemicals were used in these experiments and they were applied twice in 8 replications.

Spraying dates: 19.11.1976 and 3.2.1977
 Site: Westfalia, block 34, Fuerte avocados
 Treatments: Aliette 0,3% a.i.
 Benlate 6 oz/100 gal water
 Benlate 8 oz/100 gal water
 Topsin 12 oz/100 gal water
 Topsin 16 oz/100 gal water
 Control

Table 5

The development of post-harvest disease after cold storage on fruit sprayed on 22.4.77

Treatment	Diseases on ripe fruit (rated from 1 to 10)							
	External				Internal			
	Chilling injury	Anthrac-nose	Stem-end rot	Anthrac-nose	Stem-end rot	Pulp spot	Vascular browning	Lead discolour
Aliette 0,3%	0,71	0,22	0,40	0,06	0,32	0,17	0,15	0,01
Benlate 6 oz/100 g	0,43	0,13	0,13	0,05	0,17	0,09	0,04	0,00
Benlate 8 oz/100 g	0,38	0,14	0,21	0,04	0,23	0,04	0,06	0,01
Control	0,63	0,19	0,43	0,13	0,42	0,09	0,12	0,01

CONCLUSIONS

1. *Cercospora perseae* is the main cause of Black spot (*Cercospora* spot) on avocados in the Westfalia area.
2. Fruit on the Western aspect of Fuerte trees are inclined to develop a higher incidence of *Cercospora* spot.
3. Benlate was more effective than Aliette and Topsin for the control of *Cercospora* spot and Anthracnose.

References

- BRODRICK, H.T., PRETORIUS, W.J. & FREAN, R.T., 1974. Avocado diseases. Fanning in South Africa. Avocado Series No. H.1: 1 - 8.
- CHUPP, C., 1953. A monograph of the genus *Cercospora* 667 pp. Ithaca, New York.
- GUSTAFSON, C.D., 1976. 1976 World avocado production. California Avocado Society, Yearbook, 1976: 74 - 90.
- TURU, T., 1969. Avocados South of the Border. California Avocado Society, Yearbook 1969-70: 31 - 37.
- ZENTMYER, G.A., 1953. Diseases of the avocado. Yearbook of Agriculture 1953: 875 - 881.