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Report on the epidemiology of pepper spot on Hass avocado

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ABSTRACT

Pepper spot, caused by the fungus *Colletotrichum*, continues to cause concern on Hass avocado fruit in the Kiepersol area. In the 1997/1998 season infection periods of pepper spot were determined by covering Hass fruit at two localities in the Kiepersol area. Fruit were covered with lightweight plastic caps at the beginning of December. Every fortnight a set of 50 caps was removed to allow infection and then replaced at the end of the fortnight. At harvest, fruits were assessed for pepper spot and the data correlated with weather data from the ITSC-Burgershall station. Results show that pepper spot is closely correlated to the periods during which the tree is wet. The developmental stage of the fruit may also be important in terms of resistance.

INTRODUCTION

Pepper spot caused by a *Colletotrichum spp*. continues to cause concern on Hass in the Kiepersol area, since it was first reported in the 1995/1996 season. The disease was initially confined to this location and cultivar, but has since been reported from Levubu on Hass and also from Kiepersol on Pinkerton.

Lesions consist of a multitude of very small shiny black spots on the surface of the fruit. The spots are mostly confined to the upper, outer third of the fruit surface adjacent to the pedicel, the area usually affected by sunburn. The fruit pedicel shows the same spotting. Symptoms appear from late January onward.

Earlier work showed that at least two copper sprays (early November and early January) were necessary to control the disease. A late (March) Benlate spray in addition or three copper sprays (October, December and January) further improved disease control (Schoeman & Manicom, 1998). The grower has to decide if the better packout percentage is worth the costs of the additional fungicide application. Current orchard layouts and equipment sometimes make it difficult for growers to apply more than two rounds per season and therefore pepper spot continues to cause concern and more effective and better-timed sprays are necessary.

During the 1998/1999 season covering trials were conducted at two locations in the Kiepersol area to determine the infection periods of pepper spot. Weather data was recorded and correlated with the infection periods.

The aim of the study was to define critical weather conditions for disease development to enable effective timing of spray applications.

MATER/ALS AND METHODS

Two sites (Weirich and Minnaar) of mature Hass trees with a history of pepper spot were selected at Kiepersol. One thousand fruit were capped with lightweight plastic caps at the beginning of December at each of the two sites. Every fortnight a set of 50 caps was removed to allow infection and then replaced at the end of the fortnight. This gave 13 exposure periods from December to April (Table 1).

Table 1 Exposure periods from December to April (A-K)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1-15 Dec	X*	A											Z**
15-29 Dec			B										
29 Dec-12 Jan				C									
12-26 Jan					D								
26 Jan-9 Feb						E							
9 Feb-23 Feb							F						
23 Feb-9 Mrt								G					
9-23 Mrt									H				
23 Mrt-6 April										I			
6-20 April											J		
20 April-4 May												K	
4 May-19 May													

*X = all fruit capped from 1 December.
**Z = all fruit open from 1 December

Plastic caps chosen as bags are too subject to wind damage and also appear to inhibit fruit development. The sole function of the caps is to prevent water borne spores running down the stem onto the fruit. Polyurethane sealer was used to seal the caps to the stem.

At harvest, fruits were assessed for disease and the data correlated with weather data (rainfall, temperature and humidity) from the ITSC-Burgershall station.

RESULTS

At the end of December fruit drop was severe at both locations and many of the capped fruit dropped. By the middle of January 45% of the capped fruit at Weirich Boerdery had dropped and 40% at Jean Minnaar Boerdery. As a result the number of capped fruit from which caps were removed at fortnightly intervals changed to 40 and later to 35 depending on availability of capped fruit.

The fruit was harvested on 19 and 20 May and evaluated for pepper spot on a scale of 0-3, with 0 = clean fruit, 1 = moderately infected fruit, 2 = moderately to severely infected fruit and 3 = severely infected fruit. Results are expressed in terms of an index according to Wheeler (1969).

Daily rainfall for each location as well as infection indexes are presented in Figure 1 (Weirich) and Figure 2 (Minnaar).

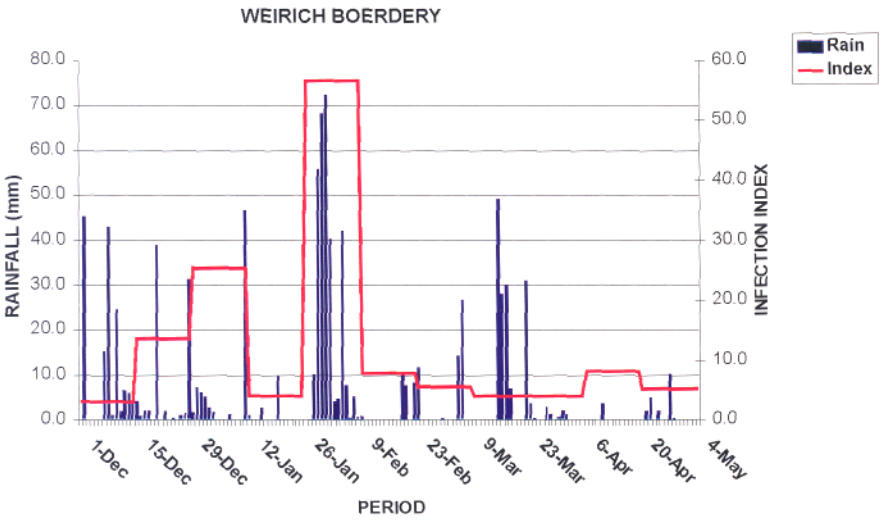

Figure 1 Disease severity in relation to rainfall at Weirich Boerdery in the Burgershall area

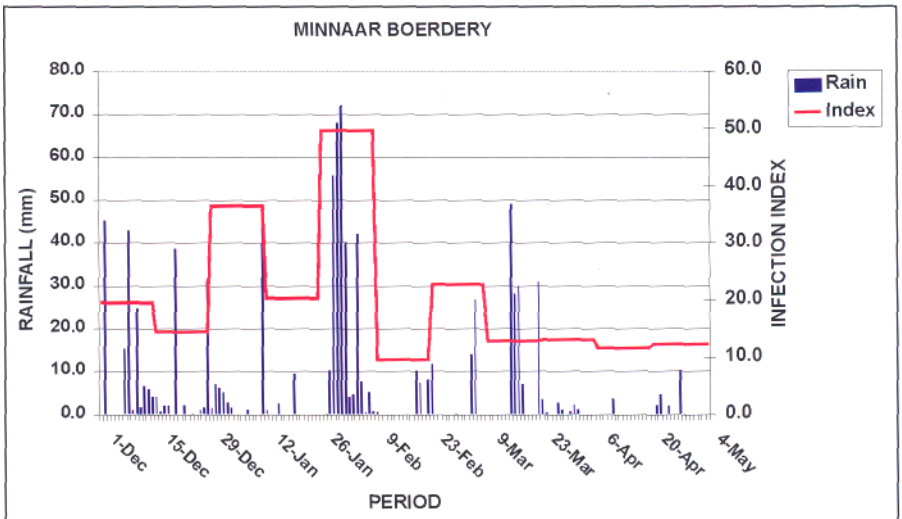

Figure 2 Disease severity in relation to rainfall at Minnaar Boerdery in die Burgershall area

The infection indexes for periods 1 (fruit unexposed from 1 December) and period 13 (fruit exposed from 1 December) are not presented on the graphs. At Minnaar an infection index of 3.7 was calculated for fruit that was unexposed from 1 December to 19 May and at Weirich, an index of 5.8. Some leakage of rainwater between the cap and the pedicel must have occurred despite the sealer. At Minnaar the infection index for fruit exposed during all the periods was 61.4 and at Weirich, 69.4.

DISCUSSION AND CONCLUSION

Infection index data from both localities were pooled for correlation analysis with weather data from Burgershall since the indexes of the two localities were positively

correlated (P = 0.05, r = 0.94). The infection index was positively correlated with rainfall (r = 0.70), minimum temperature (r = 0.46) and minimum humidity (r = 0.52)(P = 0.05). From this it is clear that any climatic condition which wets fruit and lengthens the wet period increases disease.

The highest infection index at both localities was recorded in period E (26 January to 9 February). During this period heavy rain was recorded on several days and rain was recorded on every day, except 26 January. During period A (1-15 December), rain was recorded on 9 of the 14 days, but disease was not as severe. It may be that the inoculum pressure has not built up at this stage or that fruit are more resistant when small (small fruit are known to be resistant to Cercospora spot). The infection indices at Minnaar were higher than at Weirich throughout the season, which could be attributed to a higher initial inoculum present in the orchard. Period D was a very dry period with rain on only two days. The infection index for both localities during this period was low. During period F not much rain was recorded and disease incidence was also low. The orchard at Weirich was unfortunately sprayed during this period, which reduced disease in this and in the following periods. At Minnaar, the rain in period G caused an increase in disease. During period H (9 to 23 March) rainfall was high enough to expect relatively high infection index, but infection was low. It would appear that the fruit might not be susceptible at this stage. Periods I, J and K were dry periods and infection indices were low.

The indication is that the critical infection period is during January and February. Rain and any factor that prolongs the wet period increase disease. The developmental stage of the fruit may be an important factor, and this needs to be investigated.

LITERATURE CITED

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