Effect of Humidity on Conidial Morphology of *Phaeoisariopsis personata*

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During the course of sporulation studies on the late leaf spot pathogen *Phaeoisariopsis personata*, diseased groundnut plants were placed in single plant chambers with controlled humidity (Butler et al. 1995). All chambers were kept at 25°C, and constant humidities of 96%, 98.5%, and 100% relative humidity (RH) were maintained. Conidia from lesions on attached leaves were collected using a suction spore sampler (Woolacott and Ayres 1984) after 24 h, and at 100% RH after 48 h and 72 h. Microscopic examination showed distinct differences in the morphological characters of conidia which developed at various humidity levels (Table 1, Fig. 1).

Table 1. Morphological characters of *Phaeoisariopsis personata* conidia at different relative humidities (RH).

	Length (μm)		Breadth (μm)		Number of septa	
Treatment	Mean	SE	Mean	SE	Mean	SE
96.0% RH (24 h)	38 d	±0.9	6.0 c	±0.10	2.5 c	±0.1
98.5% RH (24 h)	50 c	±1.9	6.0 c	±0.09	3.5 bc	±0.2
100% RH (24 h)	84 b	±4.0	6.2 bc	±0.08	10.5 a	±0.6
100% RH (48 h)	108 a	±4.0	6.1 c	±0.09	11.2 a	±0.4
100% RH (72 h)	115 a	±6.0	6.4 b	±0.06	11.0 a	±0.5
Burkard spore trap catches	42 cd	±1.9	7.0 a	±0.18	4.5 b	±0.3
LSD (5%)	9.31		0.29		1.06	

Mean and standard error values are for 100 determinations. Means followed by the same letter are not significantly different at P<0.05.

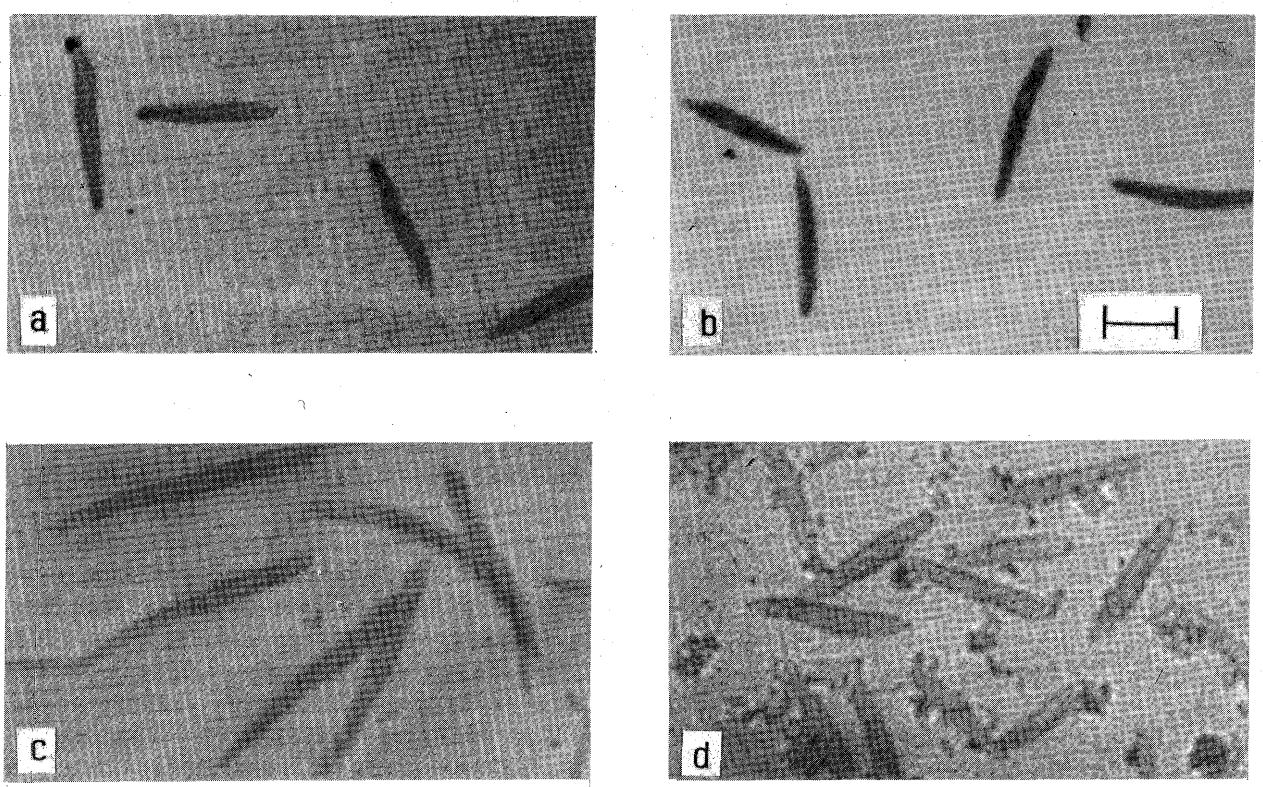

Figure 1. Photomicrographs of *Phaeoisariopsis personata* conidia collected after 24 h exposure to (a) 96% RH, (b) 98.5% RH, (c) 100% RH, and (d) Burkard spore trap catches. Bar represents 20 μm.

After 24 h, mean length of conidia ranged from 84 µm at 100% RH to 38 µm at 96% RH, and there were more than 10 septa at 100% rh compared to 2–3 septa at 96% RH. There were significant differences ($P<0.05$) in both mean conidial length and number of septa between all humidity treatments. A further significant increase in conidial length occurred after 48 h exposure to 100% RH, but there were no equivalent increases in the number of septa. There was no obvious trend in conidial breadth. Usually, conidial dimensions from spore catches in the field in the rainy season (Fig. 1d) are similar to those at the lower humidities (96%–98.5% RH).

Both the conidial length and number of septa at 100% RH reported here are very different to earlier reports for *P. personata* (Deighton 1967). Variability of morphological characters of fungal isolates of the same species collected from different geographical locations is commonly attributed to different pathotypes. The effect of environment on morphological characters can be large and should not be overlooked.

References

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Assessment of Losses in Groundnut Due to Early and Late Leaf Spots

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Early leaf spot caused by *Cercospora arachidicola* and late leaf spot (*Phaeoisariopsis personata*) cause serious damage to groundnut crops in many areas. Leaf spots can cause up to 53% losses in pod yield and 27% losses in seed yield (Patel and Vaishnav 1987). In susceptible genotypes, combined attacks of rust and leaf spot can reduce seed yields by as much as 70% (Subrahmanyam et al. 1980). However, most of these reports are not correlated with repeated disease severity measurements. Therefore, it is not possible to use such data to construct mathematical models of the relationships between disease severity and yield loss. A clear knowledge of such relationships is important for effective disease management.

As a prerequisite to finding such correlations, differential epidemics must be achieved on experimental plots. This can be done by repeated recording of disease in different fields where disease levels are different. An indirect method was used (Van der Graf 1981). Differential epidemics were generated by using different numbers of fungicidal sprays and staggering the timing of sprays, while a disease-free plot was developed by blanket spraying of fungicides.

Groundnut cultivar JL 11 (susceptible to early and late leaf spots) was sown in 2 × 2 m plots during three rainy seasons from 1990 to 1992. The experiment was conducted in a randomized block design with three replications. Tridemorph was used to control rust and carbendazim to control leaf spots. Up to six sprays were applied every 10–15 days; some plots received fewer sprays than others, to generate differential epiphytotics. Tridemorph @ 0.2% was sprayed at 15-day intervals on 10-day old plants to inhibit rust infection, and this treatment did not interfere with leaf spot development (Das and Raj 1992). Similarly, up to six sprays of carbendazim (0.05%) were applied to generate differential levels of leaf spot. A rust-free condition was maintained by using blanket sprays of tridemorph and carbendazim even before appearance of the disease. In another control, no carbendazim was applied.

In each season, artificial epiphytotics were created by inoculating plants with *Cercospora* conidia. Spores were collected from severely infected groundnut leaves from the nearby early-sown fields. Approximately 20 g of infected leaves were blended in one liter of distilled water, and filtered through cheesecloth to remove extraneous debris. The filtrate was centrifuged at 3000 rpm for 15 min, decanted, and the pellet material containing spores was diluted with distilled water to provide a concentration of approximately 2000 spores mL^{-1}. Using a hand sprayer, 25-day old plants were sprayed with the inoculum immediately after it was prepared, till the point of run off in the evening. Spots appeared 15 days after inoculation. Disease severity on individual plants was rated using a 1–6 scale (Lewin et al. 1973) 10 days before harvest and computed as: