

## NEW OR UNUSUAL DISEASE REPORTS

### ***Citrullus lanatus*, a new host of *Bipolaris spicifera* in Morocco**

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**Summary.** *Bipolaris spicifera* was isolated from necrotic leaves of field-grown watermelon plants from the Taroudant area of southern Morocco. The pathogenicity of this fungus was tested on the leaves of two cultivars of watermelon (Peacock 124 and Mabrouka) widely cultivated in this area. The infection coefficients (incidence × severity index) of the cv. Mabrouka and Peacock 124 after inoculation with *B. spicifera* conidial suspensions were 53.3 and 22.4 respectively. Calculated disease development rates were greater for cv. Peacock 124 than for cv. Mabrouka. Conidium production of *B. spicifera* on inoculated leaves was very abundant on the two cultivars, and the fungus was re-isolated from lesions on inoculated plants. This is the first record of *B. spicifera* on watermelon in Morocco.

**Key words:** pathogenicity, watermelon.

Watermelon (*Citrullus lanatus* (Thunb.) is an important horticultural crop in Morocco, where it is cultivated particularly in the high-temperature regions of Souss Massa, Marrakesh, Loukkos, Saïs and Doukkala (Skiredj *et al.*, 2002). Morocco produces 500 000 t of watermelons each year, and is ranked as the world's fifteenth country for watermelon production (FAO Statistics, 2005).

A survey carried out in the Taroudant area of southern Morocco during April 2008 revealed some watermelon plants in field-grown crops, with the leaves completely necrosed. This was the first time that these symptoms were seen in watermelon crops. Sections of symptomatic tissue were placed on blotting paper in Petri dishes and maintained

at 26°C to detect the fungus associated with the lesions. After 4 days, the conidia that developed were plated onto potato dextrose agar using a single-conidium isolation technique and incubated at 27°C. The fungus isolated was characterised by brown and cylindrical conidia (14–20 µm long, 5–10 µm wide) rounded at the ends, each with an evident hilum. Conidia were attached to geniculate conidiophores. Based on the morphological characters, this fungus was identified as *Bipolaris spicifera* (Bainier) Subram. (Fig. 1).

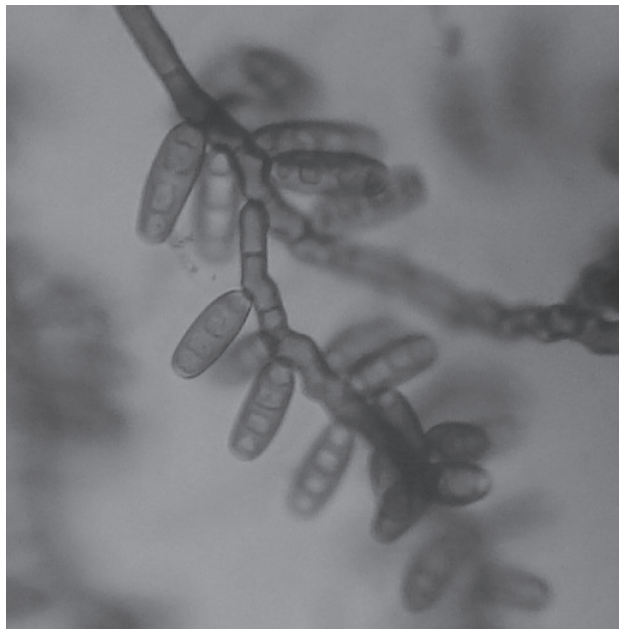
*Bipolaris spicifera* has been isolated from 77 host plants, from the air and from the soil (Ellis, 1971) and was isolated for first time in Morocco from the foliar lesions of rice (Ennaffah *et al.*, 1997), and later from *Hibiscus rosa-sinensis* plants (Meddah *et al.*, 2007).

The pathogenicity of the fungus was confirmed by inoculating plants of two watermelon cultivars (Mabrouka and Peacock 124) with conidium

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Fig. 1. Micrograph of *Bipolaris spicifera* conidia attached to conidiophores ( $\times 400$ ).

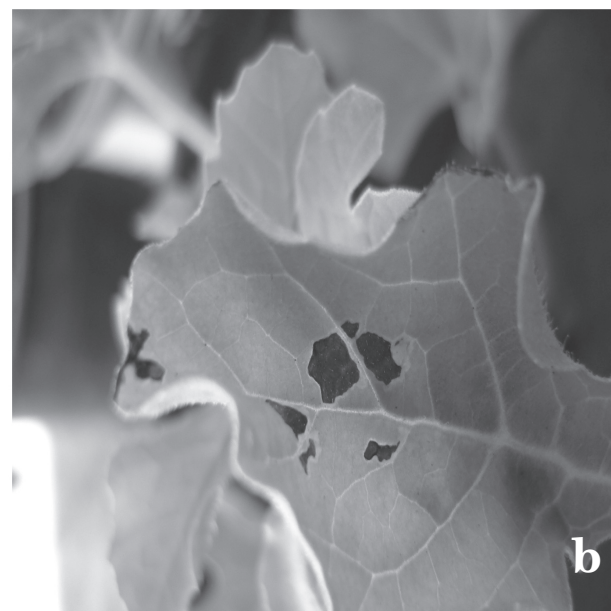


suspensions of *B. spicifera* ( $10^5$  conidia  $\text{ml}^{-1}$ ) in distilled water containing 0.05% of Tween 20 plus 0.25% of gelatine. The inoculum was prepared by scraping the surface of 10-day-old cultures of the fungus. The inoculum was applied on the leaves of plants (three to four true leaves) grown from seeds disinfected with a sodium hypochlorite solution in pots containing soil from the Mamora forest (near Kénitra city). The inoculated plants were kept covered for 48 h with black bags and then moved to a greenhouse.

Symptoms on inoculated leaves appeared 3 days after inoculation, and were characteristically brown to black spots (Fig. 2) measuring 1 to 4 mm in diameter on the two watermelon cultivars tested. The incidence and the severity of the disease 7 days after inoculation were different for the two watermelon cultivars. Disease incidence (number of leaves affected) was 14 for cv. Peacock 124, and 26 for cv. Mabrouka. Disease severity varied between 1 and 2 for cv. Peacock 124, and between 1.25 and 3.5 for cv. Mabrouka. Thus, cv. Mabrouka was the most susceptible to infection, with an infection coefficient (= incidence  $\times$  severity) of 53.3. For cv. Peacock 124 the infection coefficient was 22.4 (Table 1).

The leaf lesions increased in size until they had completely covered individual leaves. We

Fig. 2. Symptoms caused by *Bipolaris spicifera* on leaves of watermelon, 7 days after inoculation.



calculated the development rate of the disease using the equation:

$$\frac{1}{t_1 - t_0} \left[ \log_e \frac{X_1}{1 - X_1} - \log_e \frac{X_0}{1 - X_0} \right]$$

where  $t_1$  = final time,  $t_0$  = initial time,  $X_1$  = final severity index, and  $X_0$  = initial severity index (Castano Zapata, 2002).

The lesions developed more rapidly on leaves of

Table 1. Disease incidence, severity index, and infection coefficients 7 days after inoculation of *Bipolaris spicifera* on the leaves of two watermelon cultivars.

Cultivar	Incidence	Severity	Infection coefficient
Peacock 124	14	1	22.4
		1.5	
		2	
		2	
		1.5	
Mabrouka	26	2	53.3
		2	
		1.25	
		3.5	
		1.5	

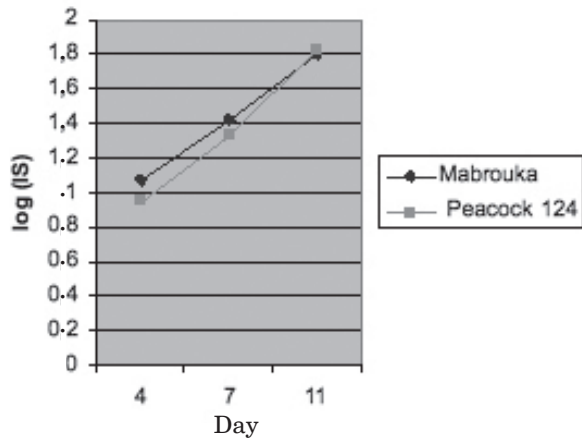


Fig. 3. Disease severity index over 11 days after inoculation of two watermelon cultivars with *Bipolaris spicifera*.

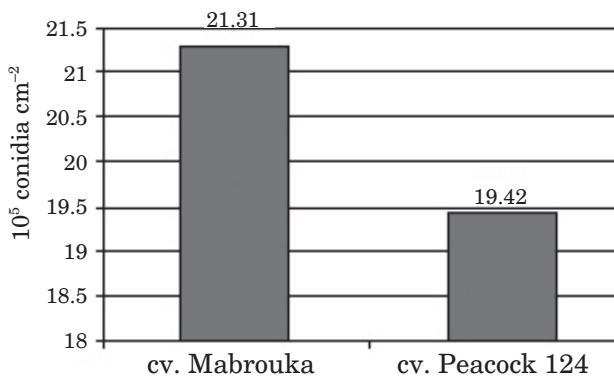


Fig. 4. Production of *Bipolaris spicifera* conidia on the leaves of two watermelon cultivars.

cv. Peacock 124 than on the leaves of cv. Mabrouka (Fig. 3), with the development rate of the disease being 0.17 for cv. Peacock 124 and 0.12 for cv. Mabrouka. We assessed production of *B. spicifera* conidia on infected leaves and recorded a very abundant production of  $21.3 \times 10^5$  conidia  $\text{cm}^{-2}$  on the leaves of cv. Mabrouka and  $19.4 \times 10^5$  conidia  $\text{cm}^{-2}$  on the leaves of cv. Peacock 124 (Fig. 4). We successfully isolated *B. spicifera* from inoculated watermelon plants of both cultivars.

Brown spot caused by different species of *Bipolaris* is not well known on watermelon. However, this fungus does colonise some weeds such as Bermudagrass (*Cynodon dactylon*) (Pratt, 2000), where it causes severe diseases.

To our knowledge, this is the first report of brown spot caused by *Bipolaris spicifera* on watermelon in Morocco. The pathogen poses a potential threat for watermelon production in this country.

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