

Evaluation of culture media for the growth of *Bipolaris sorokiniana* and *Drechslera teres*

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Bipolaris and *Drechslera* are genera of fungi known to cause leaf spots and a variety of symptoms depending on the type of disease and host (2). Wheat and barley crop losses due to leaf spots have been estimated at 15% to 20% grain yield reduction (3). Currently, information on the growth and sporulation of these pathogens in different culture media is scarce and outdated. To perform fungicide sensitivity assays, it is important to conduct the tests with a culture medium that maximizes mycelial growth. In general, culture media have been selected in order to maximize sporulation, but information on media that maximize vegetative growth is scarce. Therefore, the objective of the present study was to evaluate the growth of *Bipolaris sorokiniana* (Sacc.) Schoem. and *Drechslera teres* (Sacc.) Shoem. in different culture media.

A strain of *B. sorokiniana* and a strain of *D. teres* were isolated from barley seeds of the variety Q. Carisma, sampled during the 2015/2016 growing season. A collection of isolates is kept in the University of Buenos Aires, School of Agronomy, Department of Plant Pathology. The used media were: potato carrot agar (PCA, 200 g potato, 200 g carrot, 20 g agar and 1000 ml water), beans agar (BA, 30 g beans, 20 g agar and 1000 ml water), rice agar (RA, 30 g white rice, 20 g agar and 1000 ml water), potato glucose agar (PGA, 200 g potato, 20 g agar and 1000 ml water), potato glucose agar (Britania, 39 g powder and 1000 ml water), barley leaf agar (BLEA, 200 g barley leaf extract, 20 g agar and 1000 ml water), vegetable juice agar (VJA, 1 vegetable stock: 22 g, 20 g agar and 1000 ml water) and carrot agar (CA, 200 g carrot, 20 g agar and 1000 ml water). The assay was performed in 90-mm plastic Petri dishes with five replicates. Mycelial discs (6 mm diameter) were cut with a number 3 cork borer from 7-day-old stock cultures, inverted, transferred to the media and placed in an incubator under conditions of 12 h light close to ultraviolet and 12 h darkness, at 24±2°C. Afterwards, the mycelial growth of each pathogen was measured twice with a digital caliper (DIGIMESS, No. 1304I, China) two, four and six days after incubation. Growth rate was estimated based on the formula proposed by Mead et al. (7), cited by Lovato et al. (5): $V = (X_f - X_i) / (T_2 - T_1)$, where V is the growth rate (cm day⁻¹), X_f is the final growth (cm), X_i is the initial growth, T₂ is the final time and T₁ is the initial time. A completely randomized design with five replicates was performed. Statistical analysis was applied to the results, using One-way ANOVA Tukey's test for comparison of means.

B. sorokiniana had a higher growth rate in RA, PCA, GPA, VJA media, whereas *D. teres* had higher growth in GPA (p<0.05) (Table 1). The CA medium showed an intermediate behavior for both fungi. Considering the characteristics of the colonies of each strain in the

different media, *B. sorokiniana* in RA showed whitish mycelial growth due to lack of sporulation. In an assay with *Fusarium oxysporum* in RA, Berton (1) observed that the production of conidia was low, although it was superior to that in wheat flour medium and potato dextrose agar. On the other hand, using GPA (commercial) medium, pink colonies were observed. This finding was unexpected because when commercial GPA is compared to traditional GPA, the differences in color and sporulation were remarkable for *B. sorokiniana*, which even raised doubts about the isolate. Variation in color and shape has been reported by other authors, e.g., Maraite et al. (6) observed 27 isolates of *B. sorokiniana* and found different colony colors ranging from white to light pink and reaching dark green. Although sporulation was not quantified in VJA and BLEA media, for *D. teres* an abundant production of hyaline conidia was recorded, a characteristic that was not observed in other media. According to Hernández & Rosón (4), the composition of the culture medium can influence the development and the sporulation of fungi because they require sources of carbon, nitrogen, sulfur, iron, sodium and potassium for their metabolism.

In summary, RA, PCA, GPA and VJA for *B. sorokiniana*, and GPA, CA, PCA, GPA (Commercial), VJA and RA for *D. teres* could be used individually or in combination with other media to achieve the highest growth and sporulation, since other media do not favor the rapid and sustained growth of these pathogens.

Table 1. Average growth rate of *B. sorokiniana* and *D. teres* in different culture media

Medium	Colony growth rate (cm day ⁻¹)	
	<i>B. sorokiniana</i>	<i>D. teres</i>
Barley Leaf Extract Agar (BLEA)	0,55 d*	0,21 e
Beans Agar (BA)	0,70 cd	0,65 d
Carrot Agar (CA)	0,81 bc	0,89 b
Glucose Potato Agar (GPA)	0,99 ab	1,06 a
Glucose Potato Agar (Commercial)	0,49 d	0,84 bc
Potato Carrot Agar (PCA)	1,09 ab	0,88 b
Rice Agar (RA)	1,17 a	0,78 c
Vegetable Juice Agar (VJA)	0,98 ab	0,84 bc

*Values followed by different letters in a column are statistically different at p < 0.05 (Tukey's test)

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