Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Target Spot of Soybean Caused by *Corynespora cassiicola* in the Colombian Eastern Plains

Nathali López-Cardona,¹ Alejandra Guevara-Castro,¹ and Lederson Gañán^{2,†}

¹ Corporación Colombiana de Investigación Agropecuaria AGROSAVIA, Centro de Investigación La Libertad, Villavicencio, Meta, Colombia

² Washington State University, Department of Plant Pathology, Pullman, WA 99164, U.S.A.

Funding: Funding was provided by Ministerio de Agricultura y Desarrollo Rural (Macroproyecto 129) and AGROSAVIA. Plant Dis. 105:490, 2021; published online as <https://doi.org/10.1094/PDIS-07-20-1586-PDN>. Accepted for publication 18 September 2020.

Soybean (*Glycine max* L. Merr.) is an important leguminous crop for Colombia, given the growing demand from the livestock, poultry, and aquaculture industries. About 80% of Colombian soybean production is in the State (or Department) of Meta, located in the Eastern Plains region, or Llanos Orientales, where the crop has an average yield of 2.5 t/ha (FENALCE 2020). In July 2017, foliar symptoms, including rounded to irregular reddish-brown spots surrounded by a yellowish halo progressing to irregular spots with concentric rings, and in severe cases defoliation, were observed in a production field of Soyica P-34 soybean cultivar in Puerto López, Meta (Colombia). Dark brown lesions on stems and dark-brown to black spots on pods were also observed, and the incidence of symptomatic plants was recorded as 50%. Four infected plants were arbitrarily sampled from different locations across the field and used for pathogen isolation. Specimen collection was conducted according to the permit conferred to AGROSAVIA under ANLAS resolution number 1466 of December 3, 2014, Colombia. Symptomatic leaf pieces (~5 mm²) were rinsed with tap water for 1 min, dipped in a 0.5% sodium hypochlorite for 2 min, rinsed with sterile distilled water for 1 min, and then plated on potato dextrose agar (PDA, 39 g/liter). Plates were incubated at 25°C for 2 weeks with a 12-h/12-h light/dark cycle using dark light. Four monoconidial isolates with similar morphological characteristics were obtained. Observations under the light microscope showed that conidia ($n = 50$) were hyaline, elongated, 65 to 120 × 9 to 12 µm, with three to 10 pseudosepta, corresponding with those characteristics described for *Corynespora cassiicola* (Berk. & M. A. Curtis) C. T. Wei (Ellis and Holliday 1971). Colonies on PDA medium were dark gray with abundant

aerial mycelia growth. To confirm the morphological identification, extracted DNA from isolates AGSV13 and AGSV15 was used as a template to obtain partial sequences of the internal transcribed spacer (ITS) region of ribosomal DNA using the primer pair ITS 5/ITS 4 (White et al. 1990). Results from an NCBI-BLASTn search revealed that the ITS sequences (GenBank accessions MN298749 and MN298751) were 100% identical to those of *C. cassiicola* in GenBank (accessions MN945374 and AB873045). A phylogenetic analysis, using the maximum likelihood method, based on ITS sequences from voucher specimens of *Corynespora* spp. available at GenBank, revealed that the two isolates were placed in the same clade as *C. cassiicola*. Pathogenicity tests were conducted by spraying a conidial suspension (1×10^4 conidia/ml) of *C. cassiicola* AGSV13 onto young leaves (two to four true leaf stages) of 10 soybean plants (cv. Soyica P-34). Five plants were sprayed with sterile distilled water and served as a noninoculated control. All plants were incubated at high humidity for 7 days at 28°C. Fungal-inoculated plants showed typical foliar symptoms of brown spots surrounded by a yellowish halo, similar to those observed in the field. Disease symptoms were not observed on plants of the noninoculated control. Fungal cultures were recovered from symptomatic leaves of all inoculated plants and verified as similar in morphology to the original *C. cassiicola* isolates, thus fulfilling Koch's postulates. Based on morphology, pathogenicity, and sequence data results, this is the first report of *C. cassiicola* causing target spot on soybean in the Eastern Plains of Colombia and expands our knowledge of this disease. Target spot poses a threat to the expanding soybean crops in this country, because the range of yield losses due to this disease, in South America, has been estimated to be 8 to 42%, depending on the cultivar (Edwards Molina et al. 2019). These findings are significant to the soybean industry in Colombia and will be useful to provide better recommendations to growers for disease monitoring and management.

References:

- Edwards Molina, J. P., et al. 2019. Plant Pathol. 68:107.
- Ellis, M. B., and Holliday, P. 1971. Descriptions of Pathogenic Fungi and Bacteria, No. 303. CMI, Kew, U.K.
- FENALCE. 2020. Indicadores Cerealistas 2019. Federación Nacional de Cultivadores de Cereales, Leguminosas y Soya, Bogotá, Colombia.
- White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: fungi, field crops, oilseeds and legumes, etiology

[†]Indicates the corresponding author.

E-mail: L. Gañán; l.gananbetancur@wsu.edu