plant disease

Editor-in-Chief: Anthony P. Keinath
Published by The American Phytopathological Society

August 2007, Volume 91, Number 8
Page 1051
DOI: 10.1094/PDIS-91-8-1051B

Disease Notes

First Report of *Phytophthora palmivora*, Causal Agent of Black Pod, on Cacao in Puerto Rico

B. M. Irish and **R. Goenaga**, USDA-ARS Tropical Agriculture Research Station, Mayaguez, Puerto Rico; and **S. Park** and **S. Kang**, Department of Plant Pathology, Pennsylvania State University, University Park

Black pod or Phytophthora pod rot is the most economically important and widespread disease of cacao, *Theobroma cacao* L. Total losses due to Phytophthora exceed $400 million worldwide (1), and several species are known to attack cacao with *P. palmivora* (E.J. Butler) E. J. Butler as the most common. All plant parts are infected, but pod infections are particularly damaging. Symptoms resembling those of black pod disease were observed at the National Plant Germplasm Collection System of cacao at the USDA-ARS Tropical Agriculture Research Station (TARS) in Mayaguez, Puerto Rico for a number of years. During May of 2005, to determine the etiology of the disease, small, surface disinfested sections of pod lesions were placed on water agar and incubated for 4 days. The formation of papillate, deciduous, ellipsoidal to ovoid sporangia produced on sympodial sporangiophores on fruits, fit the description of *P. palmivora* and the identification was confirmed on cultures on water agar (2). Chlamydospores were readily observed in diseased pods and observed in pure cultures on V8 agar (2). Eight, single hyphal tips were transferred to potato dextrose agar (PDA) (Sigma-Aldrich, St. Louis, MO) and maintained as stock cultures. For pathogenicity tests, healthy mature pods were surface disinfested and placed in a humidity chamber lined with moist paper towels. Eight isolates were tested on four fruits per isolate and the pathogenicity test was repeated once. Inoculum was prepared by growing each isolate on PDA for 5 days with irradiation at 24°C, adding approximately 3.0 ml of water to each plate, dislodging the sporangia with a glass rod, mixing the suspension, estimating spore numbers with a hemacytometer, and

ISSN: 0191-2917

adjusting to 10^4 sporangia per ml. A small, sterile scalpel was used to make an approximately 20.0 mm cut on the fruit epidermis, and approximately 0.2 ml of inoculum was placed on the wound. Pods were evaluated daily for 2 weeks. For molecular analysis, each of the eight cultures were grown in 50% potato dextrose broth to produce mycelia for DNA extraction using the FastDNA kit (Q-Biogen1, Irvine, CA). The internal transcribed spacer (ITS) region of the ribosomal RNA gene cluster was amplified, purified, and sequenced for all eight isolates. The ITS sequences of GenBank Accession Nos. DQ987915 to DQ987922 were identical and exhibited strong similarity (>99% identity) to that of three previously described isolates of *P. palmivora* from cacao (GenBank Accession Nos. AF 228097, AF467093, and AF467089). *P. palmivora* has been reported on citrus, coconut, black pepper, and *Arracacia xanthorrhiza* in Puerto Rico (2,3) and inoculum may have originated from these host or imported on cacao planted into the cacao collection before 2000. USDA-ARS-TARS is the official site for the cacao germplasm collection, thus, a detailed integrated pest management plan that includes the evaluation for resistance, sanitation measures, and use of fungicides to reduce disease levels has been implemented. Decreasing incidence and severity of this disease is a top priority. To our knowledge, this is the first report of *P. palmivora* on cacao in Puerto Rico.

References: (1) M. C. T. Braga et al. Agrotropica 1:108, 1989. (2) D. Erwin and O. K. Ribeiro. Phytophthora Diseases Worldwide. The American Phytopathological Society. St. Paul, MN, 1996. (3) E. Rosa-Marquez. J. Agric. Univ. P. R. 84:53, 2000.