

First Report of *Xanthomonas phaseoli* pv. *manihotis*, the Causal Agent of Cassava Bacterial Blight, in Mali

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Cassava bacterial blight (CBB), which is a vascular disease caused by *Xanthomonas phaseoli* pv. *manihotis* (*Xpm*), previously known as *Xanthomonas axonopodis* pv. *manihotis*, poses a major threat to cassava (*Manihot esculenta*) production worldwide. Typical symptoms include angular leaf lesions, blight, wilting, stem exudates, and stem cankers. Stem cuttings are used to propagate cassava and play a crucial role in *Xpm* dissemination. In line with a growing interest of smallholder farmers for cassava in West Africa, recent surveys revealed the occurrence of CBB in Burkina Faso (Wonni et al. 2015) and Ivory Coast (Kone et al. 2015). In Mali, which shares borders with these two countries, CBB was reported in the early 1980s, but the available information is quite limited: there is no description of symptoms nor of the causal agent, and no strain of the pathogen has been isolated (CABI 2018). To fill this gap, cassava fields were surveyed in the regions of Ségou (site of Bla) and Bamako (sites of Sotuba and Samanko) from December 2015 to January 2016. Approximately 80 leaves exhibiting typical angular translucent spots were collected at the three sites and processed for bacterial isolation. White *Xanthomonas*-like colonies were isolated from ground diseased leaf tissues 48 h after incubation at 28°C on LPGA medium (yeast, 5 g; peptone, 5 g; glucose, 5 g; Bacto agar, 15 g; distilled water, 1 liter). Fifty candidate *Xpm* strains were then tested using a diagnostic multiplex PCR (Bernal-Galeano et al. 2018) using the *Xpm* reference type strain CFBP 7661 as a positive control. The two bands expected for *Xpm* were obtained for 40 candidate strains, as well as for



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Caption

Symptoms of citrus yellow mottle-associated virus on a leaf of Washington navel orange (J. X. Wu et al.). Photo credit: M. J. Cao. Effect of pydiflumetofen + difenoconazole on the severity of *Cercospora* leaf spot caused by *Cercospora beticola* in a small plot (S. J. Pethybridge et al.). Photo credit: S. J. Pethybridge.

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CFBP 7661. *Xpm* strains CIX2484, CIX2492, CIX2502, CIX2504, CIX2497, and CIX2498 were further analyzed by sequencing of the housekeeping gene *gyrB*, resulting into 98 to 100% identity with the *gyrB* sequence of 66 *Xpm* strains available at NCBI, including the type strain CFBP 7661. Pathogenicity tests were performed on 4-week-old cassava plants of the MCOL1522 cultivar. CIX2484, CIX2492, CIX2502, CIX2504, CIX2497, and CIX2498 strains were grown overnight in LPGA medium and resuspended in sterile water at 1×10^8 CFU/ml. Bacterial suspensions were inoculated into cassava leaves and stems as previously described (Wonni et al. 2015), whereas sterile water and *Xpm* strain CFBP 7661 were used as negative and positive controls, respectively. After 7 days of incubation under greenhouse conditions (28°C, 70% relative humidity, and a photoperiod of 12 h), cassava leaves developed typical CBB water-soaked lesions. Wilted leaves and stem exudates were also visible 30 days after stem inoculation, with symptoms being reminiscent of those typically seen in the field. By contrast, plants inoculated with water remained symptomless. White colonies with a typical *Xanthomonas*-like morphology were next reisolated from diseased leaves and confirmed as *Xpm* using the diagnostic PCR assay, thus fulfilling Koch's postulates. Strains CIX2484, CIX2492, and CIX2504 were deposited in the French Collection for Plant-Associated Bacteria (CIRM-CFBP). Information on *Xpm* strains as well as *gyrB* sequences is available through CIRM-CFBP: https://www6.inra.fr/cirm_eng/CFBP-Plant-Associated-Bacteria. To our knowledge, this is the first report of CBB in Mali supported by molecular diagnostic methods. Given the growing importance of cassava for human consumption, CBB could represent a major threat in Mali, as well as in neighboring countries. Further surveys at the national level will help to evaluate the

prevalence of CBB in Mali and help orientate adapted control strategies.

The author(s) declare no conflict of interest.



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