First Report of Orange Rust caused by *Puccinia kuehnii* on sugarcane on the Island of Reunion

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Puccinia kuehnii (W. Krüger) E. J. Butler, the causal agent of orange rust, is reported as one of the two known widely spread rust species on commercial sugarcane (*Saccharum* spp.). This pathogen affects plant foliage, and the symptoms are characterized by the appearance of small elongated uredinial lesions (pustules), typically light orange to yellowish-brown, oval in shape, producing urediniospores. On highly susceptible cultivars, abundant pustules develop and coalesce on lower leaf surface, causing tissue death. On such cultivars, orange rust has severe yield and economic impact (Magarey et al. 2001). This pathogen has expanded its range of distribution over the last ten years, now affecting America and Africa. In July and August 2018, in different areas of Reunion Island, typical rust symptoms were observed on leaves of R062006 and R062007 sugarcane varieties in selection. The intensity of the disease was low to moderate. Samples were collected on both varieties in fields from ERCANE breeding station in Saint-Louis (Le Gol) in the southwest (-21.265027; 55.379830) and in Saint-Philippe (Le Baril) in the southeast (-21.359220; 55.731959) for laboratory analysis. The lesions were examined under a dissecting microscope. Microscopic slides were prepared from material by carefully picking up spores in rust sori with a needle. The presence of the causal fungus of orange rust was confirmed by the observation of typical microscopic features. Urediniospores were mostly obovoid to pyriform, echinulate, variable in size, 35.9 - 57.1 x 16.4 – 29.5 µ. Walls were 1- 2.5 µm thick, most often with apical thickening up to 8.3 µm. Few inconspicuous hyaline paraphyses with thin wall (1-2 µm) were present. No teliospore could be observed (Virtudazo et al. 2001; Dixon et al. 2010). Identity of the species involved was determined by sequencing the internal transcribed spacer (ITS) region of the rDNA followed by comparison with reference sequences available on GenBank. Leaf material containing uredinial lesions was cut into pieces about 2x3 mm and transferred into 2 mL microtubes. Total DNA was then extracted using a commercial plant DNA extraction kit (DNeasy Plant Mini Kit, Qiagen) and the fungal ITS region was amplified by PCR using specific primers PkPm-F/R, located respectively in ITS1 and ITS2 (Glynn et al. 2010). Nucleotide sequence was determined and deposited on GenBank (MK578656-MK578657). Analysis of the sequence by BLAST showed 100% and 99% identity with *P. kuehnii*, over a 494 and 493 bp length, respectively, which was consistent with the morphological features observed. This is the first report of *P. kuehnii* in Reunion Island. Up to now, the disease has only been found in cultivar trials in Reunion. Orange rust has spread rapidly in the sister mascarene Island of Mauritius since it was initially detected in March 2018. Out of four cultivars present in Mauritius and planted on Reunion, three tend to be moderately or slightly susceptible and one is symptomless (S. Saumtally, personal communication). Following the emergence of brown rust caused by *Puccinia melanocephala* Syd. & P. Syd. in Reunion in 1965 (Boyer de la Giroday et al. 1979), resistant cultivars, such as R570 bearing the *Bru*I resistance gene (Costet et al. 2012), have been bred and planted to control this rust species. The same work will have to be

conducted by the breeders in the years to come in order to take into account this new threat.

References **:**

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