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**INSECT VECTORS OF *XANTHOMONAS CAMPESTRIS* PV
MUSACEARUM: DISTRIBUTION ACROSS ALTITUDES, SEASONS
AND BANANA CULTIVARS IN RWANDA**

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ABSTRACT

Xanthomonas Wilt of banana (XW) is a devastating bacterial disease in Rwanda. To gain an improved understanding on the management of XW, two studies were carried out in Rwanda. Data were collected mainly on identification of insect vectors of XW, nectar volume and sugar content and XW incidence across banana varieties grown in the study areas. Sampling for insects was done across four agro-ecologies, four annual seasons and four times of the day. Sampling for nectar followed the same pattern as for insects except that the time of the day was not considered. To confirm vector status, *Xcm* was isolated from insect body parts using a semi-selective medium (Cellobiose Cephalixin Agar). High Performance Liquid Chromatography (HPLC) was used to identify nectar sugar content. Nectar was removed from flowers by rinsing with distilled water and the nectar volume obtained as a difference between the total volume and the volume of water added during rinsing. XW incidence was assessed by looking at the proportion of male bud infection in the study fields. Results revealed 17 insect species commonly associated with banana flowers. Among them four (Drosophilae/fruit flies, bees, flies and wasps) were confirmed vectors of *Xcm* as the bacterium was isolated from them. The four insect vectors were generally more active during mid-day and early afternoon and more prevalent in the low altitude and the Lake Kivu border region during the long rainy season. Of 27 banana cultivars encountered, beer and dessert banana genotypes attracted more insects. These banana cultivars were the most affected by XW with the highest mean incidence ranging between 1.2% –3% and 0.5% – 3.2% (square root transformed data) for the dessert and beer bananas, respectively. The disease incidence varied across the four agro-ecologies and the four annual seasons with the highest mean disease incidence of 5.8% recorded in the low altitude and during the long rainy season (4.4%). Nectar volume and sugar content also significantly varied ($P < 0.01$) across the factors considered for this study. Three sugars (Glucose, Fructose and Sucrose) were identified in nectar across all assessed banana genotypes. Dessert and beer bananas contained more sugars in comparison to other genotypes. Nectar sugar content was highest in the low altitude during the long dry season. But nectar was hardly available during that season and was rather available in moderate concentrations during the long rainy season. Insects were more prevalent during the latter and this also corresponded with higher disease incidence. It was concluded that XW incidence increases with increase of the prevalence of insect vectors and these ones seemed to be attracted by the availability of nectar and sugar. In that case, banana varieties with dehiscent male buds and non-persistent male flowers and bracts were highly susceptible to XW via insect transmission. This was the case of all assessed banana varieties with the exception of some cultivars (i.e. 'Nkazikamwe', 'Impura' and 'Ikinyangurube') that possess non-dehiscent male buds and subsequently, persistent male flowers and bracts. This study therefore strengthened the recommendation of timely and regular removal of male buds and cultivation of banana cultivars that escape the disease due to possession of persistent male flowers. In the long run, studies to manipulate and reduce nectar secretion by bananas should be initiated.