SEED TRANSMISSION EFFICIENCY FOR Xanthomonas campestris pv. phaseoli

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Xanthomonas campestris pv. phaseoli (XCP) the causal organism of common bacterial blight of beans is mainly seed transmitted (Cafati and Saettler, 1980; Weller and Saettler, 1980). The most important control measures of this disease are use of resistant varieties and use of disease free seed. In Uganda and other countries of Eastern Africa, farmers keep seed from previous season for planting the following season. This helps build up inoculum in farmers' seed. Hence it is important for farmers to use varieties with very low seed transmission efficiency. This reduces the build up of CBB in subsequent crops.

A study was carried out at Kawanda Agricultural Research Institute (KARI) to evaluate elite breeders beans lines from different countries in Eastern Africa using five most aggressive XCP isolates from the same region. The varieties were K20, CAL 96, RWR 136 and MCM 5001 (from Uganda); 2395-B-b-1 and 2439-B-b-1 (from Tanzania); Awash 1, Roba and ICA linea 64 (from Ethiopia); and GLP 585 (from Kenya). Kanyebwa and Kasuka Nyewele were susceptible checks and XAN 112 was a resistant check. The seeds of each of the variety used was increased from a single seed in the greenhouse at Kawanda. The seeds were all inoculated by soaking in a bacterial suspension for four hours before planting. The inoculum concentration used was 5x10^7 cfu per millilitre. The XCP isolates used were 1068, 1073, 1069, 1010 and 1029. The design was split-plot with isolates in main plots and genotypes in subplots.

Records were taken on incidence of CBB as percentage of infected seedlings at 10, 18, 35, and 56 days after sowing. Disease transmission efficiency (TE) was calculated as:

\[ \text{TE} = \frac{\text{NDS} \times 100}{\text{TGS}} \]

Where NDS is the number of diseased seedlings at 10 days after sowing and TGS is the total number of seedlings that germinated.
The results showed significant difference \( (P< 0.05) \) between genotypes in their ability to transmit XCP from seed to seedling. K20 had the highest infected seedlings at 10 and 18 days after sowing. These were followed by RWR 136, 2395-B-b-1, GLP 585, 2439-B-b-1, Awash 1, CAL 96, Roba and Ica linea 64 respectively. All seedlings from seeds of MCM 5001 and XAN 112 were healthy for all treatments. These results indicate that these two genotypes had very low or no transmission of the disease and could be used by breeders for developing bean varieties that are resistant to CBB and with low (or no) transmission efficiency of the disease. A significant interaction between isolates and genotypes was obtained in this study indicating that CBB seed transmission in beans depends on the XCP isolates and the genotype used.

This work will continue to evaluate more breeders lines in order to identify more bean lines that can be used by breeders to develop bean varieties which are both resistant to CBB infection and seed transmission.

References: