Screening Graft Compatibility Between Sweet Watermelon Varieties and Bottle Gourd Landraces: The Case of South Africa

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Abstract:

Sweet watermelon is one of the widely consumed crop in the world. However, its production faces many challenges such as biotic (pest and diseases) and abiotic (heat and drought) stress particularly in sub-Saharan Africa. Techniques such as grafting with related species in the same family have never been explored in South Africa owing to the larger pool of potential resistant species. This study, therefore, investigated the grafting compatibility of four watermelon varieties (Carina, Turbo, Sante Matilda, and Audry) with eight selected bottle gourd landraces (BG-19, BG-24, BG-27, BG-29, BG-33, BG-70, BG-79, and Clive Govender). The seeds of sweet watermelon varieties and bottle gourd landraces were planted simultaneously following the standard planting procedure in seedling trays. Two weeks post emergence, the watermelon seedlings were grafted onto the bottle gourd landraces using hole insertion method. After grafting, four grafts from each combination were randomly placed in one of the four healing chambers in a randomized complete block design. The healing chambers were 160L black plastic containers, each containing 1L of water to increase humidity, maintained 27°C. The grafted seedlings remained in the healing chambers for two weeks. The chambers were kept in darkness for 24 hours, with light gradually introduced from days 2 to 4. On day 5, four 2 cm holes were made to reduce humidity, increased by 2 cm daily for 4 days. By day 11, the covers were removed to fully reduce humidity. The seedlings remained in the open chambers for 3 days before being moved to a net house for 7 days of hardening. The results revealed that the Carina variety had the highest survival rate, with 100% survival rate on Clive Govender and BG-19 landraces, and an average survival rate of 69% across other landraces. Sante Matilda and Audry exhibited similar survival rates across all landraces with an average survival rate of 79 and 73% on Clive Govender and BG 19 respectively; and 52% across other landraces, while the Turbo variety had a 0% survival rate across all landraces.

These results revealed potential graft union compatibility for further exploration for biotic and abiotic stresses.

Keywords:

Grafting, landrace, watermelon, bottle gourd, compatible.