



Integrated pest management for *Bemisia tabaci* and *Tuta absoluta* on solanaceous vegetables in Tanzania

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Introduction

Vegetables play a vital role in the economy and nutrition of smallholder farmers in rural and peri-urban areas of Tanzania. Solanaceous vegetables, especially tomato and sweet pepper, are key horticultural crops for improving farmers' livelihoods. Income from tomato sales is used for family needs, including the purchase of other foods. Infestation by a plethora of insect pest species constrains production of these crops. Whitefly (*Bemisia tabaci* Genn.) and South American pinworm (*Tuta absoluta* Meyrick) cause the most damage.

Aim

This study evaluated the efficacy of net houses and a biopesticide (*Metarhizium anisopliae*) against *B. tabaci* and *T. absoluta* in farmers' fields in Babati district, Tanzania.

Results

Results showed that *M. anisopliae* and net houses had a synergistic effect on the control of *T. absoluta* on tomato leading to high yield, averaging 38.6 ± 4.0 and 37.5 ± 3.9 t/ha (Fig. 1A) as well as controlling of *B. tabaci* on sweet pepper yielding 17.6 ± 2.2 and 16.2 ± 2.0 t/ha in net house and open field conditions, respectively (Fig. 2A). Integration of *M. anisopliae* and net houses against *B. tabaci* yielded 97.9% and 94.6% of marketable tomato and pepper, respectively, whereas untreated open fields produced only 70.6% and 63.2% of marketable tomato and pepper, respectively (Fig. 1B and 2B). Generally, untreated tomato plants were more susceptible to *T. absoluta* damage, and untreated pepper plants were prone to *B. tabaci* infestation.

Material & Methods

The study was conducted from February to June 2017 (the rainy season) following a Randomized Complete Block Design. Tomato variety 'Tengeru 2010' and sweet pepper variety 'Yolo wonder' were used. The experiment was conducted in three villages--Matufa, Shaurimoyo and Bermi--under open field and net house conditions in each location. *Metarhizium anisopliae* was applied in all biopesticide treatments. Water was applied as the control treatment by drenching the root-zone of three-week-old seedlings. Treatments were organized as follows:

Tbio-OP: Tomato with biopesticide in open field

Tbio-SH: Tomato with biopesticide in net house

Tno-OP: Tomato without biopesticide in open field

Tno-SH: Tomato without biopesticide in net house

Swbio-OP: Sweet pepper with biopesticide in open field

Swbio-SH: Sweet pepper with biopesticide in net house

Swno-OP: Sweet pepper without biopesticide in open field

Swno-SH: Sweet pepper without biopesticide in net house

Conclusion

Integrating biopesticides and net houses was an effective approach for management of South American pinworm on tomato and whitefly on tomato and pepper, and increased marketable yields.

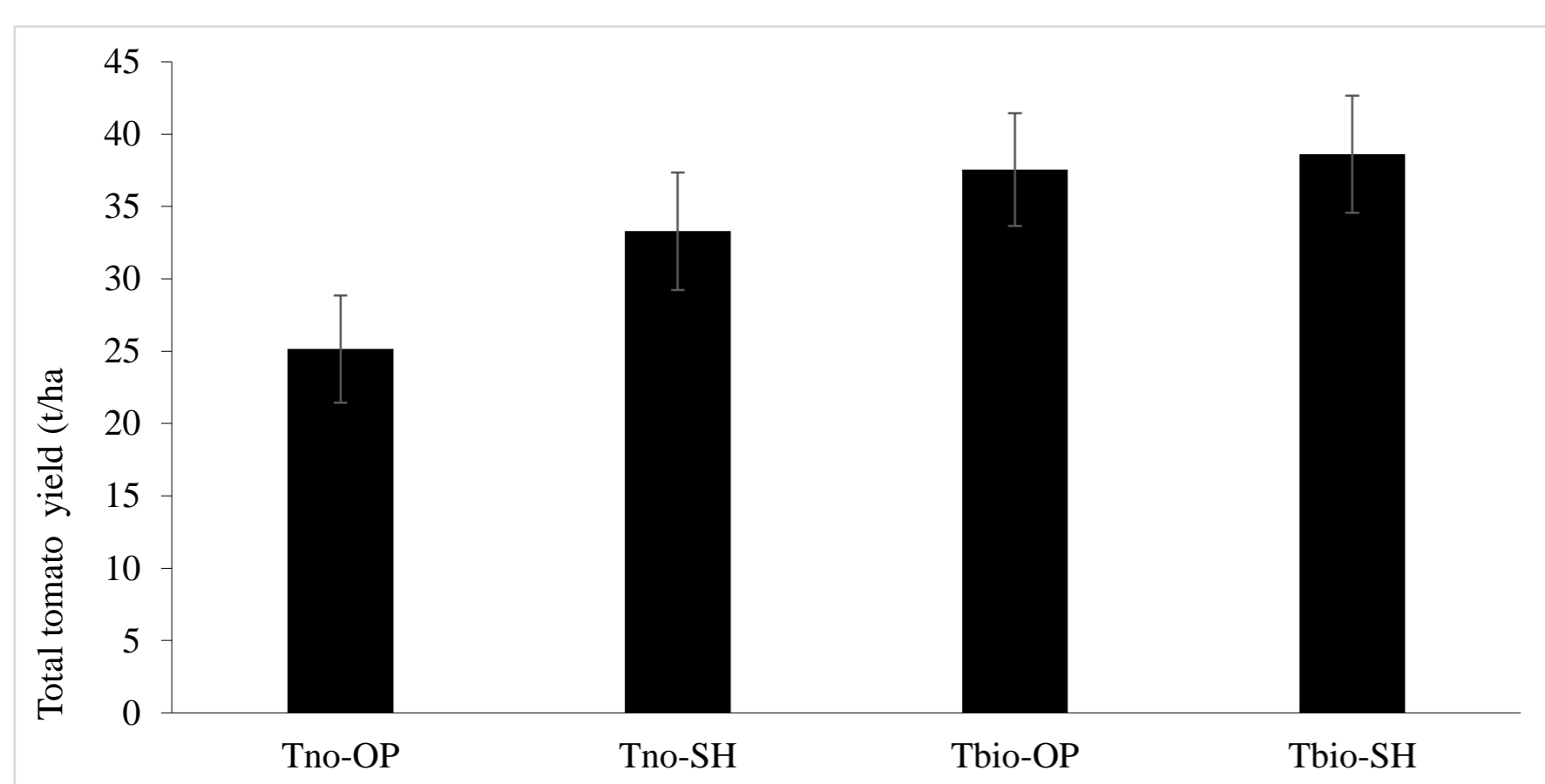


Fig. 1A: Total tomato yield t/ha in treated and control open and net house plots.

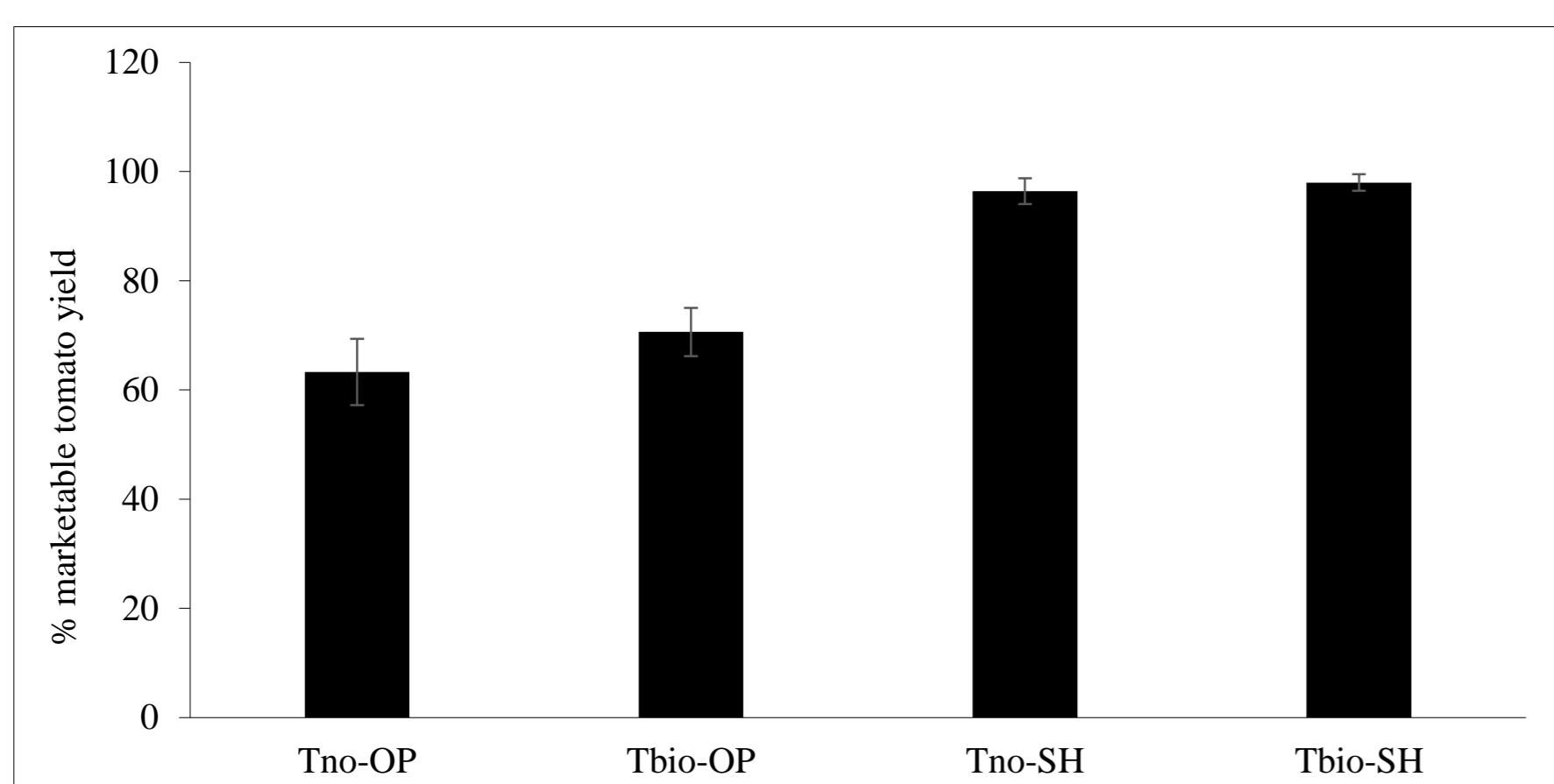


Fig. 1B: Percentage of marketable tomato yield after sorting out *T. absoluta* damaged fruits indicated by excavating holes.

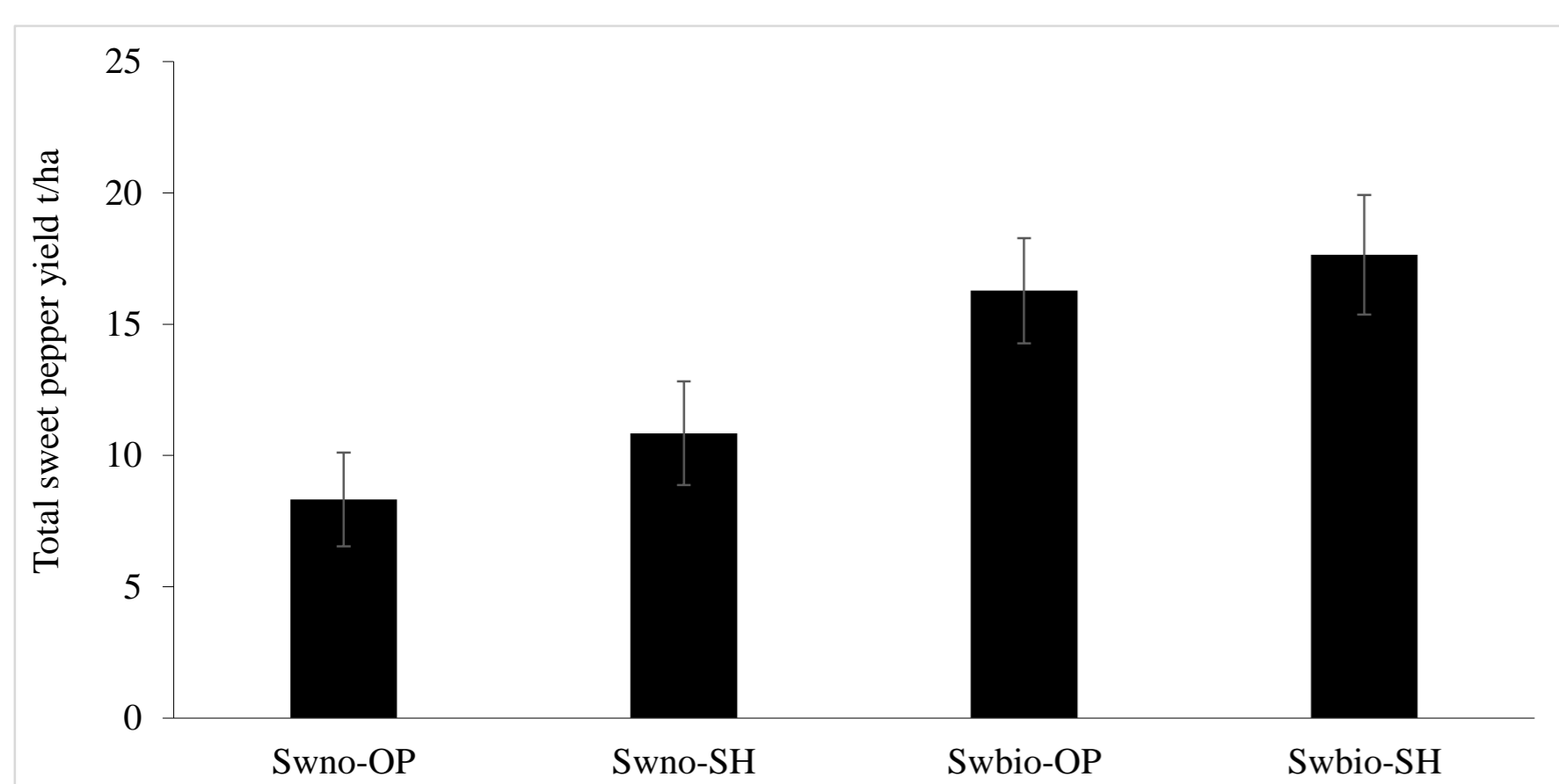


Fig. 2A: Total sweet pepper yield t/ha in treated and control open and net house plots.

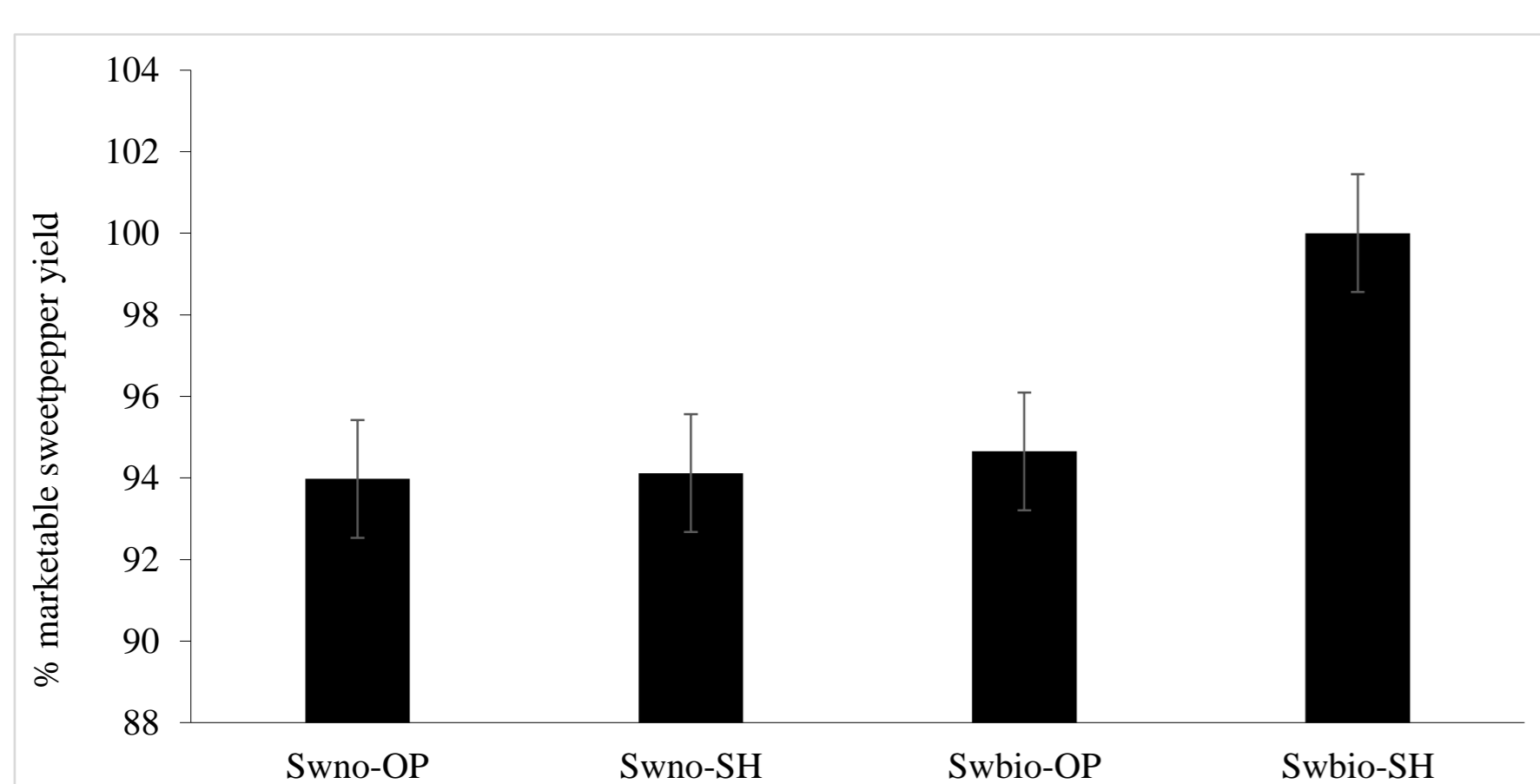
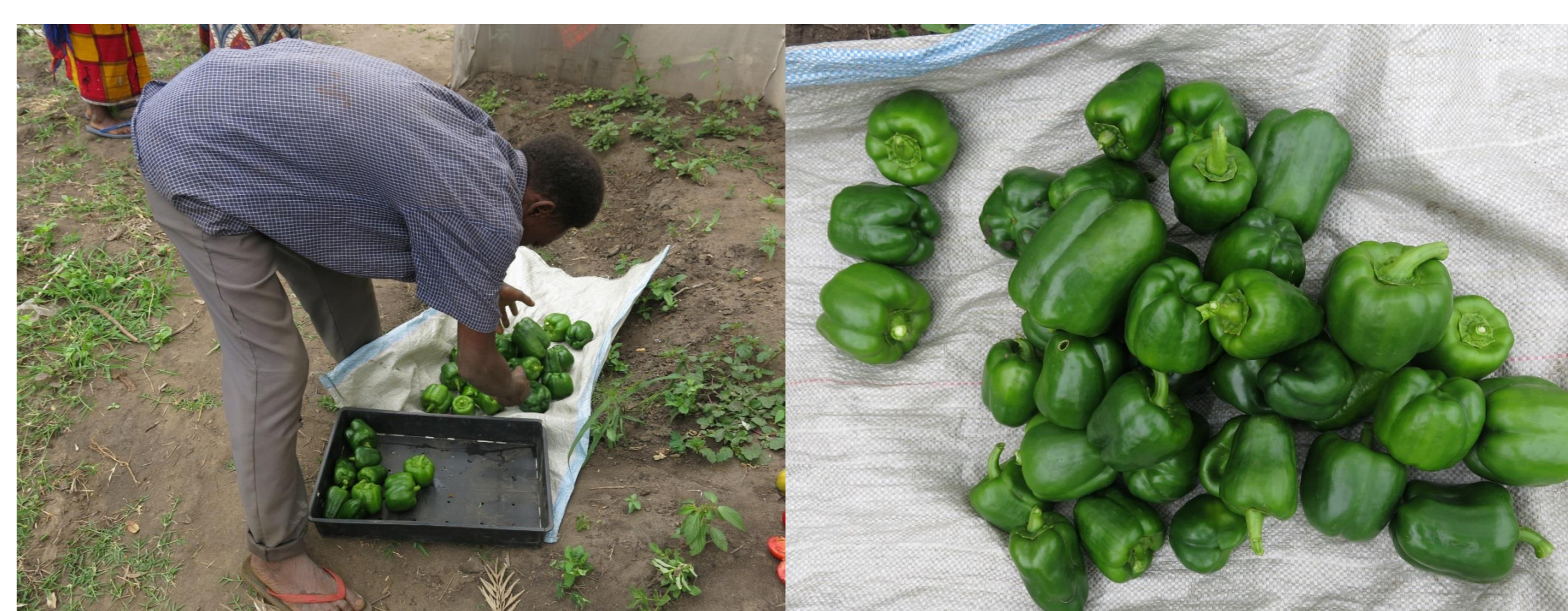


Fig. 2B: Percentage of marketable sweet pepper yield after sorting out diseased fruits due to whitefly infestation.



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