



RESEARCH PAPER

Development and performance evaluation of picking mechanism for knapsack cotton picker

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Abstract : One of the most significant fibre cash crops in both India and the rest of the world is cotton (*Gossypium herbaceum*). India is the world's second-largest cotton producer. Cotton is hand-picked by human labours in India, which is a laborious and time-consuming task. In existing knapsack cotton picker, the cotton quality was compromised due to the impact of the impeller vanes during conveying of picked cotton to collector. Keeping all these aspects in mind, a picking mechanism for knapsack power driven cotton picker was developed with considering the agronomical parameters, functional requirements, engineering requirements and ergonomic aspects. As a power source, a 0.9 kW, 5500 rpm petrol engine was used. The remaining components of the knapsack cotton picker, such as the aspirator, impeller, sucking assembly, collecting sack, mounting frame and so on, were developed according to design specifications. It was evaluated how effectively the knapsack cotton picker performed in terms of picking capacity, picking efficiency, harvesting losses, trash content, the quality of machine-picked cotton, and operation costs. Based on trial results using cotton varieties as GPG-3, a knapsack cotton picker's picking capacity was determined to be 7.62 kg/h. The average picking efficiency for cotton picking using a knapsack cotton picker was 95.79%. The harvesting losses and trash content were determined as 4.21% and 8.13%, respectively in case of knapsack cotton picker. The fiber quality in terms of span length, uniformity ratio and strength was not affected by knapsack cotton picker. There was reduction in time requirement and the picking cost by 51.44 and 14.86%, respectively over manual picking method. Cotton picking with a knapsack cotton picker showed a 3.27% increase in overall net realization over manual picking.

Key Words : Cotton picker, Harvesting losses, Knapsack, Picking capacity, Picking efficiency, Picking mechanism, Pneumatic

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