Development and evaluation of a power-operated carrot harvester-cum-detopper for hilly regions

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Carrot harvest is a major drudgery operation that includes manual digging using hand hoes and manual detopping. It is a highly labour-intensive operation in the Indian hilly regions. We have developed a power-operated carrot harvester-cum-detopper suitable for hilly areas. The design parameters of the harvester, viz. blade height (100, 200 and 300 mm), conveying angle

(15°, 25° and 35°) and catch height (20, 40 and 60 mm) were considered to evaluate the machine in actual field conditions. The optimum parameter values obtained for field operation were blade height of 300 mm, conveying angle of 25° and catch height of 40 mm. The field results of the power-operated carrot harvester indicate an actual field capacity of 0.028 ha h^{-1}, digging efficiency of 95.5%, conveying efficiency of 97.5%, detopping efficiency of 98.0% and damage percentage of 2.0. The harvester performs well for carrots grown in raised beds and single, narrow-row cultivation practices.

Keywords: Carrot harvester, design parameters, detopping, digging efficiency, hilly regions.