Field Performance Evaluation of Indigenous Tractor Mounted Reaper

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The present study was conducted to investigate performance of indigenous tractor mounted reaper for wheat harvesting and to determine break-even point. The machine was evaluated for different design parameters, cost analysis and mechanical harvesting efficiency in comparison with sickle. Wheat Field was selected at University of Agriculture Faisalabad, Pakistan. Factorial experiments (3 x 3) were conducted at three wheat varieties (Fsd-2008, Lasani-2008 and Sahar-2006) with three levels of moisture contents i.e. (22%, 18%, and 15 %). The levels of tractor forward speeds were 2.77,4, and 5.2 kmh^{-1}. The tractor was operated at selected levels of ground speed and moisture content for each variety to collect data for average percentage of cutter bar losses. Factor wise ANOVA showed that moisture contents and selected levels of ground speeds have highly significant ($p=0.05$) effect on cutter bar losses, but the varieties have significant effect on cutter bar losses, whereas varieties and moisture contents have significant and highly significant effect respectively on sickle losses. Results showed that at high moisture content (22%) with tractor speed (2.77 kmh^{-1}), the cutter bar losses were significantly low. The fuel consumption, effective field capacity, field efficiency, knife cutting speed, average cutting index were 6 L/ha, 0.42 ha/hr, 72%, 1.143 m/s and 1.104 respectively. Harvesting cost and losses of reaper were 55% and 50.2% less respectively as compared to sickle. The break-even point of machine can be achieved at 9.78 ha/year. An appropriate level of tractor speed and moisture content can reduce the grain losses and increase the overall yield of crop.

Keywords: reaper, mechanical harvesting, efficiency, break-even analysis, moisture content, cutter bar