

Investigation of Boll Properties on Cotton Picker Machine Performance

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Abstract : Cotton, as a strategic crop, plays an important role in providing human food and clothing need, because of its oil, protein, and fiber. Iran has been one of the largest cotton producers in the world in the past, but unfortunately, for economic reasons, its production is reduced now. One of the ways to reduce the cost of cotton production is to expand the mechanization of cotton harvesting. Iranian farmers do not accept the function of cotton harvesters. One reason for this lack of acceptance of cotton harvesting machines is the number of field losses on these machines. So, the majority of cotton fields are harvested by hand. Although the correct setting of the harvesting machine is very important in the cotton losses, the morphological properties of the cotton plant also affect the performance of cotton harvesters. In this study, the effect of some cotton morphological properties such as the height of the cotton plant, number, and length of sympodial and monopodial branches, boll dimensions, boll weight, number of carpels and bracts angle were evaluated on the performance of cotton picker. In this research, the efficiency of John Deere 9920 spindle Cotton picker is investigated on five different Iranian cotton cultivars. The results indicate that there was a significant difference between the five cultivars in terms of machine harvest efficiency. Golestan cultivar showed the best cotton harvester performance with an average of 87.6% of total harvestable seed cotton and Khorshid cultivar had the least cotton harvester performance. The principal component analysis showed that, at 50.76% probability, the cotton picker efficiency is affected by the bracts angle positively and by boll dimensions, the number of carpels and the height of cotton plants negatively. The seed cotton remains (in the plant and on the ground) after harvester in PCA scatter plot were in the same zone with boll dimensions and several carpels.

Keywords : cotton, bract, harvester, carpel

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