



## SEED YIELD LOSS DUE TO FRUIT SHATTERING AND EFFICIENCY OF MECHANICAL HARVEST OF FIVE CASTOR GENOTYPES IN WEST TEXAS

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**RESUMO** – Castor seed yield can be considerably reduced because of seed shattering. The main factors causing this loss are the fruit dehiscence, wind, traffic of machinery, and inefficiency of mechanical harvest. This study had the objective to assess the castor seed loss of mechanically harvested castor in West Texas. Five genotypes (Brigham, BRS Energia, Hale, Memphis, and Ultra-dwarf) were cultivated in the Experimental Farm of Texas Tech University (Lubbock, USA) in 2011. Each genotype was planted in a plot with five rows spaced by 0.91 m, 200 m long, and 2 plant/m. The plots were watered with sub-surface drip irrigation from July through September. The harvest was performed at 29/Nov/2011 (22 days after the killing frost). All the seeds were carefully collected from three squares randomly assigned along the rows, with area of 0.84 m<sup>2</sup>, placed between rows. In two genotypes (Brigham and Hale) the samples were collected before and after mechanical harvest in the same spot in order to discriminate loss due to fruit shattering and mechanical harvest. From the mechanically harvested seeds, three 200-g samples were separated into normal seed, broken seed, unhulled seed, and trash. Each fraction was weighed. The seed loss was 979.1 kg/ha in Brigham, 1458.3 kg/ha in BRS Energia, 1054.1 kg/ha in Hale, 1448.8 kg/ha in Memphis, and 814.1 kg/ha in Ultra-dwarf. The losses due to the mechanical harvest were 604 kg/ha (61.7% of the total loss) in the cv. Brigham, and 271.5 kg/ha (25.8%) in the cv. Hale. The average percentage of normal seed was 36.8% (by weight), with the minimum in the cv. Ultra-dwarf (22.9%) and the maximum in the cv. Memphis (42.4%). The average of broken seed was 15.1% with minimum in the cv. Ultra-dwarf (6.9%) and maximum in the cv. BRS Energia (22.1%). The average of unhulled seed was 30.1%, with minimum in the cv. BRS Energia (14.4%) and maximum in the cv. Ultra-dwarf (47.5%). The trash averaged 18.0% (in the range of 10.8 to 22.7%). The losses due to shattering were high in Lubbock because of intense winds in this region in the early fall of 2011. Winds as fast as 50 km/h blowing for a long period occur often in West Texas. The fruit shattering could be reduced if the harvest were performed early. Large differences between Brigham and Hale were observed in the loss caused by the harvesting process. A detailed study will be necessary to determine whether this difference is due to the plant architecture (Brigham is taller than Hale) or due to adjustments in the combine. There are large differences in the amount of broken and unhulled seeds. Such differences can be caused by variation in fruits and seed characteristics (seed size, seed coat thickness, shell hardness, etc) or adjustments in the harvesting equipment. The shattering loss was found to be extremely high, and mechanical harvest of castor in this region can only be profitable if the production system (genotypes and agronomy) is modified to reduce shattering loss.

**Palavras-chave:** Colheita, Mecanização, Eficiência.