

Title Design and Development of Cutting System for Thick Stalk Plants Harvester

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Abstract

Thick stalk plants, such as Gladiolus, Sunflower, Corn and Sorghum, can be harvested with the different harvesters related to usage. We cannot use usual harvesters, such as corn chopper, cutter-bar mower and drum mower. Sweet Sorghum and ornamental plants, as Gladiolus, must be cut at the lowest point of the stalks, because in these plants we need the whole-stalks. With due attention to thick stalks properties, a rotary cutting system was selected. A developed cutting mechanism in this research has a rotary disk with a 50 cm diameter and four cutting blades that spin at their position, freely. The stalks are cut with the impact and inertia forces at the linear velocity of 27 m/s, by cutting blades. For evaluation of the developed system, this system was installed on a removable frame, Test of the machine was achieved by two series of blades, with 30° and 45° blade sharp angles, on the Sweet Sorghum stalks, with 0.5-3 cm stalk diameters. The result showed stalk cutting surface with the 30° blade sharp angle was smooth and without any fracture on the filaments and vasculums, better than that with the 45° blade sharp angle. Blade penetration was accomplished very well with the 30° blade sharp angle. According to the farm tests, the efficiency of this harvesting system for greenhouses that produce thick stalk flower, such as Gladiolus, Sunflower, etc., and small or research farms of Sweet Sorghum, has been evaluated well.