Development and Prototype Experiment of Environmental Self-Propelled and Orderly Harvester for Artemisia selengensis Turcz

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Abstract

We developed an environmental and self-propelled harvester with the aim of overcoming the problem of low efficiency, high cost, and complex processing in Artemisia selengensis mechanization harvesting; the developed harvester can complete cutting, conveying, and collecting for selengensis harvesting in an orderly manner. The basic structure and working principle of the machine were determined, including the structure design and parameter analysis of the key components such as the clamping conveyor, steering device, and cutting device. Through theoretical research and a prototype test, we confirmed the machine battery capacity to be 48 V/100 Ah, the conveyor angle θ to be 30°, the adjustable range of the stubble height to be 100-400 mm and the drive motor model, etc. The field experiments indicated that the orderly harvester structure was reasonably designed, easily operated, and helped realize orderly harvesting for selengensis. The mean working velocity, the forward speed, the feeding rate, and the efficiency of the machine can be up to 0.84 m/s, 6 m/s, 0.62 kg/s, and 0.2 hm^2/h respectively. The swath quality meets the industry standards and the subsequent production requirements, which contributes to facility agricultural mechanization development.