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The design of a digger device for root crops harvester to operate in hard soil condition

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Due to climate change impacts, harvesting root crops with the help of machines is complicated, especially during work in heavy physical and mechanical composition of soil. During harvesting time, due to non-optimal conditions of soil, increased traction resistance forces, with no sufficient break up of cut layer of soil, significantly determines the reduction of quality indicators of harvesting technology. Digger blades of the existing harvesting machinery cannot manage sufficient break up of soil, to compensate this, it is made by increasing vibration frequency and amplitude of the separators. Because of this, mechanical damage of bulbs by machines increases and also increases required power of the vehicle. In order to solve the current problems, vibratory digger blade was developed which was mounted on exiting potato harvester produced by Grimme (RL 1700). The prototype has independent oscillatory input, which vibrate the whole "curve shape" blades horizontally. The oscillatory input is made of the eccentric shaft, with an attached digger blade. The direction of vibration and tilt angle of the blades can be changed from a special regulatory mechanism. It will be used in late field experiments to determine the effect of vibration on the dependent variables of draft, torque and soil break-up. Laboratory examination of mechanism is done at this time and field test is scheduled for later. Theoretically, mutual dependence between technology and design parameters of the vibratory digger blades of root crops harvester was established. Optimization of the parameters occurred by processing of the influencing factors using the theory of Similarity and dimensions. Simulation of machines working and parameters of mathematical analysis was used for the following computer programs: MSC software and Matlab.

Biography

Nodari Natenadze was awarded the Degree of Master of Engineering in Agricultural Mechanization by Decision №15-04/205 of 05 August 2013 of the Faculty of Engineering Technology (Agricultural University of Georgia). Currently, he is pursuing PhD engineering program in same university. Meanwhile, he is working as a Chief Specialist in Agricultural Engineering division of the Scientific Research Center of Agriculture. Also he is working in Agricultural University of Georgia as a Laboratory Assistant. He is the winner of Shota Rustaveli National Scientific Foundation's 2015 PhD program, as a project name: "Improving Potato Harvesting Machinery Technology Based on the Constrictive Modernization of Picker's Acting Body for Georgian Soil Conditions". He has published 5 papers in proceeding of the international conferences. He is the author of 4 inventions and has obtained patents for each of them.

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