Benchmarking the Efficiency of Transplanting Plant Cuttings


Transplant of unrooted cuttings is an important process in the production of rooted liner trays. There is potential for companies producing young plants to decrease production cost and increase profit margin by improving the efficiency of this process. However, there has been no comprehensive analysis regarding cutting transplant efficiency. This study focused on (1) benchmarking labor productivity with transplanting cuttings at young plant operations, and (2) identifying key factors that differentiate efficiency between businesses and workers. We collected data on the transplanting process of 14 greenhouse companies during the peak spring season. For example, in one greenhouse (A), the total labor cost was $44,033 with 110 employees receiving, transplanting and handling 2,974,713 cuttings during one week in the peak period, and the labor cost per cutting was $0.0148. In contrast, the total labor cost in another greenhouse (B) was $15,816 with 172 employees processing 1,600,000 cuttings, and the labor cost per cutting was $0.0099 [33% lower than (A)]. This illustrates a wide variation of labor cost and productivity between greenhouses and potential for improved efficiency. For the entire process in greenhouse (A), receiving and handling imported cuttings represented 10% of total labor cost, filling trays with root substrate was 6%, supervision was 7%, transplanting cuttings into trays was 67%, and moving cuttings to the greenhouse bench was 10%. These figures can be used to evaluate return on investment of robotics for the transplant process, benchmarking rooted liner production within and between companies, and allow us to calculate enterprise budgets. Results are expected to assist growers in decreasing production cost and increasing profit margin.