Effectiveness of Drone Sprayer in Controlling Weeds in Rice Plants (*Oryza sativa* L.)

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ABSTRACT

Drones as agricultural innovations need to be studied more closely for their effectiveness in controlling weeds. This research is to examine the effectiveness of drone sprayers compared to knapsack sprayers in controlling weeds in rice cultivation. The research was conducted in June-November 2022 in Balung Lor Village, Jember Regency. The treatment consisted of two types of sprayer, namely the drone sprayer and the knapsack sprayer to apply bensulfuron-methyl herbicide. The sampling method was carried out using the quadratic method (each plot/sample point measuring 1m^2) with three replications. Data were analyzed using SPSS followed by Mann Whitney Test. Parameters included weed diversity index (Shannon Wiener index) and weed similarity index (Sorensen index), SDR (Summed Dominance Ratio), working time efficiency, absolute weed dominance, absolute weed density, and dry ricegrainweight per clump. The results showed that the weed diversity index in this study was low ($1<H'\leq2$) as indicated by the drone sprayer (1,440) and knapsack sprayer (1,208) where the weed similarity index was 25%. In the SDR, grass weeds dominate the drone sprayer area while broadleaf weeds dominate the counterpart. Meanwhile, the working time efficiency of the drone sprayer (0.17 hours/ha) is statistically better than the knapsack sprayer (11.57 hours/ha). Moreover, there was no significant difference between the two types of sprayers in terms of absolute weed density and absolute weed dominance. Likewise, in the dry rice grain weight per clump, there was no significant difference between the drone sprayer (51.37 g/clump) and the knapsack sprayer (58.23 g/clump).

Keywords: *drone sprayer, weeds, knapsack sprayer, Oryza sativa* L.