

Efficacy and cost-effectiveness of three broad-spectrum herbicides to control weeds in immature oil palm plantation

Abstract

Efficacy and cost-effectiveness of three herbicides (paraquat, glufosinate ammonium, and glyphosate) were evaluated at the MAB Agriculture-Horticulture Sdn. Bhd. Plantation, in Sepang, Malaysia from February 2004 to October 2005. The experimental design was RCBD with four replications. Each plot size, with the measurement of 4.8 x 20.5 m, was used for three oil palm plants. There were 13 treatments applied at the respective rates (namely, paraquat at 200, 400, 600, 800 g a.i. ha⁻¹, glufosinate ammonium at 200, 400, 600, 800 g a.i. ha⁻¹, glyphosate at 400, 800, 1200, 1600 g a.i. ha⁻¹) and an untreated check as a control. The rates for the herbicides cover their field recommended rates (paraquat at 400-600 g a.i. ha⁻¹, glufosinate ammonium at 500 g a.i. ha⁻¹, and glyphosate at 1000 g a.i. ha⁻¹). Results showed that glufosinate ammonium and glyphosate gave better efficacies than paraquat as revealed by the data on the percentage of weeds killed, the percentage of weed growth reduction and the duration of effective weed control. Nonetheless, a similar efficacy did not always produce the same cost-effectiveness. The most cost-effective treatment was glyphosate (at 400 g a.i. ha⁻¹), followed by glyphosate (at 800 g a.i. ha⁻¹) and glufosinate ammonium (200 g a.i. ha⁻¹) with the costs around RM108.95, RM160.70, and RM214.19 ha⁻¹year⁻¹, respectively. Meanwhile, glyphosate has the ideal criteria as the most cost-effective herbicide because it is cheap (at the current price of RM13.75 L⁻¹), good efficacy at low dose, produces long duration of effective weed control, and lesser spraying rounds required year⁻¹.

Keyword: Efficacy; Cost-effectiveness; Herbicides; Oil palm