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PL1

Sustainable Weed Control in Immature Oil Palm: Assessing Herbicide Performance and Economic Benefits

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ABSTRACT

Effective weed management is crucial for optimizing oil palm (Elaeis guineensis) yield and reducing operational costs. This study evaluated the efficacy and cost-effectiveness of seven different herbicide active ingredients (a.i.), namely indaziflam (45.5%), glufosinate ammonium (24.5%), glufosinate ammonium (13.5%), MSMA (39.5%) + diuron (7.8%), MSMA (47%), glyphosate potassium (48.7%), glyphosate dimethylammonium (52%), and 2-sodium amine as a reductant adjuvant. A total of 16 treatments were applied for general weed control via circle spraying on one-year-old immature oil palm at PR20, Ladang FGVAS PPPTR, Jerantut, Pahang. The results demonstrated that pre-emergence application of indaziflam (45.5%) combined with MSMA (39.5%) + diuron (7.8%) provided prolonged weed suppression and delayed weed regeneration for up to 180 days. This combination was particularly effective against both broadleaf and grassy weed species commonly found in immature oil palm areas. Additionally, all six post-emergence herbicides showed comparable weed control even at a 50% reduced application rate when combined with 2-sodium amine as an herbicide reductant. This synergistic effect suggests the potential of adjuvant-enhanced herbicide systems to reduce active ingredient load without compromising efficacy. No phytotoxicity symptoms were observed on immature oil palm. From a cost-efficiency perspective, the use of pre-emergence herbicides extended the weed regeneration period, thus reducing the herbicide application round in immature oil palm from 12 rounds per year to 4 rounds per year, resulting in significant cost savings. These findings highlight the importance of herbicide selection and formulation in determining both agronomic and economic outcomes. Continuous herbicide screening in immature oil palm supports integrated weed management strategies aimed at enhancing cost-effectiveness and sustainability by reducing application frequency and minimizing environmental impact.

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