

EFFECT OF DRIP IRRIGATION ON THE GROWTH AND YIELD OF YARD-LONG BEAN (*Vigna unguiculata*) UNDER DIFFERENT MULCHING MATERIALS

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Abstract

This study investigates the effects of various mulching materials under drip irrigation on the growth and yield performance of yard-long beans (*Vigna unguiculata*) cultivated under a drip irrigation system, employing a Completely Randomized Design with four treatments and six replicates (T1: control without mulch, T2: straw mulch, T3: black polythene mulch, T4: paddy husk mulch) to assess the impact on the plant height, leaf count, fresh and dry weights of shoots and roots, flower count, pod number, and yield parameters of yard-long bean as the measured outcomes. Analysis was conducted using ANOVA at a 5% significance level with Minitab 17 software, with Tukey's test applied for mean separation. Results indicated that mulches significantly enhanced the growth and yield of yard-long beans ($P < 0.05$) with black polythene and straw mulch. Plants with black polythene mulch showed the highest growth than other treatments in terms of plant height (47.8 cm), leaves (18), branches (8.7), shoot fresh weight (60.6 g), shoot dry weight (17.8 g), root fresh weight (5.48 g), root dry weight (2.38 g), number of flowers (6.5), and total yield (31.94 g). The performance of plants without mulch (T1) and with straw mulch (T2) was comparable and not significantly different, while plants with paddy husk mulch (T4) showed the lowest growth characteristics. The study demonstrated that black polythene mulch (T3) significantly improved water use efficiency (WUE) to 18.14 kg/ha-mm and soil moisture content to 15.5%, outperforming control (T1), straw mulch (T2), and paddy husk mulch (T4). This increase in WUE and moisture content underlines the effectiveness of black polythene mulch in optimizing water utilization and retention. The study found that drip irrigation and mulching notably increase yard-long bean yield. Black polythene and straw mulches were the top performers, with black polythene mulch yielding the highest crop output, outperforming no mulch and paddy husk treatments. These findings suggest that black polythene could be the most effective mulch material under drip irrigation for optimizing the yield of yard-long beans in the studied area.

Keywords: Mulching, Soil moisture, Water use efficiency, Yard-long bean

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