Theme 1
Status and trends
of global soil
nutrient budget

Effects of different Organic mulching on the soil moisture retention and crop productivity increase of maize in Northern Tanzania.

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INTRODUCTION

Organic mulches play an important roles in conserving soil moisture, soil erosion mitigation, improve soil conditions, suppress weed growth, provide organic matter and plant nutrients in the soil. It is observed that organic material for mulching increases soil organic matter content that can improve soil physical and chemical properties as well as the activities of the soil microbial community. Organic mulching conserves soil moisture content by reducing evaporation which in turn mitigates the negative effects of water stress on plant growth and yield especially in semi-arid conditions.

METHODOLOGY

A field experiment was set at TARI Research farm located at 03.36349° E and 36.63260° S at an altitude of 1407m above the sea level using a RCBD design replicated three times during 2021/2022.
Six (6) treatments were randomly assigned in the plots (broadcasted within the plots) at the rate of 6 kg per plot which is equivalent to 10 ton/ha. Maize (SITUKA M1 variety) was used as a test crop and was planted at a spacing of 75cmx50cm. Data on soil moisture (0-20cm, 20-50cm depth), maize Stover weight, cob weight, number of weeds per plot, grain yield per plot and 100 seed weight were collected and subjected to One-Way ANOVA using GenStat Software. Significant means were separated using Turkey Test at 5% level of significance.
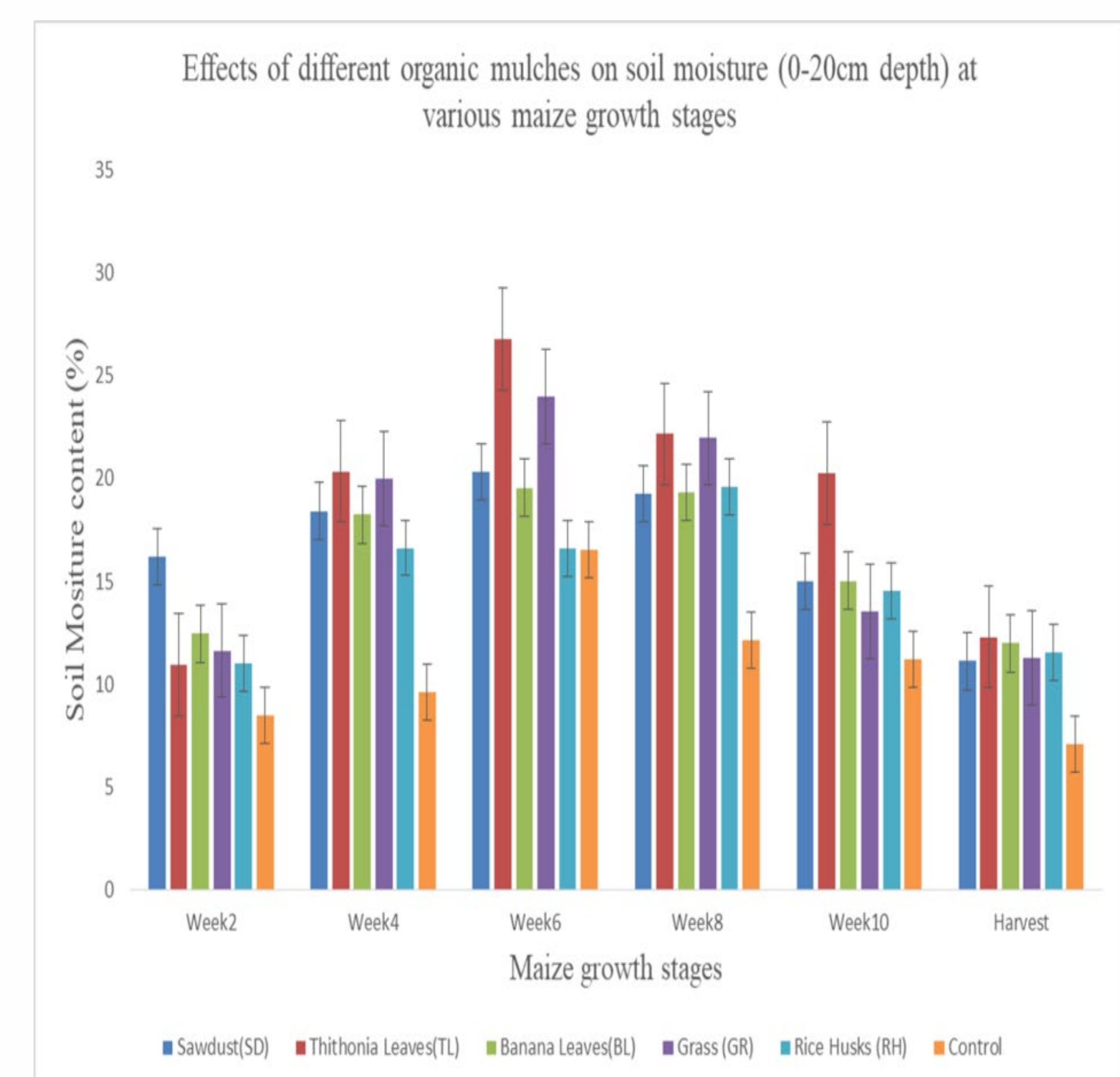
RESULTS

The results gathered from analysis such as growth parameters , yield parameters and soil moisture content is illustrated below;
❖Mulching showed significant difference ($p < 0.01$) on plant height at different plant growth stages. At week 10, the maximum plant height (164 cm) was measured under Sawdust and banana leaves.
❖Mulching showed significant difference ($p<0.01$) on weed abundance at different plant growth stages. Higher number of weeds were recorded in the control treatment (No mulch) whereas the lowest number of weeds were scored under the sawdust, Thithonia, and Grass treatment.
❖The analysis of variance showed highly significant ($p < 0.01$) difference between organic mulches for biomass, fresh cob weight and grain yield. Higher biomass (10.93 t/ha) was recorded under Sawdust mulch. The lowest biomass yield (4.410 t/ha) was obtained under the control (No mulch).
❖In the upper soil depth (0–20cm), the highest soil moisture (16.18%) was conserved under sawdust mulch while the lowest soil moisture content (8.49%) was conserved under the control. In the lower soil depth (20-50cm), the highest soil moisture (21.30%) was conserved in rice husks (RH) mulching material while the lowest soil moisture content (11.98%) was conserved under the control.

Effects of different organic mulches on soil moisture (0-20cm depth) at various maize growth stages

Effects of different organic mulches on maize grain yield

CONCLUSION

Results of this study indicated significant ($p<0.01$) influence of **Sawdust** and banana leaves mulch resulted into maximum plant height as compared to other mulches and the control. This study shows that mulches has an influence in suppressing weed emergence. Lowest number of weeds were scored under the **sawdust mulch**. The results further indicated that organic mulches positively influenced higher biomass, fresh cob weight and maize grain yield.
Therefore, the findings of our investigation indicated that organic mulching had influence on soil moisture content at different stages and yield of maize as the yield increased with mulch compared to the control (No mulch).

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