



RESEARCH PAPER

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Green fodder yield of maize (*Zea mays* L.) as affected by integrated levels of potassium and zinc

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Abstract

A field study to evaluate the influence of integrated levels of Potassium and Zinc on the green fodder yield of Maize (*Zea mays* L.) was carried out at Agronomy Section, Agriculture Research Institute Tandojam University during Kharif, 2013. The experiment was laid out in a three replicated randomized complete block design (RCBD), having net plot size 5 x 4m. The treatments consisted of No Potassium + No Zinc (Control), Potassium @40 kg ha⁻¹ and 60 kg ha⁻¹, Zinc @ 5 kg ha⁻¹ and 10 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5 kg ha⁻¹, Potassium @ 40 kg ha⁻¹ + Zinc @ 10 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10 kg ha⁻¹. The integrated application of Potassium significantly effect on maximum plant population, plant height, green leaves plant⁻¹, leaf length, stem girth, biomass weight plant⁻¹ and green fodder yield. Potassium @ 40 kg ha⁻¹ + Zinc @ 10 kg ha⁻¹ almost in all the growth and yield traits, particularly green fodder yield (38.1 t ha⁻¹) showing the non-significant differences of above treatments with each other. Hence, the integration of Potassium @ 40 kg ha⁻¹ + Zinc @ 10 kg ha⁻¹ was found most suitable and economical for obtaining an optimum green fodder yield of maize because non-significant differences with Potassium @60 kg ha⁻¹ + Zinc @ 10 kg ha⁻¹ and Zinc @ 5 kg ha⁻¹.

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Introduction

Green fodder is the most valuable and cheapest source of feed for the livestock. It is a very rich source of energy, nutrient elements, carbohydrates, proteins and water. Fodder shortage is the major limiting factor for livestock Production (Younas and Yaqoob, 2005). Maize occupies a key position as one of the most important fodder crop for animal consumption and grown under various conditions in different parts of the world. Maize is a crop plant characterized by a high potential of biomass, especially in comparison with other fodder crops. Maize makes high quality silage for dairy cattle at less cost than silage made from grass. Research has shown that maize silage in the diet of dairy cows increases milk yield and milk protein content. Supplementation with concentrates can be reduced and profitability is improved (Ali *et al.*, 2012). Potassium is the nutrient required in the greatest amount by maize. Potassium plays an important role in regulating the water content of the plant and with an adequate supply of K plants can survive drought stress more easily. It is essential for the transport of sugar from the leaves to the storage organs where the sugar is converted to starch. It plays a major role in maintaining the turgor of plant tissue. Leaves need to be turgid to remain fully extended to maximize the surface exposed to sunlight that provides the energy to convert carbon dioxide in the atmosphere to sugars in the leaves. Plants well supplied with K also seem to be less susceptible to fungal and pest attacks (Salimi *et al.*, 2012).

Zinc (Zn) is an essential component of various enzyme systems for energy production, protein synthesis, and growth regulation. Zinc-deficient plants also exhibit delayed maturity. Zinc is not mobile in plants so Zn deficiency symptoms occur mainly in new growth. Poor mobility in plants suggests the need for a constant supply of available Zn for optimum growth (Mortvedt, 2011). Zinc deficiency in plants does not only reduce the yield but also the nutritional quality. Hence soil conditions and agronomic practices are conducive to the incidence of micronutrient deficiencies in plants (Graham and Welch, 2002).

Growth and development would stop if specific enzymes were not present in plant tissue (Sajedi and Ardakani, 2008). Majlesy *et al.* (2012) found that soil application of potassium and zinc significantly increased fresh forage, biomass, concentration of Fe, Mn and Zn in grain, leaf and stalk. Foliar application of micronutrients with potassium in drought stress situation, significantly increased concentration of Fe and Mn in stalk and Zn in grain, leaf and stalk. Foliar application of micronutrients and drought stress without potassium increased concentration of Fe in grain. In normal irrigation form: foliar application of micronutrients without using potassium increased concentration of men in leaf, but soil application of micronutrients by using potassium increased biomass. Keeping in view the facts stated above, a study was designed under the agro-ecological conditions of Tandojam.

Materials and methods

Materials

The field study to evaluate the “Green fodder yield of maize (*Zea mays* L.) as influenced by integrated levels of potassium and zinc” was carried out at Agronomy Section, Agriculture Research Institute, Tandojam during Kharif, 2013.

Experimental Design

The experiment was laid out in a three replicated randomized complete block design (RCBD), having net plot size 5 x 4m (20 m²).

Treatments

The treatments consisted of No Potassium + No Zinc (Control), Potassium @ 40.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Zinc @ 5.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹.

Site Preparation and Sowing

The land was prepared by giving two dry ploughings followed by precision land leveling. After soaking doze, when soil came in condition two crosswise ploughings with cultivator followed by planking was done to achieve the fine seedbed.

The treatments were managed in such a way to separate the treatments and replications easily, while the channels and bunds were developed to facilitate the irrigation water application. The seed of maize variety Agaiti-2002 was sown with the help of single row hand drill. Fertilizers Nitrogen and Phosphorus were applied at the recommended rate of 130 and 60 kg ha⁻¹ in the form of Urea and SSP. Full dose of SSP and 1/3rd of Urea was applied at the time of sowing, whereas remaining nitrogen was applied at the time of first irrigation was applied. Potassium and zinc doses were maintained as per treatments. The first irrigation as recommended was applied at 25 DAS, whereas the subsequent irrigations were applied at 15 day intervals, keeping in view the soil condition and crop requirement.

The following observations were recorded.

- Plant population
- Plant height
- Leaf length
- Number of green leaves per plant
- Nodes per plant
- Stem girth
- Biomass yield
- Fodder yield

Results

Plant population (m⁻²)

The data in relation to plant population (m⁻²) of maize as influenced by different integrated levels of potassium and zinc are presented in Table 1. The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly (P<0.05) maize plant population (m⁻²) as compared to No Potassium + No Zinc (Control). The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum plant population (9.00 m⁻²) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with plant population of 8.67 and 8.33 m⁻², respectively showing the non-significant (P>0.05) differences of above treatments with each other. The maize plant population reduced to 7.33, 6.67, 6.67, 6.33 and 6.00 m⁻²

in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, minimum plant population (5.0 m⁻²) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on plant population of maize as compared to control plot but the integrated application of potassium and zinc was more effective than their sole application.

Plant height (cm)

The results regarding plant height (cm) of maize as influenced by different integrated levels of potassium and zinc are presented in Table 1. The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly (P<0.05) maize plant height (cm) as compared to No Potassium + No Zinc (Control). The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum plant height (180.67 cm) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with plant height of 179.52 and 179.15 cm, respectively showing the non-significant (P>0.05) differences of the above treatments with each other. The maize plant height reduced to 171.54, 146.87, 143.60, 135.87 and 131.27 cm in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, minimum plant height (117.80 cm) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on plant height of maize as compared to control plot, but the integrated application of potassium and zinc was more effective than their sole application.

Nodes plant⁻¹

The results pertaining to nodes plant⁻¹ of maize as influenced by different integrated levels of potassium and zinc are presented in Table 1.

The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly ($P < 0.05$) maize nodes plant⁻¹ as compared to No Potassium + No Zinc (Control). The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum nodes plant⁻¹ (5.91) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with nodes plant⁻¹ of 5.80 and 5.75, respectively showing the non-significant ($P > 0.05$) differences of above treatments with each other. The maize nodes plant⁻¹ reduced to 5.17, 3.61, 3.34, 3.01 and 2.74 in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, minimum nodes plant⁻¹ (2.34) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on nodes plant⁻¹ of maize as compared to control plot, but the integrated application of potassium and zinc was more effective than their sole application.

Number of green leaves plant⁻¹

Number of green leaves in maize for fodder production is a quantity parameter; but this trait is generally influenced by level of input application. The results in regards to the number of green leaf plant⁻¹ of fodder maize as influenced by the potassium and Zinc application sole and in combination are summarized in Table 1. The maximum number of leave were observed in treatment potassium @ 60 kg ha⁻¹ and Zinc @ 10 kg ha⁻¹ (15.68). Number of green leaves were significantly higher from the control and when Zinc and potash were added solely.

Leaf length (cm)

The results regarding leaf length (cm) of maize as influenced by different integrated levels of potassium and zinc are presented in Table 2. The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly ($P < 0.05$) maize leaf length (cm) as compared to No Potassium + No Zinc (Control).

The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum leaf length (48.55 cm) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with leaf length of 47.96 and 47.48 cm, respectively showing the non-significant ($P > 0.05$) differences of above treatments with each other. The maize leaf length reduced to 43.44, 41.66, 40.55, 29.00 and 27.55 cm in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, the minimum leaf length (23.66 cm) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on leaf length of maize as compared to control plot but the integrated application of potassium and zinc was more effective than their sole application.

Table 1. Effect of integrated levels of potassium and zinc on maize yield traits.

Treatments	Plant population (m ⁻²)	Plant height (cm)	Nodes plant ⁻¹	Number of green leaves plant ⁻¹
No Potassium + No Zinc (Control)	5.00 d	117.80 g	2.34 g	7.09 g
Potassium @ 40.0 kg ha ⁻¹	6.67 bc	143.60 d	3.34 d	9.69 d
Potassium @ 60.0 kg ha ⁻¹	6.67 bc	146.87 c	3.61 c	10.89 c
Zinc @ 5.0 kg ha ⁻¹	6.00 c	131.27 f	2.74 f	7.76 f
Zinc @ 10.0 kg ha ⁻¹	6.33 c	135.87 e	3.01 e	8.69 e
Potassium @ 40.0 kg ha ⁻¹ + Zinc @ 5.0 kg ha ⁻¹	7.33 b	171.54 b	5.17 b	15.13 b
Potassium @ 40.0 kg ha ⁻¹ + Zinc @ 10.0 kg ha ⁻¹	8.33 a	179.15 a	5.75 a	15.65 a
Potassium @ 60.0 kg ha ⁻¹ + Zinc @ 5.0 kg ha ⁻¹	8.67 a	179.52 a	5.80 a	15.64 a
Potassium @ 60.0 kg ha ⁻¹ + Zinc @ 10.0 kg ha ⁻¹	9.00 a	180.67 a	5.91 a	15.68 a

Stem girth (cm)

The results regarding stem girth (cm) of maize as influenced by different integrated levels of potassium and zinc are presented in Table 2. The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly ($P < 0.05$) maize stem girth (cm) as compared to No Potassium + No Zinc (Control). The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum stem girth (4.10 cm) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with stem girth of 4.04 and 3.89 cm, respectively showing the non-significant ($P > 0.05$) differences of above treatments with each other. The maize stem girth reduced to 3.45, 3.20, 3.05, 2.84 and 2.67 cm in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, minimum stem girth (2.51 cm) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on stem girth of maize as compared to control plot, but the integrated application of potassium and zinc was more effective than their sole application.

Biomass weight plant⁻¹ (g)

The results pertaining to biomass weight plant⁻¹ (g) of maize as influenced by different integrated levels of potassium and zinc are presented in Table 2. The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly ($P < 0.05$) maize biomass weight plant⁻¹ (g) as compared to No Potassium + No Zinc (Control). The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum biomass weight plant⁻¹ (520.79 g) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with biomass weight plant⁻¹ of 517.90 and 515.16 g, respectively showing the non-significant ($P > 0.05$) differences of above treatments with each other.

The maize biomass weight plant⁻¹ reduced to 504.79, 385.79, 346.12, 296.46 and 261.79 g in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, minimum biomass weight plant⁻¹ (209.12 g) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on biomass weight plant⁻¹ (g) of maize as compared to control plot but the integrated application of potassium and zinc was more effective than their sole application.

Green fodder yield (t ha⁻¹)

The results pertaining to green fodder yield (t ha⁻¹) of maize as influenced by different integrated levels of potassium and zinc are presented in Table 2. The analysis of variance showed that various levels of potassium and zinc either sole or integrated affected positively and significantly ($P < 0.05$) maize green fodder yield (t ha⁻¹) as compared to No Potassium + No Zinc (Control). The data indicated that integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ resulted in maximum green fodder yield (41.53 t ha⁻¹) of maize, closely followed by Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with green fodder yield of 38.90 and 38.12 t ha⁻¹, respectively showing the non-significant ($P > 0.05$) differences of above treatments with each other. The maize green fodder yield reduced to 34.54, 24.39, 20.69, 15.76 and 14.79 t ha⁻¹ in plots receiving Potassium @ 40.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, Potassium @ 60.0 kg ha⁻¹, Potassium @ 40.0 kg ha⁻¹, Zinc @ 10.0 kg ha⁻¹ and Zinc @ 5.0 kg ha⁻¹, respectively. However, minimum green fodder yield (11.85 t ha⁻¹) of maize was recorded in plots receiving No Potassium + No Zinc (Control). The overall data suggested that sole application of potassium and zinc also demonstrated significant effects on green fodder yield (t ha⁻¹) of maize as compared to control plot but the integrated application of potassium and zinc was more effective than their sole application.

Table 2. Effect of Potash and Zinc application in *Zea mays* L. yield traits.

Treatments	Leaf length (cm)	Stem girth (cm)	Green fodder yield (t ha ⁻¹)	Biomass weight plant ⁻¹ (g)
No Potassium + No Zinc (Control)	23.66 f	2.51 f	11.85 g	209.12 g
Potassium @ 40.0 kg ha ⁻¹	40.55 c	3.05 cd	20.69 d	346.12 d
Potassium @ 60.0 kg ha ⁻¹	41.66 c	3.20 c	24.39 c	385.79 c
Zinc @ 5.0 kg ha ⁻¹	27.55 e	2.67 ef	14.79 f	261.79 f
Zinc @ 10.0 kg ha ⁻¹	29.00 d	2.84 de	15.76 e	296.46 e
Potassium @ 40.0 kg ha ⁻¹ + Zinc @ 5.0 kg ha ⁻¹	43.44 b	3.45 b	34.54 b	504.79 b
Potassium @ 40.0 kg ha ⁻¹ + Zinc @ 10.0 kg ha ⁻¹	47.48 a	3.89 a	38.12 a	515.16 a
Potassium @ 60.0 kg ha ⁻¹ + Zinc @ 5.0 kg ha ⁻¹	47.96 a	4.04 a	38.90 a	517.90 a
Potassium @ 60.0 kg ha ⁻¹ + Zinc @ 10.0 kg ha ⁻¹	48.55 a	4.10 a	41.5 a	520.79 a

Discussion

Fertilizer application with optimum doses is considered one of the major factors which can enhance the fodder production (Ali *et al.*, 2012). Potassium is required in the greatest amount by maize. Zinc fertilization increases both nitrogen uptake and yield of maize. Different nutrients may interact with Zn by affecting the availability of each other from soils and their status in the plant through the process of growth or absorption, distribution and utilization. Application of potassium and zinc demonstrated significant enhancement in the fresh and dry weight of maize.

The results indicated that all the doses of potassium and zinc either alone or in integration with each other affected positively and significantly ($P < 0.05$) seed germination, growth and fodder yield traits of maize variety Agaiti-2002 over No Potassium and Zinc (Control). Integrated application of Potassium @ 60.0 kg ha⁻¹+Zinc @ 10.0 kg ha⁻¹ resulted in maximum plant population (9.00 m⁻²), plant height

(180.67 cm), nodes plant⁻¹ (5.91), green leaves plant⁻¹ (15.89), leaf length (48.55 cm), stem girth (24.73 cm), biomass weight plant⁻¹ (520.79 g) and green fodder yield (41.53 t ha⁻¹), followed by integration of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹, whereas minimum attributes were recorded in No Potassium and Zinc (Control). The higher growth and fodder yield traits of maize under integrated application of potassium and zinc at higher rates were possibly due to optimum availability and uptake of required nutrients at optimal concentration. The results are in line with the findings of Majlesy *et al.* (2012) who found that application of potassium and zinc showed marked increase in the fresh weight and dry weight of maize. In another study, Mahdi (2012) reported that zinc at 10 kg ha⁻¹ markedly enhanced the plant height, leaf area index, dry matter production, chlorophyll content and number of functional leaves plant⁻¹ of maize as compared to no zinc application. Stem diameter, leaf-stem ratio, green and dry fodder yield also increased significantly with zinc application @ 10 kg ha⁻¹. Similarly, potassium fertilization significantly increased total yield of maize (Salimi *et al.*, 2012).

Zinc fertilization increased both nitrogen uptake and yield of maize (Sajedi and Ardakani, 2008). The results of this study are also in accordance with the findings of Tabrizi *et al.* (2011) who suggested that zinc had greatest impact on growth and yield of maize. In another study, Maqsood (2009) reported that with the application of potassium growth response of maize in terms of plant height and total biomass varied significantly compared to the control. It was found that fertilization with potassium improved the crop growth and biomass yield of maize. In a study, Nanjundappa and Manure (2002) assessed the response of fodder maize to fertilizer applications of nitrogen and potash and concluded that the application of N and K at the rate of 150 kg N ha⁻¹ and 50 kg K₂O ha⁻¹ helps in increasing the dry fodder yield of fodder maize. The results of this study are supported with those of Osundare *et al.* (2008) who concluded that potassium substantially improved maize leaf area from 0.33 m² plant⁻¹ for control to 0.60, 0.86, 1.05 and 1.19 m² plant⁻¹ for 100, 200, 300 and 400 kg K ha⁻¹, respectively.

Similarly, Barlog and Pawlak (2008) revealed that maize response to potassium fertilization depended on the vegetation season. In the year favorable for the establishment of a high maize yield, simultaneous potassium and magnesium fertilization @ 150 and 16.3 kg ha⁻¹ induced a significant yield increase. The influence of zinc fertilization on yield depended both on the vegetative period and cultivar. In another study Saleem *et al.* (2006) found that different fertilizer levels played a significant role in boosting up the growth and yield parameters of maize. Potassium @ 275 kg ha⁻¹ produced the highest leaf area (699 cm²) and yield efficiency ratio.

Conclusion

The results concluded that various levels of potassium and zinc either sole or integrated influenced positively and significantly ($P < 0.05$) growth and fodder yield traits of maize as compared to No Potassium + No Zinc (Control). The integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ produced maximum values for almost all the traits studied, particularly green fodder yield (41.53 t ha⁻¹), closely followed by integrated application of Potassium @ 60.0 kg ha⁻¹ + Zinc @ 5.0 kg ha⁻¹ and Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ with 38.90 and 38.12 t ha⁻¹ green fodder yield. Moreover, the integration of Potassium @ 40.0 kg ha⁻¹ + Zinc @ 10.0 kg ha⁻¹ proved to be the most promising and economical treatment for obtaining optimum green fodder yield of maize due to having non-significant ($P > 0.05$) differences with other two treatments above.

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