Effect of sulphur and zinc on different character of grasses production in various seasons

Priyanka, Kunwar Chand Chauhan and Harshita Sharma

Abstract
Awareness and adoption of improved fodder production and conservation technologies among farmers will increase the production & availability of green fodder in term of quality and quantity significantly. NDDB demonstrates cultivation of improved varieties of fodder crops viz. cereals (maize, sorghum, pearl millet, oats, barley), legumes (Lucerne, berseem, cowpea, guar, rice bean, velvet bean), perennial grasses (hybrid napier, guinea grass, congo-signal grass, para grass) and perennial pasture legume (siratro, cilitoria, stylo) and fodder trees (sheveri, gliricidia, augusthi, drum stick) to farmers / trainees visiting the Fodder Demonstration unit (FDU). Regular training programmes on fodder production and conservation technologies are being conducted for exposure of fodder officers and field staff from different milk unions for fodder development purpose. Present investigation was conducted at Main Experiment Station of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (U.P.) during rainy, winter and summer season 2011-2012. In many cases the production of grass for cattle fodder is a valuable intercrop between crops for human consumption, because it builds the organic matter in the soil. Some agricultural byproducts fed to animals may be considered unsavory by human consumers.

Keywords: Grasses, sulphur and zinc, seasons

Introduction
The increased forage production is possible only through increased productivity per unit area per unit time by using adequate amount of plant nutrient, fertilizers use has, so for played a vital role in increasing forage production, and a further increase in production would definitely require greater and greater use of fertilizers. There is no doubt that so for much of our concern for fertilizer all has been restricted to the use of primary nutrients i.e. N, P and K in spite of knowing that fact that deficiency of secondary and micro nutrient would reduce the efficiency of applied N, P and K fertilizers by restricting yield of low level. For many years the deficiency of more than one of the low essential element other than primary ones was not experienced because of the low requirement of poor yielding forage verities and Len intensive forage cropping system. Beginning with the popularization of N some 30 years ago, at least five nutrient, that is N, P, K, S and Zn have assumed large-scale practical importance for Indian farmers. Out of these, sulphur is a unique element. It resemble N its role and ways are similar for both the elements, a soil with less than 20 kg ha⁻¹ available sulphur is generally considered to be deficient in sulphur while it range from 16-60 kg ha⁻¹. Critical level of available sulphur depends on factor like physico-chemical properties of soil. Zinc, an important micro nutrients element in plant growth and metabolism, has widely been supported to be deficient in there problematic and orchards soil limiting the yield and quality of apple in Himachal Pradesh (Sharma and Boundari 1992) [1].

Materials and Method
Data pertaining to impact of sulphur and zinc on green fodder yield of grasses in various seasons have been presented in Table 1. Green fodder increased significantly with application of sulphur and zinc. Maximum green fodder yield of all three grasses were recorded where sulphur was applied @ 60 kg ha⁻¹ and minimum under the control. An increase in green fodder yield was recorded with increase in levels of zinc in all three grasses during rainy, winter and rainy seasons, respectively. Zinc level increased the green fodder yield significantly and maximum green fodder yield was recorded where zinc level was applied @ 15 kg ha⁻¹ in grass Pennisetum purpureum (28.24, 7.97, 14.44 t ha⁻¹), Brachiaria mutica (16.01, 7.48, 11.88 t ha⁻¹), Panicum maximum (13.69, 4.56, 12.55 t ha⁻¹), respectively. Data pertaining to impact of sulphur and zinc on dry fodder yield of grasses in various seasons have been presented in table 2. Dry fodder increased significantly with application of sulphur and zinc. Maximum dry fodder yield of all three grasses were recorded where sulphur was applied@ 60 kg ha⁻¹ and
minimum under the control. An increase in dry fodder yield was recorded with increase in levels of zinc in all three grasses during summer, winter and rainy seasons, respectively. Zinc level increased the dry fodder yield significantly and maximum dry fodder yield was recorded where zinc level was applied @ 15 kg ha\(^{-1}\) in grasses and minimum under the control.

**Results and Discussion**

Effect of sulphur and zinc application the maximum increment of tree height, dbh, canopy, length and width were obtained with application @60kg ha\(^{-1}\) and zinc @10 kg ha\(^{-1}\) individually and instruction found is not significant. The present findings are conformity and Lodhyl 1990. Rajnesh kumar and Sharma 2005. Effect of S and Zn application on growth grasses have been measured with application sulphur @60 kg ha\(^{-1}\) and zinc 15 kg ha\(^{-1}\) during rainy, winter and summer season. The higher plant height achieved might due to Sulphur being played role in protein. Synthesis chlorophyll formation and also constituent of amino acid and zinc work as essential component of several enzyme which regulate various influential in these three grasses during three season. Similar finding is also reported by (Tripathi et al. 1995) \(^3, 5\) N finding number of tillers hill\(^{-1}\) was significantly affect with application of sulphur and zinc individually. The highest no of tillers hill\(^{-1}\) was recorded with the application of @60 kg ha\(^{-1}\) and zinc 15 kg ha\(^{-1}\) individually during all three season the nitrogen the higher number of tillers obtained may be because of role in increasing number of hills during all three grasses seasons. The similar finding also reported by (Dadhich et al. 2004) \(^6\). Nitrogen, Phosphorus and Potassium content of grasses increased significantly due to basal application S and Zn during rainy, winter and summer season. The highest nitrogen content of grasses was recorded with sulphur @60kg ha\(^{-1}\) and zinc @15kg ha\(^{-1}\) individually during all three season. The highest nitrogen content obtained due to sulphur and zinc application which might with due to sulphur played a key role protein synthesis and chlorophyll formation and also constitute of amino acid and zinc being involved in several enzyme which ultimately increase the nitrogen of grasses. Higher phosphorus and potassium content was recorder with sulphur@ 60kg ha\(^{-1}\) and zinc @15 kg ha\(^{-1}\) during all three season. Similar finding Nakagawa et al. 1992 \(^7\). The highest sulphur content of grasses was analyzed with sulphur @60kg ha\(^{-1}\) and zinc @ 15 kg ha\(^{-1}\) individually during all three season. The highest sulphur content of grasses achieved due to sulphur and zinc application which might due to exogenous application of sulphur. The highest Zn content in grasses was analyzed with sulphur @60kg ha\(^{-1}\) and zinc @ 15 kg ha\(^{-1}\) individually during all three season. The highest Zn content obtained may be because of zinc played a role as an essential component several enzyme which regulate various metabolic activities in all three grasses and there by enzymes positively influenced Zinc in content grasses and also indirect role of sulphur increasing Zn content in grasses. The height of grasses, leaf area of three grasses was measured with application of sulphur 60 kg ha\(^{-1}\) and Zn 15 kg ha\(^{-1}\) individually during three seasons The higher leaf area obtain due to sulphur and zinc may be because of higher chlorophyll formation and protein synthesis. The present finding is in accordance with (Dadhich et al. 2004) \(^8\). The highest green and fodder yield of grasses were recorded with sulphur achieve due to S and Zn application which may be because of and played a role in protein synthesis and also constituent of amino acid and zinc act as essential component several enzymes that affected various metabolic activities in three grasses. The present finding is conformity to (Dixit 2006 in rice).

**Conclusion**

Based on the result obtained from the present investigation, it may be concluded that plant height of grasses *Pennisetum purpureum, Brachiaria mutica, Panicum maximum*, number of tillers hills\(^{-1}\) with high chlorophyll and protein contents in grasses as well as higher N, P, K, S and Zn in grasses and soil have been recorded during rainy, winter and summer season of experimentation.

**Table 1:** Effect of sulphur and zinc on plant height grasses (m) in various seasons

<table>
<thead>
<tr>
<th>Treatments</th>
<th><em>Pennisetum purpureum</em></th>
<th><em>Brachiaria mutica</em></th>
<th><em>Panicum maximum</em></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Rainy</td>
<td>Winter</td>
<td>Summer</td>
</tr>
<tr>
<td>S(_1) - 0</td>
<td>1.23</td>
<td>1.15</td>
<td>1.18</td>
</tr>
<tr>
<td>S(_2) - 20</td>
<td>1.39</td>
<td>1.30</td>
<td>1.36</td>
</tr>
<tr>
<td>S(_3) - 40</td>
<td>1.59</td>
<td>1.43</td>
<td>1.53</td>
</tr>
<tr>
<td>S(_4) - 60</td>
<td>1.79</td>
<td>1.59</td>
<td>1.66</td>
</tr>
<tr>
<td>SE(_m) ±</td>
<td>0.029</td>
<td>0.026</td>
<td>0.026</td>
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<tr>
<td>CD at 5%</td>
<td>0.083</td>
<td>0.075</td>
<td>0.076</td>
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<tr>
<td>Zn(_1) - 0</td>
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<td>1.31</td>
<td>1.38</td>
</tr>
<tr>
<td>Zn(_2) - 5</td>
<td>1.48</td>
<td>1.35</td>
<td>1.41</td>
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<tr>
<td>Zn(_3) - 10</td>
<td>1.53</td>
<td>1.39</td>
<td>1.45</td>
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<tr>
<td>Zn(_4) - 15</td>
<td>1.56</td>
<td>1.42</td>
<td>1.49</td>
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<td>SE(_m) ±</td>
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<td>0.076</td>
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</table>
Table 2: Effect of sulphur and zinc on number of tillers hill⁻¹ on grasses in various seasons

<table>
<thead>
<tr>
<th>Treatments</th>
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<th>Panicum maximum</th>
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</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>S₀⁻ 0</td>
<td>8.67</td>
<td>6.83</td>
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<tr>
<td>S₀⁻ 20</td>
<td>10.17</td>
<td>8.17</td>
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<tr>
<td>S₀⁻ 60</td>
<td>12.83</td>
<td>11.17</td>
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<tr>
<td>SEm +</td>
<td>0.187</td>
<td>0.161</td>
<td>0.148</td>
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<tr>
<td>CD at 5%</td>
<td>0.540</td>
<td>0.467</td>
<td>0.429</td>
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Table 3: Effect of sulphur and zinc on leaf area of grasses (cm²) in various seasons

<table>
<thead>
<tr>
<th>Treatments</th>
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<th>Panicum maximum</th>
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<td>SEm +</td>
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<td>CD at 5%</td>
<td>1.761</td>
<td>1.397</td>
<td>1.503</td>
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References