Using vermicompost and organic amendment to cultivate salt tolerant crops in high salt-affected soil

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ABSTRACT

Saline-affected soil are widely distributed thought the world. In the Northeast of Thailand, an area of 17.81 million hectares of the region faces this problem. The soil in the Northeast has a low fertility rate due to sand soil texture in the most part of the area. Salt tolerant crops have been introduced for remediation of salt-affected area. However, for severely salt-affected soils, salt tolerant crops may not be cultivated. Therefore, the objective of this research was to study the effect of vermicompost and rice husk ash amendment on cultivation of salt tolerant crops (Sesbania rostrate) in high salt-affected soil. The experiment plan was randomized complete block design with 5 treatments and 4 replications; T1. Saline soil (Control), T2. Saline soil + Vermicompost 25:75, T3. Saline soil + rich husk ash 25:75, T4. Saline soil + Coconut coir 25:75 and T5. Saline soil + Vermicompost + rich husk ash + Coconut coir 25:25:25. The results found that Sesbania rostrate could growth in all treatment with saline soil 25%. The highest growth rate of salt tolerant crops were found in T5 with Vermicompost + rich husk ash + Coconut coir fiber and followed by T2 with vermicompost treatment and T3 and T4 after 10 weeks with 97 cm, 85.33 cm, 33 cm and 0 cm respectively. Salt tolerant crops could not survive in T1 saline soil. Vermicompost and organic amendments could increase soil nutrients and reduce electrical conductivity (EC). The results from this study would be useful knowledge to help increasing farmers’ income by cultivating salt tolerant crops in severe salt-affected soil.

Key word: saline, vermicompost, organic amendment, salt tolerant crops

INTRODUCTION

About 17% of land is salt-affected in Northeast Thailand (LOD, 1991) and origin of the salt is rock salt that called Mahasarakham

Paddy fields belong to Northeast Thailand are approximately 607 ha and it account for 58 % of paddy fields in Thailand. However, productivity of crops is low due to soil degradation and salinization of irrigation water result from soil-affected. (Kimura et al.,1990)

Salinity negatively impacts plant growth and delays development, thus decreasing crop production. Whereas engineer-ing practices to ameliorate saline soil are being developed, there is also an interest in identifying and cultivating stress resistant plants, which have increased resistance to soil salinity. Stress-resistant plants can be used as medicine, food, or wood. (Li et al., 2016)

The objective of this research was to study the effect of vermicompost and some organic amendment such as rice husk ash and coconut coir on cultivation of salt tolerant crops (Sesbania rostrate ) in high salt-affected soil.

Experimental Treatments


RESULTS AND DISCUSSION

Figure 1 The electric conductivity in sesbania production in high salt-affected soil under greenhouse conditions.

Figure 2 The growth of sesbania in high salt-affected soil conditions.

Table 1 The growth of sesbania in high salt-affected soil conditions.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Fresh biomass (gram)</th>
<th>Dry biomass (gram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 Saline Soil</td>
<td>27.90</td>
<td>16.92</td>
</tr>
<tr>
<td>T2 Saline Soil + Vermicomp.</td>
<td>16.79</td>
<td>14.20</td>
</tr>
<tr>
<td>T3 Saline Soil + Coconut coir</td>
<td>11.49</td>
<td>10.17</td>
</tr>
<tr>
<td>T4 Saline Soil + rich husk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T5 Saline Soil + Vermicompost + rich husk + Coconut coir 25:25:25</td>
<td>22.79</td>
<td>17.08</td>
</tr>
</tbody>
</table>

CONCLUSION

Salt tolerant crops could not survive in T1 saline soil. Vermicompost and organic amendments could increase soil nutrients and reduce electrical conductivity (EC). The results from this study would be useful knowledge to help increasing farmers’ income by cultivating salt tolerant crops in severe salt-affected soil.

REFERENCES

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