IMPACT OF MOISTURE DEFICIT STRESS ON NITROGEN AND PHOSPHOROUS MINERALIZATION UNDER LEGUME CULTIVATION: ROLE OF SOIL AMENDMENTS

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Conclusion and future prospects

The current investigation lasted two years and took place in a greenhouse at Khetri, Kamrup (M), Assam (2017-18 – 2018-19). Mung bean (*Vigna radiata*) and grass pea (*Lathyrus sativus*) were grown in order to study the effects of drought on the crops at two different growth stages as well as the effects of biochar and FYM as soil amendments on soil biological properties, nitrogen and phosphorus mineralization, and grain quality of the produce.

Beneficial impacts of application of soil amendments on N and P mineralization during drought are dependent upon N input from soil amendments, water regimes, rhizospheric microbial community and plant N uptake. It was also observed that soil amendments significantly alter the N transformations in soil under drought. However, the responses are very much specific to crop and may differ within the same family. Increment in total N content under the application of soil amendment was more prominent in FYM amended soils as compared to biochar even at harvest of the crop. Moreover, drought is responsible for the shifts in phosphorus transformation with the prominent increase in labile P and decrease in reductant soluble P. Addition of soil amendments increased all inorganic P fractions, especially under FYM application. Moreover, FYM also promoted higher P uptake in plants under drought compared to biochar.

Observations made in the soil biological properties imply that drought caused modifications in the microbial community structure and functioning resulting in shifts in nutrient cycling. Positive impact of application of both the soil amendments was also noted in soil biological activities even under drought. However, FYM had a more beneficial impact under drought in both the crops as compared to biochar.

Assessment on the grain quality aspects of the legumes imply that drought led reductions in grain protein fractions. Globulin, albumin, prolamin and glutelin fractions of protein

were enhanced under application of biochar and FYM. However, this also increase grain phytic acid content highlighted the importance of grain quality assessment under the application of soil amendments during drought.

Future Prospects

- In-depth studies of the microbial community structure may help in understanding the mechanism behind alterations in N and P transformation in the soil under drought and application of soil amendments.
- Gene expression studies may reveal the mechanism behind the crop specific response in protein and mineral nutrient accumulation in the grains.
- Further investigations in the grain quality aspects such as amino acid profiling, fatty acid profiling, tocopherol profiling and more particularly antinutritional factors may help in getting more insights into the impact of drought and application of soil amendments.