CHAPTER - 6

SUMMARY AND CONCLUSION

SUMMARY

The present investigation was carried out to study the growth of forest trees raised in two plantation sites and underneath soil characteristics to find out soil influence on the growth of tree species.

The effect of chemical properties of soil, i.e. pH, organic carbon content, available nitrogen, phosphorous and potassium level in soil, and physical characteristics of soil, i.e. bulk density, particle density, porosity, water holding capacity and textural composition of soil – percentage of sand, silt and clay, are estimated on the height, girth, MAI and volume of stand/growing stock.

*Dalbergia sissoo*

1. The height of *Dalbergia sissoo* has not shown statistically significant correlation with any chemical or physical parameters for both the sites. However, it has shown significant correlation with sand content of soil at Okhairagara plantation area only.

2. The girth and basal area of *Dalbergia sissoo* are not found significantly correlated with variables under study for measurement of soil characteristics at both the plantation area. However, it has shown significant correlation with pH, organic carbon and water holding capacity of soil at Okhairagara plantation area only.
3. The volume and MAI of *Dalbergia sissoo* have not indicated any significant correlation with variable soil characters for both the plantation area. However, it has shown significant correlation with pH, organic carbon and bulk density of soil at Okhairagara plantation area.

**Cassia siamea**

1. The height of *Cassia siamea* is not found to be significantly associated with the chemical and physical proprieties of soil at both the site. However, it has been significantly correlated with water holding capacity of soil at Sadma plantation area.

2. The girth and basal area of *Cassia siamea* have not found to be significantly associated with the soil variables, at both the plantation area. However, it has significant correlation with nitrogen content, phosphorous content, bulk density, soil porosity and percentage of silt and clay in soil on either of the plantation area.

3. The volume and MAI of *Cassia siamea* have not found to be significantly associated with any of the soil properties for both the plantation areas. However, it has significant correlation with nitrogen content, phosphorous content, soil porosity and percentage of silt and clay in soil on either of the plantation area.

**Gmelina arborea**

1. It has been found that height of *Gmelina arborea* is significantly correlated with nitrogen level, bulk density, porosity and percentage of sand and silt content of soil at both the plantation area. Significant correlation was found with phosphorous and potassium on either of the plantation area.
2. The girth and basal area of Gmelina arborea have been found significantly correlated with organic carbon content, nitrogen and sand percentage of soil at both the plantation area. Significant correlation was found with phosphorous, potassium, bulk density and soil porosity on either of the plantation area.

3. The volume and MAI of Gmelina arborea have been found significantly correlated with organic carbon, nitrogen and phosphorous content, bulk density, porosity, and percentage of sand and clay in soil at both the plantation area.

**Acacia auriculiformis**

1. It has been found that the height of Acacia auriculiformis is significantly correlated with organic carbon content of soil at both the plantation area. However, it has shown significant correlation with nitrogen and potassium content, bulk density, particle density, porosity and clay content of soil on either of the plantation area.

2. The girth and basal area of Acacia auriculiformis have been found significantly correlated with organic carbon content, nitrogen and phosphorous content of soil at both the plantation area. Significant correlation was found with potassium, bulk density, soil porosity and percentage content of sand and silt of soil on either of the plantation area.

3. The volume and MAI of Acacia auriculiformis have been found significantly correlated with organic carbon, nitrogen and phosphorous content at both the plantation area. Significant correlation was found with potassium, bulk density, soil porosity

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and percentage content of sand and silt of soil on either of the plantation area.

CONCLUSIONS

The results obtained from the present investigation in accordance with the objective of the study leads to the following conclusions:

☑️ A remarkable difference in the height of *D. sissoo*, *C. siamea* and *A. auriculiformis* at both the sites has been found. But no much difference was found in *G. arborea*. It has been found that increase in pH, percentage content of clay in soil and bulk density of soil has been found associated with decrease in the height growth of all the species, whereas, increase in organic carbon content, nitrogen, phosphorous and potassium levels, soil porosity and percentage content of sand in soil has been found associated with the increase in the height growth of all the species. Increase in the particle density has been found associated with increase in height of *D. sissoo* and decrease in height of *C. siamea*. Increase in the percentage silt content of soil has been found associated with the decrease in height of *D. sissoo* and *A. auriculiformis* and with the increase in the height of *C. siamea*.

☑️ A remarkable difference in the girth and basal area at both the plantation area has been found for all four tree species. The increase in organic carbon content, nitrogen, phosphorous and potassium level and percentage content of sand in soil has been found associated with increase in girth of all four tree species. The increase in pH has been found associated with the decrease in girth of *D. sissoo* and *G. arborea*. Increase in bulk density has been found associated with the decrease in girth of *D. sissoo*, *C. siamea* and *G. arborea*. Increase in particle density has been found associated with the increase in girth of *D. sissoo* and with the decrease in girth for *C. siamea*. Increase in soil
porosity has been found associated with the increase in girth for *D. sissoo*, *C. siamea* and *G. arborea*. Increase in WHC has been found associated with the decrease in girth for *D. sissoo* and with the increase in girth for *C. siamea, G. arborea* and *A. auriculiformis*. Increase in percentage content of silt in soil has been found associated with increase in girth of *C. siamea*. Increase in percentage content of clay has been found associated with decrease in girth of *D. sissoo*, *C. siamea* and *G. arborea*.

☑ A remarkable difference in the volume and MAI at both the plantation area has been found for all four tree species. The increase in organic carbon content, nitrogen, phosphorous and potassium level has been found associated with the increase in volume of all four tree species. Increase in soil pH has been found associated with decrease in volume of *D. sissoo*. Increase in bulk density of soil has been found associated with the decrease in volume of *D. sissoo, C. siamea* and *G. arborea*. Increase in particle density has been found associated with volume increase of *D. sissoo* and with decrease in volume of *C. siamea*. Increase in porosity has been found associated with increase in volume of *D. sissoo, C. siamea* and *G. arborea*. Increase in WHC of soil has been found associated with decrease in volume of *D. sissoo* and with increase in volume of *C. siamea, G. arborea* and *A. auriculiformis*. Increase in percentage content of sand in soil has been found associated with increase in volume of *D. sissoo, C. siamea* and *G. arborea*. Increase in percentage silt content of soil has been found associated with the volume increase of *C. siamea* and decrease in volume of *A. auriculiformis*. Increase in percentage clay content of soil has been found associated with decrease in volume of *D. sissoo, C. siamea* and *G. arborea*. 