CHAPTER 5

CONCLUSION

The results revealed that size of planting material and number of weeding year\(^{-1}\) significantly affected broom grass growth characteristics such as number of tiller tussock\(^{-1}\), tiller diameter, number of node tiller\(^{-1}\), internodal length, leaf number tussock\(^{-1}\), leaf width and leaf length, tussock diameter, panicle number tussock\(^{-1}\) and panicle length. All of broom grass growth characteristics increased with increase in size of planting material and number of weeding year\(^{-1}\) up to a level of six tiller hill\(^{-1}\) (T\(_3\)) and two weeding year\(^{-1}\) (W\(_2\)). Further increase in size of planting material and number of weeding year\(^{-1}\) beyond six tiller hill\(^{-1}\) (T\(_3\)) and two times weeding year\(^{-1}\) (W\(_2\)) respectively did not increase the growth of broom grass plants suggesting that six tiller hill\(^{-1}\) (T\(_3\)) and two weeding year\(^{-1}\) (W\(_2\)) are the optimum size of planting material and number of weeding year\(^{-1}\) respectively.

Similarly fresh weight and dry weight of tiller, leaf, panicle and root were significantly affected by size of planting material and number of weeding year\(^{-1}\). The production of fresh and dry weight of leaf, tiller, panicle and rhizome increased up to six tillers hill\(^{-1}\) (T\(_3\)) beyond which size of planting material did not have any significant effect. However number of weeding year\(^{-1}\) significantly affected the production of fresh weight and dry weight of tiller, leaf, panicle and root biomass with increase in number of weeding year\(^{-1}\) up to three times (W\(_3\)). This suggests that for production of fresh weight and dry weight of tiller, leaf, panicle and root the optimum size of planting material and number of weeding year\(^{-1}\) are six tiller hill\(^{-1}\) (T\(_3\)) and three weeding year\(^{-1}\) (W\(_3\)) respectively.
The analysis of economic return revealed that size of planting material and number of weeding year\(^{-1}\) greatly affected the economic return. Two tillers (T\(_1\)) in combination with all level of weeding for three years of harvest gave a negative net income. Four tillers (T\(_2\)), six tillers (T\(_3\)) and eight tillers (T\(_4\)) in combinations with zero weeding (W\(_0\)) and one weeding (W\(_1\)) year\(^{-1}\) produced negative net income; however T\(_2\), T\(_3\) and T\(_4\) in combination with two weeding (W\(_2\)) and three weeding (W\(_3\)) gave positive net income. Combination of eight tillers and three weeding year\(^{-1}\) (T\(_4\)W\(_3\)) gave the highest net income of Rs 82986.3 followed by T\(_3\)W\(_3\) with Rs 78364. However T\(_3\)W\(_3\) gave the highest benefit to cost ratio (BCR) followed by T\(_4\)W\(_3\). This suggests that broom grass plantation with six tillers hill\(^{-1}\) in combination with three weeding year\(^{-1}\) (T3W3) gave the optimum economic return.

Plant density did not affect the number of tiller tussock\(^{-1}\), tiller diameter, number of nodes tiller\(^{-1}\), internodal length, leaf number tussock\(^{-1}\), leaf width, leaf length, tussock height and tussock diameter in first harvest. However production of fresh weight and dry weight of panicle, leaf, tiller and root in kg ha\(^{-1}\) increased with decrease in plant density. However, all these growth parameters except the number of nodes tiller\(^{-1}\) significantly decreased with increase in plant density up to 3333 plant ha\(^{-1}\) while production of fresh weight and dry weight of panicle, leaf, tiller and root in kg ha\(^{-1}\) increased with increase in plant density up to 3333 plant ha\(^{-1}\) further after which they showed a general trend of decrease. The effect of plant density on the growth parameters became pronounced during second and third years which could be ascribed to higher availability of soil nutrient and space for absolute vegetative growth in the plots with lesser density of plants.
This trend explains that as the number of plants increased in a given area, the competition among the plants for nutrients and sunlight also increased. It can be concluded that up to three years, increase of plant density beyond 3333 plant ha\(^{-1}\) do not have any significant effect on the growth parameters and yield of panicle, tiller, leaf and below ground biomass ha\(^{-1}\). The economic analysis regarding the effect of plant density up to three years harvest revealed that plant density 3333 ha\(^{-1}\) also gave the highest net income while 2000 plant ha\(^{-1}\) have the highest benefit to cost ratio. Considering the results of all the experiments it can be concluded that broom grass with six tillers hill\(^{-1}\) and two times weeding year\(^{-1}\) at 3333 plant ha\(^{-1}\) gave the optimum yield and economic return.

Soil physico-chemical properties were significantly affected by cultivation of broom grass. The results indicate that organic carbon and total nitrogen content of soil significantly increased in broom grass plantation. It was found that with increase in age of broom grass plantation soil becomes acidic while available potassium decreased with age of the plantation. Soil moisture content decreased with increase in plant density and increase in age of the plantation. The study concludes that *T. maxima* plantation impacts soil physico-chemical properties, though the impact varies with respect of soil properties. In case of some properties the effect is detrimental while in other cases it is positive.