Growth and biomass production of *Melia azadirachta* (A. Juss) under different crop combination and mulch application in Mizoram

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SUMMARY

Growth and biomass production of *Melia azadirachta* under different crop combination and mulch application was studied from 2003-2005 in Mizoram. The plant height varied significantly was in the order of maize >turmeric > ginger > control. The collar thickness, number of branches and leaves also followed a trend similar to that of the plant height. In general, better tree growth was obtained under tree-crop intercropping than control (sole cropping). Among mulches, application of subabul leaf resulted in maximum height, collar thickness, higher number of branches and leaves, followed by rice straw and weeds. Similarly, the growth attributes were in the order of 10 t mulch/ha > 8 t mulch/ha > 6 t mulch/ha. Mulch quality was more effective than quantities of mulch applied in affecting the growth of *M. azadirachta*. However, belowground to aboveground ratio dry matter was more or less similar under all treatments. The biomass production was in the order of mulch quantity > mulch type > crop combination. The vertical root spreading was greater than the horizontal spreading in all treatments. The taproot biomass and the shoot biomass contributed substantially to the below ground and above ground biomass, respectively.

In recent time, neem (*Melia azadirachta*, A.Juss) has been receiving much attention at global level as a an economic tree owing to its various products used as biopesticides, medicines, cosmetics and animal health care. Neem based agroforestry has also become popular not only because the plant provides grain, fuel, fodder, industrial wood, domestic wood, medicines (Van Den Beldt and Bhumibhamon, 1992) but also create the pollution free environment in both dry and irrigated eco-systems. Besides, *In situ* use of neem leaves and fruits reduce the incidence of pest in both agriculture and horticultural crops, thereby, increasing productivity. The species is reported to very effective as wind breaks in drier areas, particularly on sandy soils to protect the crops and the species is good source of several alkaloids (Menon and Bagla, 1993). The present paper presents an in-depth analysis on the growth and biomass production of *M. azadirachta* under different crop combination and mulch application in Mizoram.

MATERIALS AND METHODS

Study area:

Growth and biomass study of *Melia azadirachta* was studied from 2003-2005 at Tanhril Campus of Mizoram University, located about 15 km on the south-western part of Aizawl city latitude, 23°42' to 23°46' N latitude and 92°38' to 92°42' E longitude and 845 msl, the capital of Mizoram. The average rainfall of the area is 2500 mm. The mean maximum and minimum temperature during the study period were 20° to 30° C and 8° to 18° C, respectively. The soil texture is sandy loam having 51.24% sand, 20.71% silt and 28.04% clay with an average pH of 5.03 – 5.40.

Treatments:

The experiment had 10 treatments laid down in Randomized Block Design (RBD) with three replications totaling 30 subplots. The treatments consisted of three crops (ginger, turmeric and maize), three mulch types (rice straw, weeds, subabul leaves) and mulch at the rate (6 t/ha, 8 t/ha, 10 t/ha). One year old *M. azadirachta* seedlings were transplanted to the experimental field by digging in the third week of May, 2003 during rainy season at a distance of 2.5 m x 2.5 m apart. At the time of transplanting, the tree seedling height and collar thickness (at 5 cm from the base stem) was recorded. The tree seedling and its crop component were grown under rainfed condition. The various growth attributes of the seedling such as plant height, collar thickness, number of branches, and number of leaves were recorded at 6-monthly interval using standard methods. At a 6-monthly interval, 2 seedlings of each tree species grown under a particular treatment from each replicated plot were excavated from the field preferably near the border, washed gently with water to remove the adhering soil particles. Careful attempt was made to fill back the area with the soil. Since excavation was done during crop harvest time, there was no damage

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