**Optimizing Maize Productivity under the Sandalwood-based Agroforestry System: Effect of Secondary Hosts and Tree Spacings**

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ABSTRACT

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| The aim of the study was to assess the effect of different spacings adopted for Sandalwood (*Santalum album* L.) trees along with various secondary host species on its growth and yield of maize (*Zea mays* L.) intercropped under this Sandalwood based agroforestry system. A field investigation was carried out in one-year-old Sandalwood plantations during kharif season of 2021 - 2022 year covering Marathwada agro-climatic zone of Maharashtra in Jalna district. Observations on growth (Height, Collar diameter, Crown length and Crown diameter) of Sandalwood planted in split plot design at three different spacing i.e. 4×4m, 5×5m and 6×6m) were recorded with various secondary host species including *Sesbania grandiflora* (T1), *Phyllanthus emblica* (T2), *Mangifera indica* (T3), *Casuarina equisetifolia* (T4), *Terminalia arjuna* (T5), *Tectona grandis* (T6), *Millettia* (*Pongamia) pinnata* (T7), and *Cassia siamea* (T8) while in agri crop yield attributes like plant height, dry matter accumulation, no. of cobs per plant, cob length and grain yield were recorded. Preliminary results indicates that maximum growth of Sandalwood exhibited a height of 1.69 m with crown length of 1.41m, maximum collar diameter of 2.79 cm with highest crown diameter of 1.68m planted at wider spacing i.e.S3 (6m×6m) with intermediate host of *Sesbania grandiflora* (T1) while in case of maize the number of Cobs /plant was 2.20, Cob Length (24.96 cm), and grain yield (6509.43 kg ha-1) was recorded maximum under the tree spacing of S3 (6×6m) as compared to that of 5×5m and 4×4m spacings. Also,*Sesbania grandiflora* (T1) consistently led to the maximum maize grain yield among other host species planted with sandalwood. The study concludes that wider spacing (6m×6 m) of Sandalwood with combination *Sesbania grandiflora* as a secondary host optimizes the growth of Sandalwood with maize crop. This combination proves most compatible and efficient to enhance overall productivity under the Sandalwood based agroforestry systems. |

*Keywords:* Sandalwood, Agroforestry, Secondary host, Maize yield and Tree spacing

1. INTRODUCTION

The global demand for sustainable agriculture and shrinking land resources necessitate innovative land-use systems that balance productivity and environmental conservation. In India, where over half the population relies on agriculture, traditional monoculture faces challenges from declining landholdings, soil degradation, and climate change (FAO, 2020). Integrating trees and crops, or agroforestry, offers a powerful solution for food, fodder, timber, and environmental services. Sandalwood (*Santalum album* L.) based agroforestry is gaining prominence due to its high economic value, though challenges like slow growth and parasitic dependence on hosts require careful study of its interactions with secondary hosts and companion crops. Sandalwood tree holds religious and commercially importance in India, historically used in rituals and medicine. However, natural populations have sharply declined due to illegal cutting, land-use changes, and habitat destruction and insect-pest attack. Its current distribution is mostly in southern states like Karnataka (5,245 km² of 8,300 km² total), Tamil Nadu, and Kerala (Chavan *et al*., 2024). Minor populations exist elsewhere. Recent government policy changes have promoted private cultivation, with an estimated 100 km² on private lands (Chavan et al., 2024). India faces a supply deficit for the annual demand of 5,000–6,000 metric tons of wood and 100–120 metric tons of oil, leading to imports (Das. 2021).

Sandalwood's primary commercial product is its heartwood, rich in aromatic oil for cosmetics, perfumes, and medicines. Indian sandalwood has high oil content (4–7% in mature trees) compared to *S. spicatum* (2%) and *S. lanceolatum* (1%). Heartwood and oil production vary based on genetics, site conditions, host species, and silvicultural practices. Well-managed plantations showed better growth and earlier heartwood formation. Heartwood starts forming around 6 - 7 years, becoming significant by 10–15 years, with optimal oil accumulation at 15–20 years (Rai, 1990). Understanding host-parasite interactions and optimizing growth through scientific management is crucial. Profitable sandalwood cultivation requires suitable hosts that benefits sandalwood and provide economic returns (timber, fodder, and fruit). Tree spacings significantly impacts on intercrop resource availability, growth, and yield. Wider spacing can reduce competition and enhance intercrop yield, while closer spacing might improve sandalwood heartwood quality due to competitive stress (Cannell *et al*., 1996; Ong & Huxley, 1997). Therefore, designing appropriate planting patterns that balance both sandalwood and intercrop productivity is vital.

Maize (*Zea mays* L.) is a promising intercrop due to its short duration, high demand, and adoptability as an intercrop. The crop is India's third most important cereal, cultivated across 9.6 million hectares with 2.6 t/ha productivity (Directorate of Economics & Statistics, 2022). However, maize productivity in tree-based systems is highly dependent on natural resources i.e. light and water. Tree canopy shading often limits light, reducing maize yields by 20–50% depending on tree density, pruning, and canopy architecture (Sanchez, 1995). Optimal tree spacing is a key management tool: wider spacing increases light for maize, while closer spacing can reduce understory productivity. Competition for water and nutrients also plays a significant role in the growth of tree as well as intercrop. Quantifying the effects of different tree spacings on maize productivity in sandalwood-based systems with secondary hosts is essential for maximizing both crop and tree yields.

Despite the potential of such integrated systems, research in India, especially in central and semi-arid regions, remains limited. Most sandalwood agroforestry studies are in southern India, with different agro-climatic conditions and host preferences (Viswanath *et a*l., 2010). In Central India, with its variable rainfall, diverse soils, and unique socio-economic conditions, requires region-specific research to tailor agroforestry models. The lack of scientific data on maize crop under different tree spacings and host combinations in sandalwood-based systems restricts farmer adoption.

2. material and methods

**2.1 Location of the experimental site**

A field investigation was carried out in Jalna district of Maharashtra, situated in the Marathwada region of Maharashtra state, which is geographically lies between 19°84'10” N and 75°88'64” E as shown in Figure 1.

**Figure 1: Location and geographical situation of experimental site**

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**2.2 Climate and weather conditions during Experiment**

Meteorological data from the experimental area during the study period (June 2021-May 2022) had been taken from meteorological observatory of Jalna weather condition. It has tropical with moderate and humid climate. The monsoon season typically begins in the first week of June and continues until the first week of October, sometimes extending into the last week of October. Winter showers usually commence in December and last until the first week of February. The period from March to May is characterized by intense moderate heat and generally humid conditions in this region. The region receives annual average rainfall of 783.6 mm. The mean annual minimum temperatures for the year 2021-22 were recorded as 10 °C whereas; the mean annual maximum temperatures were recorded as 39 °C. The maximum temperature was observed in the month of May and minimum temperature in the month January.

**2.3 Experimental Layout**

The experimental site was designed in split plot design with three tree spacings i.e. 4m×4m, 5m×5m and 6m×6m were assigned as main-plot factors with eight treatments as subplots in three replications. The treatments are T1 (*Sesbania grandiflora*), T2 (*Phyllanthus emblica*), T3 (*Mangifera indica*), T4 (*Casuarina equisetifolia*), T5 (*Terminalia arjuna*), T6 (*Tectona grandis*), T7 (*Pongamia pinnata),* T8 (*Cassia siamea*) selected for the study. The field was laid out into different trenches and sandalwood plant and the host species were assigned randomly. The host species were planted in between the Sandalwood trees. Farm yard manure (FYM) was applied around the 50cm radius of the plants till the plants got established. Irrigation was applied as and when required and weeding was done regularly to keep the experimental plot free of any weeds throughout. The plants were allowed to grow for one year before the recording of data. Maize was cultivated in-between the spaces and standard agronomic practices (i.e. fertilizer application, irrigation scheduling, pest management) were uniformly applied across treatments.

**2.4 Sampling procedure and observations**

The data on Growth parameters like plant height (cm), collar diameter (cm), crown diameter (m) and crown length (m) of sandalwood trees were recorded from 9 plants of each treatments while for the intercrop, yield (kg/ha) of Maize were recorded from the 1 m quadrate of the cropping area and other parameters viz. dry matter accumulation (g/plant) Yield attributes like No. of Cobs/plant, Cobs length (cm),

 From each plot randomly five maize plants were selected and plant height (from ground level to the top most point of the plant) was measured and average was calculated for further analysis. For dry matter accumulation, the same plants used for leaf area index observations were chopped into small pieces, thoroughly mixed, and a 100-gram subsample of fresh material was collected. These samples were initially sun-dried and then oven-dried at 70 °C for 48 hours until a constant weight was obtained, which was then recorded in grams per plant. Yield attributes were also assessed using standard techniques. The number of cobs per plant was determined by counting the cobs on five tagged plants in each treatment plot and calculating the average. Cob length was measured using a thread and ruler on five randomly selected cobs, and the average length was expressed in centimeters. To determine grain weight per cob, the grains from these cobs were separated, weighed, and averaged. Grain Yield was recorded by harvesting, threshing, and cleaning the grain produce from each net plot, which was then converted to kilograms per hectare.

**2.5 Statistical analysis**

The experiment was carried out in a Split plot Design. Data were analyzed by analysis of variance (ANOVA) to detect significant differences between the means (Sheoran *et a*l., 1998). Significantly differing means were tested based on the F test value at the 0.05 probability level.

3. results

**3.1 Growth parameters of Sandalwood**

The study findings (Table 1) revealed that all factors, including various tree spacings and host species although statistically do not differ from each other, they influence the growth parameters of sandalwood.

**Table: 1. Performance of *Santalum album* treeswith different hosts and spacings**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Treatments** | **Plant height (m)** | **Collar diameter (cm)** | **Crown Diameter (m)** | **Crown length (m)** |
| **Spacings (S)** |
| S1 (4 x 4 m) | 1.69 | 2.46 | 1.68 | 1.40 |
| S2 (5 x 5 m) | 1.67 | 2.79 | 1.66 | 1.38 |
| S3 (6 x 6m) | 1.69 | 2.56 | 1.67 | 1.41 |
| SE m± | 0.01 | 0.08 | 0.01 | 0.01 |
| C.V. | 5.67 | 23.22 | 5.85 | 3.46 |
| C.D. | NS | NS | NS | NS |
| **Host Species (T)** |
| T1 (*Sesbania grandiflora*) | 1.11 | 1.83 | 1.10 | 0.91 |
| T2 (*Phyllanthus emblica*) | 1.06 | 1.75 | 1.06 | 0.87 |
| T3 (*Mangifera indica)* | 1.03 | 1.46 | 1.02 | 0.84 |
| T4 (*Casuarina equisetifolia*) | 1.07 | 1.86 | 1.06 | 0.89 |
| T5 (*Terminalia arjuna*) | 1.04 | 1.46 | 1.02 | 0.88 |
| T6 (*Tectona grandis*) | 1.03 | 1.47 | 1.02 | 0.86 |
| T7 (*Pongamia pinnata*) | 1.03 | 1.69 | 1.02 | 0.86 |
| T8 (*Cassia siamea*) | 1.04 | 1.49 | 1.04 | 0.90 |
| SEm± | 0.02 | 0.15 | 0.02 | 0.02 |
| C.V. | 5.21 | 27.32 | 5.40 | 5.41 |
| C.D. | NS | NS | NS | NS |
| S x T | NS | NS | NS | NS |

The best growth attributes e.g. maximum plant height (1.69 m) & crown length (1.41m), maximum collar diameter (2.79 cm) and the highest crown diameter of 1.68m was observed in the spacing of S3 (6×6m). Notably, T1 (*Sesbania grandiflora*) tree species exhibited the highest values for various growth parameters, including plant height (1.11m), crown diameter (1.10m) and crown length (0.91m), all of which were greater than those observed in the rest of the tree host species while collar diameter 1.86 cm is higher with the T4 (*Casuarina equisetifolia*) tree host species than rest of the tree host species. The interactive effect of all the factors under consideration produced no significant effect.

**3.2 Growth parameters of Maize**

Table 2 revealed that growth parameters of maize were significantly influenced by the various tree spacings and host species of sandalwood.

**Table: 2. Effect of sandalwood tree spacings with host species on growth (plant height (cm) and dry matter accumulation (g)) of Maize crop**

|  |  |  |
| --- | --- | --- |
| **Treatments** | **Plant height (cm)** | **Dry matter accumulation (g)** |
| **30DAS** | **60DAS** | **90 DAS** | **At harvest** | **30DAS** | **60DAS** | **90 DAS** | **At harvest** |
| **Spacings (S)** |
| S1 (4 x 4 m) | 92.36c | 212.42c | 227.29c | 238.66c | 19.30b | 77.18b | 200.68b | 208.40b |
| S2 (5 x 5 m) | 97.52b | 224.30b | 240.00b | 252.00b | 25.42a | 101.68a | 264.36a | 274.53a |
| S3 (6 x 6m) | 102.34a | 235.38a | 251.86a | 264.45a | 25.81a | 103.25a | 268.45a | 278.78a |
| SEm± | 0.95 | 2.19 | 2.34 | 2.46 | 0.29 | 1.17 | 3.04 | 3.15 |
| CD (P=0.05) | 3.73 | 8.59 | 9.19 | 9.65 | 1.15 | 4.57 | 11.92 | 12.38 |
| **Host species (T)** |
| T1 (*Sesbania grandiflora*) | 65.70a | 151.12a | 161.70a | 169.78a | 16.70a | 65.79a | 173.68a | 180.36a |
| T2 (*Phyllanthus emblica*) | 66.39a | 152.69a | 163.38a | 171.55a | 16.27a | 64.07a | 169.22a | 175.73a |
| T3 (*Mangifera indica)* | 59.50b | 136.84b | 146.42b | 153.74b | 13.29b | 52.14b | 138.19b | 143.51b |
| T4 (*Casuarina equisetifolia*) | 63.67a | 146.44a | 156.69a | 164.53a | 15.92a | 62.67a | 165.56a | 171.92a |
| T5 (*Terminalia arjuna*) | 56.67b | 130.3b | 139.47b | 146.44b | 14.19b | 55.73b | 147.53b | 153.20b |
| T6 (*Tectona grandis*) | 59.53b | 136.93b | 146.51b | 153.84b | 13.65b | 53.59b | 141.96b | 147.42b |
| T7 (*Pongamia pinnata*) | 58.87b | 135.39b | 144.87b | 152.11b | 13.59b | 53.35b | 141.32b | 146.76b |
| T8 (*Cassia siamea*) | 56.70b | 130.42b | 139.54b | 146.52b | 13.94b | 54.77b | 145.02b | 150.60b |
| SEm± | 2.04 | 4.70 | 5.03 | 5.28 | 0.29 | 1.16 | 3.02 | 3.14 |
| CD (P=0.05) | 5.83 | 13.41 | 14.35 | 15.06 | 0.83 | 3.37 | 8.62 | 8.96 |
| S x T  | NS | NS | NS | NS | NS | NS | NS | NS |

Across different spacings, the highest plant height and dry matter accumulation at all growth stages included 30DAS (102.34 cm & 25.81 g/plant), 60DAS (235.38 cm & 103.25 g/plant), 90DAS (251.86 cm & 268.45 g/plant), and at harvest (264.45 cm & 278.78 g/plant) was recorded highest in tree spacing of S3 (6m×6 m) as compared to spacing of S2 (5×5 m) and S1 (4×4 m). In contrast, host species of sandalwood illustrated the growth parameters of maize crops. Notably, T2 (*Phyllanthus emblica*) host species of sandalwood exhibited higher values for plant height of maize at various growth stages, including 66.39cm (30DAS), 152.69 cm (60DAS), 163.38 cm (90DAS), and 171.55 cm (at harvest), all of which were significantly greater than those observed in rest of the treatments which was statistically parity with T1 (*Sesbania grandiflora*)*,* T4 (*Casuarina equisetifolia*)*.*.However, the dry matter accumulation of maize produced was higher with T1 (*Sesbania grandiflora*) at various growth stages, including 16.70 g/ plant (30DAS), 65.79 g /plant (60DAS), 173.68 g/plant (90DAS), and 180.36 g/plant cm (at harvest), all of which were significantly greater than those observed in rest of the treatments which was statistically parity with T2 (*Phyllanthus emblica*) and T4 (*Casuarina equisetifolia*). The interactive effect of all factors under consideration produced no significant effect.

**3.3 Yield attributes and yield of Maize crop**

The study findings (table 3) revealed that yield attributes and yield of maize were significantly influenced by the various tree spacings and host species of sandalwood.

**Table: 3. Effect of sandalwood tree spacings and host species on number of cobs/plants, cob length (cm) and grain yield (kg) in maize**

|  |  |
| --- | --- |
| Treatment | 1st Year  |
| **No. of cobs /plant** | **Cob Length** **(cm)** | **Grain Yield (kg/ha)** |
| Spacings (S) |
| S1 (4 x 4 m) | 2.19 | 24.48 | 5041.35b |
| S2 (5 x 5 m) | 2.16 | 24.68 | 5501.24b |
| S3 (6 x 6m) | 2.20 | 24.96 | 6509.43a |
| SEm± | 0.01 | 0.12 | 181.29 |
| CD (P=0.05) | NS | NS | 711.83 |
| Host species (T) |
| T1 (*Sesbania grandiflora*) | 1.44 | 15.57 | 3972.19a |
| T2 (*Phyllanthus emblica*) | 1.34 | 15.49 | 3742.90a |
| T3 (*Mangifera indica)* | 1.32 | 15.36 | 3340.95b |
| T4 (*Casuarina equisetifolia*) | 1.38 | 15.55 | 3637.63a |
| T5 (*Terminalia arjuna*) | 1.37 | 15.46 | 3371.56b |
| T6 (*Tectona grandis*) | 1.34 | 15.51 | 3342.41b |
| T7 (*Pongamia pinnata*) | 1.34 | 15.30 | 3293.89b |
| T8 (*Cassia siamea*) | 1.39 | 15.49 | 3347.50b |
| SEm± | 0.03 | 0.13 | 243.63 |
| CD (P=0.05) | NS | NS | 595.33 |
| S x T  | NS | NS | NS |

Across different spacings, the No. of cobs /plant (2.20), Cob Length (24.96 cm), and grain yield (6509.43 kg ha-1) was recorded maximum in tree spacing of S3 (6m×6m) as compared to S2 (5×5m) and S1 (4m×4m) tree spacing. In contrast, the different sandalwood host species influenced the yield attributes and grain yield of the maize crop. Notably, T1 (*S. grandiflora*) host species of sandalwood exhibited the maximum values for various yield parameters, including No. of cobs/plant (1.44), Cob Length (15.57 cm), and grain yield (3972.19 kg ha-1), all of which were higher than those observed in rest of the treatments which was statistically paired with T2 (*P. emblica*) and T4 (*C. equisetifolia*) in case of grain yield. The interactive effect of all factors is non-significant.

**3.4 Soil characteristics**

Soil samples were taken before the establishment of plantation for physio-chemical study Based on the analysis under different spacings treatments (4×4 m, 5×5 m, and 6×6 m) at the Jalna site in Maharashtra, the following observations were made. The physical properties of the soil including coarse sand (10.31% to 10.34%), fine sand (48.31% to 48.32%), silt (19.40% to 19.44%), and clay (21.93% to 21.95%), remained largely consistent all spacings treatments. This indicates a uniform soil texture throughout the experimental plots. A slight reduction in bulk density was observed in the all spacings, with values ranging between 1.41 and 1.48 Mg/m³. Particle density remained stable over the period, ranging from 2.58 to 2.64 Mg/m³. The chemical properties of the soil also showed slight but consistent improvements. Soil pH values remained nearly neutral, ranging from 6.98 to 6.99, with minimal variation between various spacings. Organic carbon content exhibited a slight improvement, increasing from 0.98% to 0.99%, indicating a gradual enhancement in organic matter. Available nitrogen levels increased in the all-spacings treatments, ranging from 195.85 to 199.78 ha-1., suggesting better nitrogen availability. Similarly, available phosphorus levels rose slightly, with values between 14.69 and 15.86 ha-1., and available potassium also increased from 243.35 to 248.15 kg ha-1.

**4. DISCUSSION**

**4.1 Growth parameters of Sandalwood**

The growth of a tree is primarily influenced by major factors, such as environmental conditions. The study demonstrated that planting spacings significantly influenced the growth of sandalwood, particularly plant height, collar diameter, crown diameter as well as crown length. The S3 treatmentconsistently produced the maximum plants growths. These findings suggest that moderate spacing optimizes resource availability such as light, water, and nutrients, reducing intra-specific competition and thereby enhancing vertical growth. Similar results have been reported by Sharma *et al.* (2017), and Prabhu and Rao (2010), who noted improved growth parameters in tree species under moderate spacing regimes, attributing this to better canopy expansion and reduced competition stress. In case of host species on growth parameters was also notable. T1 (*Sesbania grandiflora*) emerged as most suitable host, resulting in the maximum growth parameters. This superiority may be linked to the compatibility of these species as hosts to sandalwood, likely due to their root characteristics, nutrient cycling potential, and microclimate modification, which facilitate better parasitic resource acquisition by sandalwood and similar findings with conformity of other studies carried out by Sharma*,* 2017) and Doddabasawa and Chittapur, 2025). On the other hand, *Pongamia. pinnata* (T7) showed the least favourable results due to its allelopathic effects or less compatible root interactions.

**4.2 Growth parameters of Maize**

The present study revealed a significant effect of spacings on the growth parameters of Maize. Among the different spacings treatments evaluated, the widest spacing of 6 x 6 m (S3) consistently produced the maximum plant height and dry matter accumulation at 30, 60, and 90 days after sowing (DAS), as well as at harvest. These results indicate that wider spacing favors greater vertical growth in maize plants, likely due to reduced intra-specific competition for light, nutrients, and space, which promotes better resource allocation for stem elongation. Similar findings have been reported by (Stein *et al*., 2016; Kumar *et al*., 2019), who noted enhanced plant height and biomass accumulation in maize under wider planting configurations. Regarding the effect of host species on maize crop growth, *P. emblica* (T2) consistently supported the tallest plants across all growth stages, with pooled mean plant heights ranging from 65.79 cm at 30 DAS to 172.41 cm at harvest. This was closely followed by *S. grandiflora* (T1) and *C. equisetifolia* (T4), which were statistically at par with T2. The lowest plant heights were observed under *Terminalia arjuna* (T5) at all stages. The superior performance of maize grown in association with T2, T1, and T4 may be attributed to the beneficial microclimatic conditions and soil nutrient enhancement provided by these host species, which potentially improve maize growth parameters (Ngairangbam *et al.,* 2024; Kumar *et al*., 2019; Patel *et a*l., 2020). Previous studies have demonstrated that agroforestry systems incorporating nutrient-fixing or fast-growing trees can positively influence under storey crop performance by ameliorating soil fertility and micro environment (Nair, 1993; Jose, 2009).

The interactions between spacings and host species on maize plant height were found to be statistically non-significant during the study period, which shows least effect of tree spacings and intermediate host species on the maize growth. Similar results were also reported by Rao *et al.* (2016).

**4.3 Yield attributes and yield**

The present study indicates that plant spacings significantly affects the number of cobs/plants, cobs length and grain yield of maize. The maximum values were registered under wider spacing S3 (6 × 6 m) followed by the narrow spacing of S1 (4 × 4 m) which suggests that wider spacing allows for improved light interception, reduced inter-plant competition for nutrients and moisture, and better air circulation and due to better allocation of assimilates to reproductive organs, which are favourable for cob development as well as cob elongation. Similar findings were reported by Dapaah *et al*. (2003) notice increased grain yield.

Regarding host species, the choice of tree partner also played a crucial role in influencing yield and yield attributes of maize. These host species likely provided minimal shading and less root competition, favouring the intercrop's performance. *Sesbania grandiflora*, in particular, is a leguminous species capable of biological nitrogen fixation, thereby enhancing soil fertility and benefiting associated crops, as previously demonstrated by (Baier and Gross, 2023; Shreenidhi, *et al.* 2023; Ngairangbam *et al*., 2024). In contrast, the lowest yield attributes and yield was recorded with *Mangifera indica* (T3), which may be attributed to its dense canopy structure, extensive root system, and higher water and nutrient demand, leading to increased competition with the intercrop. Similar findings were reported by Ramesh *et al*. (2023), where mango-based systems were less productive in terms of intercrop yields compared to legume-based systems. The interaction effect between spacings and host species on yield attributes and yield was found to be non-significant, indicating that while both factors independently influence yield outcomes, their combined effect does not significantly modify the grain yield pattern. This supports the conclusions of previous studies by Dwipa *et al*. (2020) and Verma *et al.* (2024), that identified independent effects of tree configuration and species selection on system productivity.

5. Conclusion

The sandalwood-based agroforestry model is one of the feasible land use systems to maximize crop productivity, diversify monoculture to multi tier tree farming and maintain its sustainability. Under this model, host species and spacings significantly enhance its growth cycle and grain yield of intercrop. The study suggests most suitable secondary host along with the agri crop to provide income throughout the year to the grower. The study also concluded that the choice of interhost species showed a positive effect on intercrop productivity and simultaneously promoting the growth of sandalwood trees.

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