LECTURE-15

"LEARNING OBJECTIVE: ECONOMICS OF CULTIVATION-NURSERY AND PLANTING OF *Delbergia sissoo* Roxb."

Scientific Name	**:**	*Dalbergia sissoo* **Roxb**.
Common Name	**:**	Shisham, Sissu
Family	**:**	Leguminosae
Sub Family	**:**	Papilionoideae

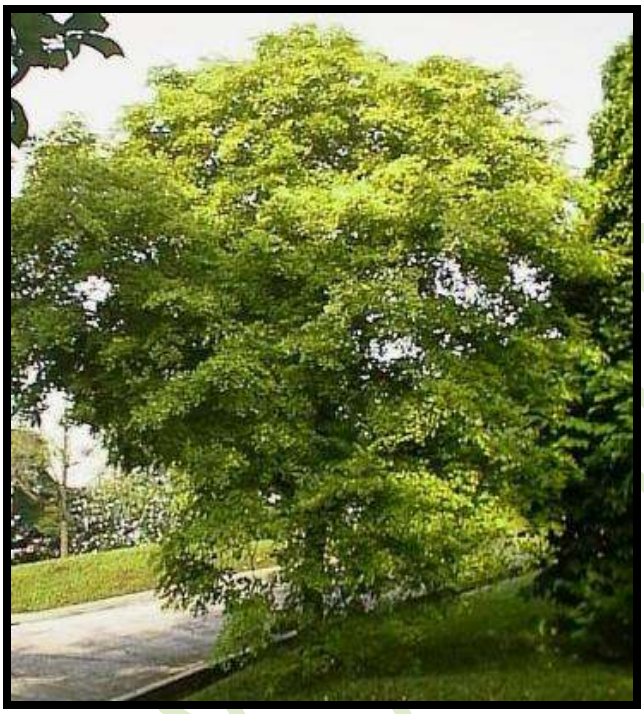

Plate 15.1(a). *Delbergia sissoo Roxb.* Tree pattern

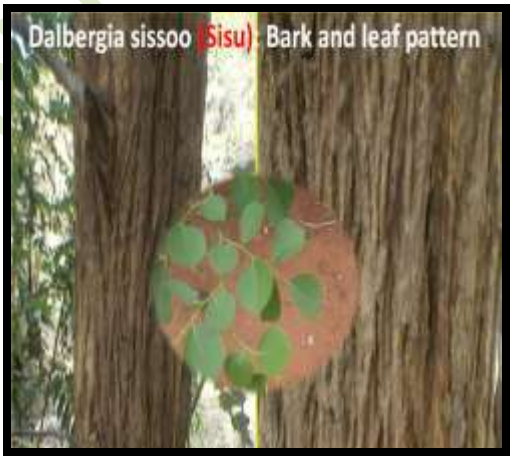

Plate 15.1(b). Shisham bark & leaf

Description:

- It is a large deciduous tree with light crown having thick, rough, grey bark with shallow broad longitudinal fissures exfoliating in irregular woody strips and scales.
- It attains a height up to 30 m and a girth of 2.4 m.

Distribution:

- The spp. occurs throughout the sub-Himalayan tract and outer Himalayan valleys from the Indus to Assam; usually upto 900 m, but occasionally ascending upto 1500 m.

- Grow gregariously on alluvial soil along stream bank, beds and islands, and on freshly exposed soil along roads and landscapes along with Khair.

Climate

It grows from tropical to sub tropical climate.

- Temperature - Maximum 40°C to 50°C, Minimum 4°C
- Rainfall - 760 mm to 4600 mm
- Altitude - Upto 1500 m.

Phenology

- Leaf-fall - November to December
- Leaf renewal - January-February
- Flowering - March/April
- Fruiting - May – July
- Fruit ripe - November-December
- Seed collection - November-December
- Seed viability - 12 - 18 months.
- Seed weight - 530 / gm.
- Germination - 80 per cent.

Silvicultural characters

- *Delbergia sissoo* is a strong light demander
- It is very frost and drought hardy spp.
- It is wind firm in nature and sensitive to fire and browsing

Regeneration

NATURAL-

- ✓ Seeds germinated during rainy season give good survival,
- ✓ Seeds regenerate on newly exposed soil, along water channel, riverine tract.

ARTIFICIAL-

- ✓ It is one of the easiest species to propagate through almost all the common methods viz. direct sowing, entire transplanting, stump planting.

Seed collection and storage:

- The seeds are plentiful every year, and keep viability for one year.
- Fertile seeds are produced at the age of 3-4 years, but it is advisable to collect seeds from the middle aged vigorously growing trees having straight and clean boles; on an average a medium sized tree produces 12-15 kg pods (4-5 kg clean seed).
- Time of collection varies from December to mid-February in Assam; West Bengal, Punjab and from November to March in Bihar and Orissa.
- The seed can be collected by ascending the tree or beating off with sticks.
- The pods are dried in the sun for 3-4 days and stored after removing dead leaves, foreign matter, etc.

Germination capacity and plant percent:

- Germination capacity and plant percent in *Delbergia sissoo* are about 90 and 45 per cent respectively.

Nursery technique

- Soaked seeds germinate after 7 to 15 days.
- Pricking by end of first season (18-20 cm height). 56 kg seeds are sufficient for one ha area.

Planting technique:

- **Direct sowing:**

✓ Direct sowing is the easiest method to raise shisham plantations; in fact, most of the seeds are sown in lines at the break of rains.

✓ Distance between lines varying from 3 to 4m.

- **Entire planting:**

✓ The planting of entire seedlings being much more laborious and costly, is adopted only in special cases such as arid areas, areas infested with tall grasses, wet sides or along the roadsides.

✓ Planting is generally done when the summer rains have properly set in, while the pits may be dug sometimes earlier.

- **Stump planting:**

- ✓ Stump planting has clear advantages over either entire planting or direct sowing.
- ✓ Cost of stump planting is low; planting period is extendable from July to September.
- ✓ The season of stump planting would depend upon the local rainfall and availability of artificial irrigation.
- ✓ Best time for planting is the rainy season.
- ✓ Stumps are spaced 1.8 m apart in lines on trenches which are 3 m apart from row to row.

Economic importance

- Furniture and house construction
- Fuel and charcoal
- Leaf fodder
- Anti-erosion works

Appendix
Model - 1

Agro-Forestry Project Profile

A-C Zone : Gujarat Plains and Hill Region
Situation : Rainfed

Tree-CropsCombination : Agrisilviculture
Tree : *Dalbergia Sissoo* (Sheesham)
Crop : Castor

Input / Output Analysis

Amount in Rupee

Year	Expenses Per Ha			Benefits Per Ha			Net Benefit Pe Ha
	Tree	Crop	Total	Tree	Crop	Total	
1	7000	240	7240	0	2000	2000	-5240
2	0	240	240	0	2000	2000	1760
3	0	240	240	0	2000	2000	1760
4	0	216	216	0	1800	1800	1584
5	0	192	192	0	1600	1600	1408
6	0	168	168	0	1400	1400	1232
7	0	144	144	0	1200	1200	1056
8	0	120	120	0	1000	1000	880
9	0	96	96	0	800	800	704
10	0	72	72	0	600	600	528
11	0	48	48	0	400	400	352
12	0	24	24	0	200	200	176
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0
20	0	0	0	112000	0	112000	112000
Net Present Value @ 15% DF			**7,080**			**15,117**	**8,037**

Assumptions :

Tree : Dalbergia Sisoo : Rotation 20 (1)

1.No. of trees/ha =280

2. Income per tree = Rs.400

3. Expenses per tree =Rs.25(in the first year)

Crop : Castor

1. Yield per ha.= 250 kg.
2. Sale price per kg. = Rs.8
3. Expenses per ha. = Rs.240

Analysis :

Benefit Cost Ratio at 15% Discount Factor : 2.14

Net Present Value in Rs. at 15% Discount Factor : 8,037

IRR : 30%

Investment :

Year 1 - **Rs.7240**

Note : 1. There is 10% reduction in area under crops due to shade effectof tree from the fourth year onwards.

2. Investment proposed includes expenses on trees and crop in the first year.