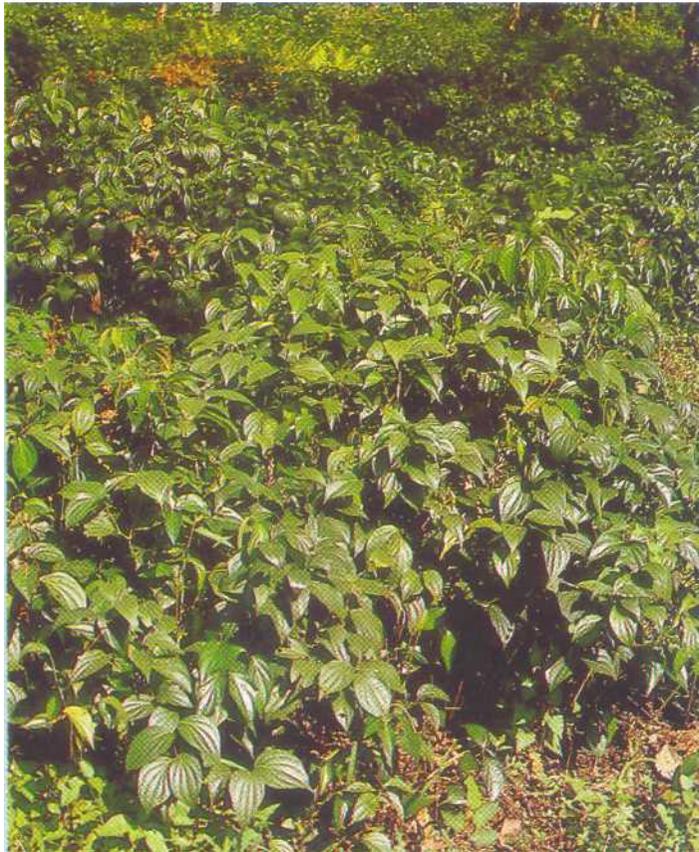


PIPLI

*AN IMPORTANT INCOME GENERATING ECO-FRIENDLY
NON-WOOD FOREST PRODUCT*



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GOVERNMENT OF ARUNACHAL PRADESH (INDIA)
ITANAGAR-791 111

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PIPLI

AN IMPORTANT INCOME GENERATING ECO-FRIENDLY NON-WOOD FOREST PRODUCT FOR ARUNACHAL PRADESH.

Introduction

The concept of sustainable development is gaining importance these days. A significant step towards this would be harnessing of our Non-timber Forest Products like bamboos, canes, medicinal plants, aromatic plants, spices, gums, resins, fibres, thatch and others. Cultivation of non-timber forest products is advantageous as they are eco-friendly and economically rewarding. Pipli (*Piper peepuloides*, *P. brachystachyum*) holds great prospect as a commercial crop for its medicinal fruits and roots. Though the species has been in exploitation by local people for fruits, it has always been from wild and no attempt has been made to cultivate scientifically. Hardly any published literature is available on this crop and there is lot of scope for its improvement which can result in increased productivity. Introduction of this crop into the forests and forest plantation does not warrant removal of trees which is an added advantage. Rather it would ensure better protection and management to the trees. Some aspects of Pipli cultivation are dealt below with a view to generate awareness among the people about this natural resource and to bring it under cultivation to provide alternative source of income. The State Forest Research Institute, Itanagar has developed cultivation package and has also selected high yielding clones.

Botanical description

Pipli is known by the botanical name *Piper longum*. But the Indian long pepper is generally coming to the market from a group of allied species viz. *Piper longum*, *P. peepuloides*, *P. brachystachyum* etc. which has wide distribution in India particularly in north-east India and western ghats. In Arunachal Pradesh more than 20 species of piper are found. Among them *P. peepuloides*, *P. brachystachyum* and *P. nigrum* are economically important. The latter is however cultivated.

Pipli plants are perennial shrubs some times scandent or climbers. They get attached to host trees by means of stem clasping roots at nodes. Leaves are generally more than one nerved from base. The plants are usually dioecious with separate male plants bearing only male flowers and female plants bearing only female flowers. Flowers are very minute and are borne on spikes. The fruits are one seeded baccate and globose, many such appearing in the spike as one fruit.

Habitat and distribution

The species grow usually in tropical forests with a preference to tropical semi-evergreen type of forests. It does best in partially shaded localities. It can also be seen in bouldery and rocky areas which are sufficiently moist and shady.

Though the species is found throughout Arunachal Pradesh below an altitude of 900m MSL, the main pockets of concentration are in Siang district at Bejari, Dambuk, Mebo, Pasighat and Sille, in Dibang valley at Roing-Shantipur and in Lohit district at Hayuliang and Kamlang areas. The species is also found in Papum Pare district. Unlike in the former places exploitation of this species for economic purpose is yet to begin in this district.

Climate and Soil requirement

Pipli plants grow well in tropical humid climate where the temperature in summer ranges between 30⁰ C - 40⁰ C and winter between 4⁰ C and 10⁰ C. The average rainfall where the plants naturally grow vary from 2000 - 3500 mm. Relative humidity is quite high between 55 - 85%. It does its best on well drained sandy soils having P^H range of 5.5 - 6.8. A rich humus laden substratum provides ideal habitat.

Phenology

New leaves appear from February to April. These leaves mature and persist for long. There is no definite leaf shedding phase. Male flowers and young female flowers appear twice a year on separate plants during March and August. Though the fruits continue to ripen in small quantities throughout the year, the main fruiting season is from December to February.

Seed/Fruit weight

On an average 2500 fresh fruit weigh in a kg. and each fruit contains 110 - 120 seeds.

Propagation method/Technique

It can be propagated from seed. Generally seed is sown during March, germinate in 3-4 weeks and pricked out when seedling is 2-3 weeks old. Since seed origin seedlings will bear fruit after 3-4 years, propagation is best done through suckers and offshoots. These are separated from each clump and planted at desired spots. A number of stolons could be seen near each clump. Each of these will have roots at nodes touching soil. They can be planted directly as naked seedlings or can be transplanted into polypots or beds for proper development of roots.

Plants can also be raised through stem cuttings. However the sprouting percentage vary from month to month. But most favourable months for propagation are March to June. This is a useful method of multiplication for raising large nurseries. It may be mentioned that in an experiment conducted at SFRI on vegetative propagation using different parts of the plants spectacular differences in results were observed. Sprouting and survival rate observed 75% for root shoot cutting, 30% for middle part and 55% for top portion. Two noded cuttings give better survival compared to one node. These cuttings should be kept under shade ensuring adequate moisture. The cuttings start sprouting and rooting within 3 to 4 weeks and after establishment the seedlings can be used for raising plantation after 3-4 months. Cuttings can also be prepared during

August/September but this being main flowering season, cuttings should preferably be made during March-June.

Planting and Aftercare

The best time for planting would be the pre-monsoon period that is March-May. Since the plants are surface feeding type there is no need of deep pits. Well dug pits of 20cm X 20cm X 20cm could be used at a spacing of 2 X 2m. Two weedings each during first and second year will be sufficient. Since the plants tend to produce off shoots in all directions they will fill up gaps in due course. In the process of planting at least 20% male plants may be incorporated randomly evenly scattered. Over planting with male plants will result in reduction of fruit production. The plants are quite hard and once out planted quickly establish.

Improvement Works (High yielding variety/clones).

After careful study of the biology of the species it is realised that there is great scope for genetic improvement of the crop through selection. The works in this direction was taken up at this institute, covering the entire distribution zone of the species. The criteria used for selections were general health of the plants, yield of fruits, size of fruits, disease resistance etc.. The screening has resulted in 40 clones from where further selection and multiplication of 20 clones was effected through vegetative means. By planting these clones at our Karsingsa plot gave the following results in a harvesting experiment:

Clone No.	Weight in Gm.	Clone No.	Weight in Gm.
1/2	240	11/16	220
2/3	630	12/17	235
3/4	210	13/18	230
4/5	250	14/19	225
5/6	225	15/24.	205
6/7	220	16/26	230
7/8	230	17/30	220
8/12	260	18/37	210
9/13	360	19/38	220
10/14	285	20/39	215

Requirement of shade

Pipli is a shade loving plant and can tolerate heavy shade but for better fruiting 50% shade is best so that the plants get filtered light.

Harvesting and yield

The main fruiting season is from December to February. Fruits are collected just prior to maturity and ripening when they are more pungent. The plants raised through vegetative method start yielding by second year. However full scale production is attained by the fourth year. On an average each plant yields 200 grams of fresh fruits (500kg/Ha.). However yield of fresh fruits upto 630gm. per plant has been recorded

from the selected clones. The fruits can be selectively plucked by hand. After harvesting, the fruits need proper drying. This is done preferably under shade. After complete drying these could be stored in bags with regulated moisture conditions. Inadequate drying will attract fungus and cause deterioration of the product.

Pests and diseases

So far no serious pests and diseases have been observed in Pipli in Arunachal Pradesh. However occasionally senescent leaves are seen infected by fungal diseases which can be controlled by spraying fungicides like Dithane M. 45 or Bevestin.

Protection from Animals

Though Pipli is not browsed, the plants need protection in the early stages to avoid trampling.

Use

The Pipli fruits apart from its use as spice and condiment has many medicinal value as drug for diseases like cough, bronchitis and Asthma. It has analgesic properties and is carminative. It is a general tonic and used in obstruction of bile duct and gall bladder. It has anthelmintic properties as well. (Wealth of India Vol. VIII).

Cost of cultivation

A. Initial establishment cost per hectare

i) Nursery cost (2500 seedlings/ha plus 25% for vacancy fining (2500+625 @ re. 1/- seedling)	Rs.	3,125.00
ii) Jungle cutting @ 15 man days	Rs.	330.00
iii) Regulating shade intensity in heavy shaded areas @ 15 man days.	Rs.	300.00
iv) Clearance of line and staking 20 man days	Rs.	440.00
v) Making of pits (20 x 20 x20cm) 2500 Nos @ 40 man days.	Rs.	880.00
vi) Transportation of seedlings 20 man days.	Rs.	880.00
vii) Planting 30 man days	Rs.	660.00
viii) Weeding thrice a year 20 man days/weeding.	Rs.	1,320.00
Paid holidays 16 ¹ / ₂ % on item ii to viii	Rs.	793.65
Total	Rs.	8,728.65

Say Rs. 8,700.00

B. Subsequent maintenance cost per ha per year and harvesting cost from third year.

Second year

i) Weeding/cleaning twice a year 20 man days/weeding	Rs.	880.00
ii) Cost of farm yard manure	Rs.	1,000.00
Paid holidays 16 ¹ / ₂ % on item i	Rs.	145.20
Total	Rs.	2,025.00

Say Rs. 2,000.00

Third year

i) Weeding/cleaning twice a year 20 man days/weeding.	Rs.	880.00
ii) Harvesting cost of fruits 20 man days.	Rs.	440.00
Hi) Drying cost. 10 man days.	Rs.	220.00
Paid holidays 16 ¹ / ₂ % on item i - ii	Rs.	254.10

Total Rs. 1,794.10

Say Rs. 1,800.00

A + B

Initial cost per ha	Rs.	8,700
Cost during 2nd year	Rs.	2,000
Cost during 3rd year	Rs.	1,800

Total Rs. 12,500

Returns : From third year onwards

Yield of fresh fruit per ha = 500 kg.

Local market rate for fresh fruits @ Rs. 20 kg.

Gross income from one ha 500 x 20 = Rs. 10,000

Market Information

The Pipli is collected from wild and sold in the local market at the rate of about Rs. 20 per kg. fresh fruits and Rs. 60 per kg. dry fruits.

Names of some of the dealers are given below :

1. M/s Dabur Research Foundation
8/3 Asaf Ali Road, New Delhi - 110 002.
2. M/S Natural Drug & Alkaloid Co. Pvt. Ltd,
1677, Kucha Jatmart, II Floor, Dariba kalkar,
Post Box No. 1043, Delhi - 110 009.
3. M/S Indian Drugs and Botanical Herbs Company,
Post Box No. 9416, Delhi - 51 .
4. A Kader Ali & Co.
89, Samuel Street, Khoja Gali,
Bombay-400 019.
5. M/s Prakash Das,
P.O. Bihpuria,
North Lakhimpur district, Assam.

The Central Institute of Medical and Aromatic Plants, P.O. CIMAP, Lucknow - 226 015, U. P. can also be approached for more dealers.

NATURAL RESOURCE
of
TIMBER

as an
ECONOMIC SOURCE

will not
LAST LONG.

GROW

PIPLI

as an
ECO - FRIENDLY

sustainable
ECONOMIC ALTERNATIVE