



ISSN (E): 2320-3862
ISSN (P): 2394-0530
NAAS Rating: 3.53
JMPS 2018; 6(6): 149-151
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Received: 05-09-2018
Accepted: 10-10-2018

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Pipli cultivation: A potential income generating option

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Abstract

The world has depended on the properties of plant as a source of healing ever since man began caring for his health. The increasing realization of the health hazards and toxicity associated with use of synthetic drugs has renewed the interest in plant-based drugs. *Piper longum*, a perennial climber is a valuable source of active substances of medicinal value and spice. The principal pharmacological constituents are piperine and pipartine. Its root, stem and leaves are used in the treatment of diseases of respiratory tract like bronchitis, asthma and cough. It is a shade loving plant often grown as intercrop with coffee, coconut and areca nut. It is cultivated through planting material such as suckers, stem cuttings and rooted vine cuttings. Many companies export a large quantity of dried/powdered fruits and roots of *Piper longum* to Europe, USA, Australia, Canada and South East countries.

Keywords: *Piper longum*, spice, alkaloids, piperine, piperidine

Introduction

Medicinal plants and products derived from them are used in both preventive as well as curative medicine as these plants produce an immense and diverse array of organic compounds. These plants are growing in importance day by day because medicine of today is observed to be shifted from synthetic molecules to naturally synthesized molecules. India is a veritable emporium of medicinal plants because of its heterogeneous biogeographic area and there is vast potential for exports of medicinal plants.

Natural forests of this region are source of some important medicinal plants that are used for traditional and folk medicinal practices. One such medicinal plant species with immense pharmaceutical importance is *Piper longum*; commonly known as pipli, pippali, papal, long pepper or Indian long pepper. The plant is a perennial, slender climber with woody roots. If no support is available, it is a perennial creeping under shrub. The branches are erect with swollen nodes. Roots arise at the nodes which help the plant to attach to the host trees or other supporting structures. Leaves are alternate and ovate with acute to acuminate apex and entire glabrous margin. *Piper longum* is a dioecious species having separate male and female plants. The plants are similar in morphology till the formation of spikes. Male spikes are cylindrical with minute greenish yellow flowers. Female spikes are erect and yellow in colour. Mature female spikes are much shorter and thicker than the male spikes and these spikes are known as long pepper. The minute fruits are ovoid, yellow orange, drupe and are sunk in the fleshy spike. These cylindrical, globose fruits turn red or black on ripening and possess aromatic odour and pungent taste. The main fruiting season is from December to February, although fruits continue to ripe in small quantities throughout the year. One fruit contains about 110-120 minute seeds.

Origin and Distribution

Piper longum is a native of the Indo-Malayan region. South Asia is also considered native of the plant. According to Manoj *et al.*, (2004), it is a native of North-east India. It is widely distributed in the tropical and subtropical regions of the world. It is found growing wild in India, Nepal, Indonesia, Sri Lanka, Malaysia, Singapore, Bhutan, Myanmar and Philippines. In India, it is found throughout the hotter parts from central to the north-eastern Himalayas, the lower hills of West Bengal and the evergreen forests of the Western Ghats. The main supply of long pepper is from wild plants growing in Assam, West Bengal and Uttar Pradesh. It is cultivated in small area in Meghalaya, West Bengal, Uttar Pradesh, Madhya Pradesh, Maharashtra, Kerala, Karnataka and Tamil Nadu.

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Chemical constituents

Medicinal plants have gained pharmaceutical importance/therapeutic value due to the presence of specific constituents/combination of secondary metabolites in them. The compound of medicinal interest is present in the female spike (inflorescence) of *Piper longum*. The fruit contains alkaloids piperine, piperidine and piperlongumine. It's piperine content is slightly higher than that in black pepper. Other active ingredients present are various amides. Volatile oil and resins are also present in the fruit. Roots contain the alkaloids piperlonguminine, piperlonguimine and piperine. The fruits also contain calcium, phosphorus and iron.

Medicinal uses

The fruits are used as spice in Indian, Malaysian and Indonesian cooking and also in pickles due to their pungent taste. They cause numbness of the mouth. The roots, stems and fruits of *P. longum* are medicinally used, especially in the treatment of diseases of respiratory tract like bronchitis, cough and asthma. It also cures dyspnoea, ascites, leprosy, diabetes, piles, indigestion, anemia, cardiac and spleen disorders, chronic fever and loss of appetite^[1]. The roots and fruits are used in palsy, gout and lumbago. It is also useful for fever, leucoderma, urinary discharges, insomnia, jaundice, hiccups and joint pains.

Long pepper is widely used as a general tonic and rejuvenator in Ayurveda. It is known to enhance bio-availability of food and drugs. Therefore, to make more effective it is taken along with quinine. The extract is locally applied to counter-irritant and act as analgesic for muscular pains and inflammation. It is used as an antidote to snakebite and scorpion sting^[2]. It forms a major ingredient of many Ayurvedic medicines.

Cultivation technology

Prpogagation: Conventionally, *P. longum* is cultivated through planting materials such as suckers, stem cuttings or rooted vine cuttings in the month of March-April and later on transplanted in June at the onset of monsoon. Seeds are rarely used as planting material because their viability is very low. Since female spikes are used as medicine, available seed material for planting becomes limited. Moreover, seed origin seedlings bear fruits after 3-4 years only. Thus propagation through seeds is not suitable for commercial purpose. The most common cultivation practice is from rooted stem cuttings.

Soil and climate: Pipli plants grow well in tropical humid climate where temperature ranges between 30-40°C in summer and 4-10°C in winters with an average rainfall of 2000 – 3500 mm. It is a shade loving plant. It can be cultivated successfully in heavy rainfall areas with high relative humidity. It does well on organic matter rich, fertile, well drained loamy soil of pH range 5.5 to 8.5.

Nursery raising and planting: The area should be ploughed two to three times. Raised beds of size 3m X 2.5m are prepared and pits are dug at a distance of 60 cm X 60 cm. Dried cow dung or farm yard manure at the rates of 100 g per pit is applied and mixed with soil. Two rooted stem cuttings or suckers (8 -10 cm long) are planted in each pit soon after the setting in of monsoon rains. Normal irrigation may be given on alternate days.

Harvesting: The vines start bearing spikes six months after planting. Fruits should be gathered just prior to ripening when they are most pungent and blackish green in colour. If left

without picking, they ripe and their pungency are lost to a great extent. The thick parts of the stem and roots may also be harvested from 18 months after planting.

Yield: The yield of dry spike during first year is around 400 Kg/ha, it increases up to 1000 Kg/ha in the third year. After 3 years, the productivity decreases and they should be replanted. The average yield of roots is 5 quintals/ha.

Processing/Post harvesting operation: The harvested spikes are dried in the sun for 4-5 days until they are perfectly dry. The dried spikes should be stored in moisture proof containers. The harvested stems and roots are cleaned, heaped in shade for a day after which they are cut into 2.5-5.0 cm long pieces. These are then dried for producing Piplamool. Inadequate drying will attract fungus and cause deterioration of the product.

Economics: Net income = Rs. 100000 – 150000 per hectare.

Current market scenario and export potential

Cultivation of medicinal and aromatic plants is fast replacing the cultivation of traditional crops in India. The country is expected to be the major player in the global market for herbal product-based medicines. The export of herbal materials and medicines is estimated to be around 500 crores. *P. longum* is being regularly exported in large quantities to countries such as USA, Austria, Australia, Canada, Russia, Hungary, Philippines, Europe, Africa and South East Asian countries like Japan, Singapore, Pakistan etc. The fruits and roots are exported in fresh, dried or powdered form. The price varies in different countries ranging from Rs. 350 to Rs. 3000 or more per Kg.

Some of the companies that sell pipli in India and also export are – Mazzy Exports (Chennai), Sathva bioactives Pvt Ltd (Karnataka), Enjay Marketing Services Pvt Ltd (Maharashtra), Mother Herbs Pvt Ltd (Delhi), ARAMACS (Delhi), Suyash Herbs Export Pvt Ltd (Gujrat), BIOPREX/LABS (Maharashtra), Nutramine Life Sciences (Delhi), Alchemy Ghemicals (Madhya Pradesh), M/S World Wide Enterprise (West Bengal), R P Enterprises (Andhra Pradesh), Genia nature Herbs Private Ltd (Tamil Nadu), Jairmdass Khushiram (Maharashtra) etc. These companies buy pipli from the cultivators, clean, dry in their processing unit and pack in 1, 5 or 25 Kg bags for export.

Prospects for farmers of India

Indian long pepper is mostly derived from the wild plants growing in Assam, West Bengal, Uttar Pradesh, Kerala and Andhra Pradesh. The species has become very rare in the forests due to the heavy collection from its natural resource. Cultivation of pipli was not common till recently. However, with increasing market demand, farmers of Meghalaya, Uttar Pradesh, Madhya Pradesh, Kerala and Tamil Nadu are becoming interested in systematic cultivation of the plant. Since it is a shade loving creeper, majority of cultivators grow the plant as intercrop in coffee and coconut plantation.

Many companies offer contract cultivation of medicinal plants. The company declares a price of the medicinal plants and buys back the harvest. Couple of Govt agencies also gives support for cultivation of medicinal plants. One is National Medicinal Plant Body (NAPB) headquartered in New Delhi. Every state has got State Medicinal Plant divisions. Government is also giving lot of subsidies for the farmers and manufacturers. Therefore, cultivation of *Piper longum* is a

very attractive proposition for Indian farmers.

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