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Rapid vegetative propagation of *Piper betle* Linn. using stem cutting in Herbal Garden

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Abstract
Variation in plants, their presence, behavior for growth and for reproduction to develop new individuals are specified among the different species of the plants. Based on different morphology, nature etc the plants are playing role in construction of plant diversity of certain ecological areas.
Plants are naturally propagated by many modes like by seeds, stem cuttings and other plant parts as well as by the modified plant parts. These are referred as vegetative propagation found to be efficient in term of their rapid multiplication in suitable environmental conditions.
The current paper dealing about the rapid vegetative propagation of *Piper betle* Linn. Using potential application of its stem cuttings. The plant *Piper betle* Linn is belonging to the family Piperaceae. The study was done in Herbal Garden for supporting plant propagation and for ex –situ conservation.

Keywords: *Piper betle* Linn., Vegetative propagation, Stem cutting, Herbal Garden.

1. Introduction

Plants are varied in their habits, habitat, and morphology as well as also unique in their wide range of propagation. Degree of the plant propagation and their different modes supporting the variation in plants of different ecological areas. Propagation of the plants are unique behavior leading successful appearance of the plants year by year or season by season. To gain such achievements by the plants these are showing a significant variation in capacity on their propagation.

It is leading by many ecological factors such as water, temperature etc and are also affected by the biotic factors of the ecosystem. Positive reactions of the plants with environmental components are responsible for their occurrence in particular type of the natural habitat. Variety of the plant species are after association forming a complex structure of plant diversity which further support the formation of biodiversity in any ecological areas.

Plants utilizing its many parts as a source of generation of new plants similar to their parental ones. Protected areas are not only important for providing better chances to protect the plants but also supporting conservation of biological species in nature. Present study is based on the above purpose in which *Piper betle* Linn. With special references to their vegetative propagation n poly bags using its stem cuttings.

Each one selected part of the stem was propagated in fifty poly bags. After maturation are shifted to suitable sites. The plants are adapted to propagate itself in a variety of modes such as by seeds, stem, leaf etc. Such parts are of a great significance in term of their regeneration in support of favourable environmental condition.

Many of the modified plant parts like bulb, tuber, rhizome etc are also found to be rich potential for development of new individuals of the certain plant species. Vegetative propagation study for rapid propagation of *Piper betle* Linn. In herbal garden developed for the aim of to support the propagation as well as ex-situ conservation.

Chakraborty and Shah 2011 [2] studied on Antimicrobial, antioxidative and antihemolytic activity of *Piper betel* leaf extracts. Bissa *et al.* 2007 [1] found traditions in oral hygiene: Chewing of betle (*Piper betle* L.) Leaves. Chandra *et al.* 2011 [3] recorded *Piper betel*: phytochemistry, traditional use & pharmacological activity-a review. Ghosh and Bhattacharya 2005 [7] analyzed chemical constituents of *Piper betle* Linn. (Piperaceae) roots. Dasgupta and De 2004 [4] studied on antioxidant activity of Piper betle L. leaf extract in vitro.

Lakshmi *et al.* 2006 [9] focused *Piper betle*: a potential natural antioxidant.

Periyanayagam *et al.* 2012 [10] found Pharmacognostical and Phyto-physicochemical profile of the leaves of *Piper betle* L. var Pachaikodi (Piperaceae) - Valuable assessment of its quality. Dwivedi and Tripathi 2014 [5] made review study on potential activity of *Piper betle.* Kaveti and Tan 2011 [8] noticed on antibacterial Activity of *Piper betle* Leaves. Garg and Jain 1992 [6] recorded on biological activity of the essential oil of *Piper betle L.*

Santhanam and Nagarajan 1990 [15] found wound healing activity of Curcuma aromatic and *Piper betle.* Pradhan *et al.* 2013 [12] found golden heart of the Nature: *Piper betle* L. Rathee *et al.* 2006 [14] recorded antioxidant activity of *Piper betle* leaf extract and its constituents. Prabhu *et al.* 1995 [11] focused on effect of orally administered betel leaf (*Piper betle* leaf Linn.) on digestive enzymes of pancreas and intestinal mucosa and on bile production in rats. Shukla *et al.* 2009 [13] examined antibacterial activity of fresh leaves of "*Piper betle* Linn.

Tripathi *et al.* 2011 [3, 19] analyzed on *Piper betle*: Phytochemistry Traditional Use and Pharmacological Activity – A Review. Sripradha 2014 [17] focused on Betel Leaf – The Green Gold. Shitut *et al.* 1999 [16] studied on antimicrobial efficiency of *Piper betle* Linn leaf (stalk) against human pathogenic bacteria and phytopathogenic fungi. Subashkumar *et al.* 2013 [18] noticed antibacterial effect of crude aqueous extract of *Piper betle* L. against pathogenic bacteria.

Material and Methods

The plant is herbaceous in nature with rich potential to regenerate new plants like their parental plants by their vegetative mode of propagation. The current study is done in herbal garden where fifty poly bags were used for the same purpose including fertile soil, sand and manure mixture equally). In all poly bags one-one stem cuttings of 20 cm long were deep till five cm depth and light irrigation made for proper setting of the soil in each poly bags. The experiment conducted in rainy season of the year 2015.

In support of the favourable environmental condition the stem cuttings producing new root, shoot system and finally convert in to new individuals same as their parental plants. Proper monitoring on the experiment was made to observe the requirement of the plant. In each ten days interval images were taken to record the major morphological changes. After of well development of the *Piper betle* Linn. In each poly bags were transferred in the beds in herbal garden and required facilities were provided for its rapid growth and development.

Images of different stages of the experiment

Starting of the experiment

After 10 days

After 20 days

After 30 Days

Result and Discussions

The plant *Piper betle* Linn. is a creeper/climber, evergreen, perennial, herbaceous in nature. It is efficiently reproducing their new individuals using their stem cutting under the favourable environmental condition.

Tap root system is small, branched and comparatively less deep in soil. Stems are long, smooth, cylindrical, branched and weak with presence of the clear node and internodes. Nodular parts of the stem are as a source of production of new root and buds for generation of the new plants like their parental ones.

Leaves are shiny, petiolate, green, cardiac shaped, smooth surface, unicosted, reticulate venation. The plant showing moisture loving tendency throughout the tenure of their successful growth and development. It require to protect against the direct sunlight during summer season.

The plant is not capable to produce the seeds but is well adapted to regenerate successfully using their stem cuttings referred as vegetative mode of propagation. The success of the experiment depends on several factors like the maturity of the stem cuttings, media, moisture, temperature etc management. As per need of the plants water and other requirements were supplied. The plant includes several medicinal proprieties like digestive, antimicrobial properties etc.

The plant includes many small adventitious rootlets originated from nodular part of the stem. These plant structures are significantly participating role in development of new plants like their parental ones in the process of vegetative propagation. The plant is registered its utility in multifold directions like in wound healing, burn, digestive, stomach pain etc. Many ayurvedic preparathions made by its utilization. Piperol –A, Piperol – B etc are important chemical constituents found in *Piper betle* Linn. It also includes several alkaloids, amino acids, steroidal components etc.

Piper betle Linn is rapidly propagated by the potential application of its stem cuttings in poly bags. The process is also marked as development of poly bags nursery and is a better step not only for its frequently propagation but also for a better way to its transfer from one place to another. Finally it is concluded that the current study of its propagation is found to be useful for its regeneration as well as important for its further conservation.

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