Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(2): 1685-1687
Received: 21-01-2019
Accepted: 25-02-2019

Manish Kumar Singh
Genetics and Tree Improvement Division, Rain Forest Research Institute, Jorhat, Assam, India

Correspondence
Manish Kumar Singh
Genetics and Tree Improvement Division, Rain Forest Research Institute, Jorhat, Assam, India

Potential of underutilized legume tree *Parkia timoriana* (DC.) Merr. In Eco-restoration of Jhum fallows of Manipur

Manish Kumar Singh

Abstract
Jhum cultivation is an ancient method of agriculture practice that is being followed in many parts of the Northeast Himalayan region. In recent times, for ensuring food security of the increased population, the Demand for more land under shifting cultivation has been increased. As the land resources are limited there was no other option than reducing fallow period of abandoned *jhum* plots to 1 to 3 years. The availability of this less stock up period doesn't allow fallow Jhum land to restore properly, hence exacerbate the problems of land degradation and deforestation in the region. This worsening of Jhum land is a matter of grave concern in many parts of NE Himalayan region, especially in the valleys of Manipur. Thus introduction of multipurpose tree like *Parkia timoriana* along with native bacterial bio-inoculents could be Use as tool for enhancing growth of the plants, productivity of the land and eventually biodiversity status of the region.

Keywords: Jhum land, Manipur, *Parkia timoriana*, bio-inoculants, productivity

Introduction
India's Himalayan region has been painstaking as one of the mega diverse regions of the world, categorized physio graphically into Eastern Himalayas, Northeastern Hills (Patkai-Naga Hills and Lushai Hills) and the Brahmaputra and Barak Valley plains (Das & Kalita, 2016) [4]. At the confluence of the Indo-Malayan, Indo-Chinese and Indian and biogeographical realms, the NE region is unique in providing a profusion of habitats, which features diverse biota with high level of endemism. This region is home for more than 200 ethnic communities and has been on priority for leading conservation agencies of the world (Chatterjee *et. al.*, 2006) [3]. Shifting cultivation (or *Jhum* cultivation) is a traditional land use system that is being practiced here since ages. The percentage utilization of cultivable area in this region (62.04) is less than the national average (73.05). Previously this jhum system was practiced for two to three years followed by land abandonment for 15-20 years, in order to allow land to get back its fertility and biodiversity (Verma *et al.*, 2017) [18]. However, in existing demand scenario, the duration of fallow period reduces to 1-3 years which exacerbate the problems of land degradation and limited production. This worsening of *jhum* land is a matter of grave concern in many parts of NE Himalayan region, especially in the valleys of Manipur. The valley districts in Manipur comprising a tenth of the geographical area of the state, supporting nearly two-thirds of the human population with as many as 0.07 million families practicing *jhum* cultivation and bringing 90,000 ha land under this method of cultivation annually (Tomar *et al*., 2012) [17]. This pressure on land and forests resources increased over a period of time resulting into nutrient deficient and environmentally degraded *jhum* land. Thus, it is right time to think for an integrated approach for improving the physiochemical properties of the degraded *jhum* land and enhancing the biodiversity status of the region besides uplifting the socio-economic status of the Jhumiers.

The *Parkia timoriana,* which is a fast-growing leguminous species bearing fruits of high economic importance can be one of the suitable species for reclamation of tainted Jhum land. This tree doesn't require much after care because being a legume it will enrich soil through nitrogen fixation. Also associated microflora found in tree rhizosphere will perhaps potentially enhance the growth and development of the plant and assisted degraded *Jhum* fallow to get back its lost nutrients (Fig. 1). *P. timoriana* which is popularly known as 'tree bean', grows luxuriantly in north-east hilly regions of India and distributed in South east Asian countries like Burma, Bangladesh, Thailand and the Malaysian region (Hooker, 1879 & Hopkins, 1994) [7, 8]. It is commonly growing in every house yard, Jhums and forests in Northeast states in India such as Mizoram, Nagaland, Manipur, Meghalaya and Assam (Kanjilal *et al.* 1938) [9].

This tree is well adapted to grow in diverse agro-climatic regions from colder hilly regions to hotter plains (Thangjam, 2014) [16] and varied altitudinal range i.e from 40 to 820 m a.s.l. (Robert *et al.* 2003) [11]. It is a medium-sized tree having a grayish-brown bark with 15-25 m height (Singh & Singh, 2017) [15]. The leaves are alternate with 18-42 cm long primary rachis including petiole consisting of 14-31 pairs of pinnae arranged opposite or sub opposite. The peduncles are alternately arranged usually 4-7 per compound inflorescence. The flowers are hermaphroditic with calyx 9- 10.5 mm long including pseudo pedicel, corolla 10-11 mm long and filaments exerted 2-3.5 mm beyond calyx. The flowers appear from September to October and develop into a strapped-shaped fruit in about four months from anthesis and are available for harvest during February to March. The pod production in the plants start at the age of 6 years however, full bearing stage is reported to be 10 years. During favourable seasons a full-grown plant bears 10,000-15,000 pods. Thus, a single plant can yield approx. 8,000 to Rs. 10,000 per annum to the grower (Rocky *et al.* 2004) [12].

In NE India, it is considered as the costliest vegetable fetching a market value of Rs 100-120/kg. Besides this, its timber is used for making boxes, decorative articles (Kumar *et al.* 2012) [10] and light furniture. Its bark contains 6-15% tannin reported to be useful in tannin industry and the wood can also be used as a source of paper pulp (Anonymous, 1966) [2]. *Parkia* is also useful as a shade tree to tea plantations (Dhyani and Chauhan, 1990) [5] and to farmers as well (Alabi *et al.* 2005) [1]. Ethno-botanically the seeds and pods of *P. timoriana* are reported to cure stomach disorders and regulate liver functions. Pods pounded in water are used for face and head washing (Roy *et al*, 2016) [13]. The bark and leaves are used in making lotion for skin diseases and ulcers. Fermented leaf decoction is beneficial for the rheumatic affected parts (Sharma *et al.* 1993) [14]. Additionally, the tree bean has been found associated with different beneficial bacterial population i.e. *Pseudomonas fluorescens, P. hibiscicola P. putida, P. aeruginosa, Bacillus subtilis, B. brubrevis, B. cereus, Agrobacterium fabrum, Serralia marcescens etc.* colonize in their rhizospheric zone. These bacterial population could be screened further for preparation of native bacterial bio-inoculants, which may be used for establishment and growths of new plantlet and improvement of degraded *jhum* fallows of the region.

Fig 1: Eco-restoration of degraded Jhum fellows of Manipur though introduction of *Parkia timoriana* plantlets.

This article thus emphasis that tree bean being a fast-growing leguminous tree species is a popular non-conventional source of nutritional, medicinal and recreational values in north-eastern Himalayan region. It is an excellent supplier of soil nitrogen and act as Carbon sink, has wider adaptability and ability to check soil erosion can be used as a tool for reclamation of degraded *jhum* land of Manipur. Further, introduction of this multipurpose tree bean with native bio-inoculants can significantly enhance growth, survivability of plants, nutrient status of soil and eventually the biodiversity of the region. Thus, having high commercial and ecological significance, therefore state may take up large scale plantation of this species on priority basis.

References

1. Alabi DA, Akinsulire OR, Sanyaolu MA. Quantitative determination of chemical and nutritional composition of *Parkiabi globosa* (Jacq.) Benth. African Journal of Biotechnology. 2005; 4:812-815.
2. Anonymous. Wealth of India. Raw material. N - Pe. Council of Scientific and Industrial Research, New-Delhi. 1966; VIII:265.
3. Chatterjee S, Saikia A, Dutta P, Ghosh D, Pangging G, Goswami AK. Background Paper on Biodiversity Significance of North East India. Forests Conservation Programme. WWF-India, New Delhi, 2006.
4. Das H, Kalita D. Fiber and dye yielding plants of North east India. *In* Bioprospecting of Indigenous Bioresources of North-East India (ed. Purkayastha J.), Springer Science + Business Media Singapore, 2016.
5. Dhyani SK, Chauhan DS. Nitrogen fixing trees for agroforestry in Meghalaya. Indian Journal of Hill Farming. 1990; 3(2):65-68.
6. Holtum RE. On periodic leaf-change and flowering of trees in Singapore II. Gardens' Bulletin. 1940; 11:119-175.
7. Hooker JD. The Flora of British India, Missouri Botanical garden, London. 1879; 2:289-290.
8. Hopkins HCF. The Indo-Pacific species of Parkia (Leguminosae: Mimosoidae). Kew Bulletin, 1994; 49:181-234.
9. Kanjilal UN, Kanjilal PC, Das A. Flora of Assam, Prabasi Press, Calcutta. 1938; II:151.
10. Kumar R, Ashwani T, Borah RK. Identification and controlling of verticillium wilt infecting *Parkia roxburghii* seedling in Manipur India. Res. J For. 2012, 1-6.

11. Robert T, Damayanti M, Sharma GJ. Detection of genetic diversity in *Parkia timoriana* (DC.) Merr. Using randomly amplified polymorphic DNA analysis. Food Agric Environ. 2003; 1(3&4):46-49.
12. Rocky P, Sahoo UK, Thapa HS. Livelihood generation through tree bean (*Parkia roxburghii* G. Don.) in Imphal west district of Manipur. Journal of Non-Timber Forest Products. 2004; 11:135-139.
13. Roy SS, Rajlakshmi A, Ajitkumar SN. Tree Bean (*Parkia roxburghii*): A Potential Multipurpose Tree Legume of North East India. *In:* National Symposium on Vegetable Legumes for Soil and Human Health, 2016; 201-208.
14. Sharma BD, Hore DK, Salam JS. *Parkia roxburghii*- a useful tree of north-eastern India. Indian Journal of Plant Genetic Resources. 1993; 6:171-173.
15. Singh NT, Singh KN. Revisting imported Yongchak: An overview. Global Academic Research Journal. 2017; 5(1):24-28.
16. Thangjam R. Inter-simple sequence repeat (ISSR) marker analysis in *Parkia timoriana* (DC.) Merr. Populations from Northeast India. Appl Biochem Biotechnol. 2014; 172:1727-1734.
17. Tomar JMS, Das A, Puni L, Chaturvedi OP, Munda GC. Shifting cultivation in northeastern region of India - status and strategies for sustainable development. Indian Forester. 2012; 138(1):52-62.
18. Verma PK, Kumar V, Chandra A, Thunaojam B. Alternatives of Shifting Cultivation in North-eastern region of India. Report and Opinion. 2017; 9(12):1-8.