

COMPARATIVE EVALUATION OF PROMISING CHITRAK (*PLUMBAGO ROSEA L.*) SELECTIONS AT DIFFERENT LOCATIONS OF KERALA

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Abstract : A large portion of the world population, especially in developing countries depends on the traditional system of medicine for healing a variety of diseases. Chitrak (*Plumbago rosea* L.) is an important medicinal plant from plumbaginaceae family, widely cultivated in India and Sri Lanka. The root is medicinal and used as laxative, expectorant, astringent, abortifacient and as anti-dysenteric. In an earlier trial conducted at All India Coordinated Research Project on Medicinal Aromatic Plants and Betelvine (AICRP on MAP & B), College of Horticulture, Vellanikkara 25 accessions of *Plumbago rosea* were collected from different parts of the State. These accessions were evaluated for variability in morphological and yield related characters and plumbagin content. Based on yield attributes and plumbagin content two accessions were selected as promising and advanced to comparative yield trial.

Results of the study indicated that two accessions viz; TCRPR 516 and TCRPR 521 were superior and recorded 15.38 and 17.59 t/ha root yield and 0.43 and 0.48 per cent plumbagin content respectively among the 25 accessions studied. An experiment was carried out to find out the performance and comparative evaluation of these selected accessions in three different locations in Kerala namely Irinjalakuda, Ollukkara and Madakkathara farmers fields during 2013-14 period. Observations were recorded on morphological, yield and quality parameters like plant height, number of branches/plant, internodal length, leaf characters, root characters and root plumbagin content. Pooled analysis of data indicated that selected accessions registered higher morphological and yield characters than local checks Mridhula and Agni. Plumbagin content was moderately high for selected accessions.

Keywords: Lalchitrak, *Plumbago rosea*, Plumbagin.

Introduction: Chitrak (*Plumbago rosea* L.) is an important medicinal shrub from the family plumbaginaceae. It is widely cultivated in India and Sri Lanka. The root is medicinally important and used as laxative, expectorant, astringent, abortifacient and as anti-dysenteric. It is the major ingredient in ayurvedic formulations like chitrakadivati, chitrakasavam, yogarajachurnam etc. This plant is reported to cure certain cases of leucoderma also. Tribals use scraped root for illegal abortion. A tincture of the root is used in secondary syphilis, in leprosy and also in dyspepsia, piles, flatulence, loss of appetite and other digestive complaints [1]-[2]. The annual demand of *P. rosea* roots in Kerala is about 57 tonnes. Considering its demand the crop has been recommended for commercial cultivation in Kerala [3]-[4].

In an earlier trial conducted at All India Coordinated Research Project on Medicinal Aromatic Plants and Betelvine (AICRP on MAP & B), College of Horticulture, Vellanikkara 25 accessions of *Plumbago rosea* were collected from different parts of the State. These accessions were evaluated for variability in morphological and yield related characters and plumbagin content. Based on yield attributes and plumbagin content it was found that 2 accessions viz; TCR PR 516 and TCRPR 521 were superior in yield attributes and these two promising selections were advanced to comparative yield trial

at different locations of Kerala. The present study was designed to find out the performance of these two promising accessions in three different locations of Trichur district so as to find out the most suitable among them to be multiplied and recommended for commercial cultivation by farmers.

Material and methods: The two superior accessions of *Plumbago rosea* viz; TCR PR 516 and TCRPR 521 obtained from the evaluation of 25 accessions of chitrak collected from different parts of the State were used for the experiment along with Mridhula and Agni varieties of *P. rosea* as local checks. The experiment was conducted in the farmer's field at three locations in Trichur district viz; Ollukkara, Irinjalakuda and Madakkathara. The entries were evaluated in a randomized block design with five replications during 2013-14.

Three nodded semi hard wood stem cuttings were raised in nursery beds of 1 M width for rooting. Two month old rooted cuttings were planted in the field at a spacing of 15 cm between plants and 50 cm between rows. Cattle manure @ 10 t/ ha applied as basal dose and NPK @ 50: 50: 50 kg/ha. Entire P₂O₅ applied as basal dose and N and K₂O in two split doses at two and four months after planting. Observations were recorded on five plants from each accession per replication for the morphological, yield and quality parameters viz; plant height (cm), number of branches / plant, plant type, leaf shape, leaf color,

leaf length (cm), leaf breadth (cm), L/B ratio, root length (cm), root girth(cm), number of roots, root weight (fresh), root weight (dry) and plumbagin content and analysed as per the standard statistical procedures.

Results and discussion: Mean performance of selected accessions of *Plumbago rosea* at three different locations indicated that the location effects were not significant. As regards to treatment effects, significant differences were found for plant height, number of branches and internodal length. Selected

accessions TCRPR 516 and TCRPR 521 registered greater plant height and number of branches, compared to Agni and less internodal length compared to local checks Mridhula and Agni. No variation was observed in the case of plant type and leaf characters. (Table I). Root characters like root length, root girth, number of roots and root weight both fresh and dry, root yield fresh and dry were superior for TCRPR 521. Plumbagin content was moderately high for both selected accessions (Table II).

Table I. Mean performance of morphological and yield parameters of selected accessions of *Plumbago rosea* at different locations

Treatments	Characters								
	Plant height (cm) @ 8 MAP*	No. of branches/plant @ 8 MAP*	Inter Nodal Length (cm)*	Plant type (E/S)	Leaf shape	Leaf color	Leaf Length (cm)*	Leaf Breadth (cm)*	L/B*
TCRPR 516	80.07	8.58	2.78	Erect	Ovate	Reddish Green	9.27	3.95	2.36
TCRPR5 21	79.53	9.03	3.17	Erect	Ovate	Reddish Green	9.28	3.96	2.33
Mridhula	80.33	8.47	4.17	Erect	Ovate	Reddish Green	9.06	3.97	2.42
Agni	77.40	7.53	4.09	Erect	Ovate	Reddish Green	9.27	3.86	2.41
CD for treatments	1.639	1.031	0.815				NS	NS	NS

(*) pooled over locations, MAP- Months after planting

Table II. Mean performance of yield and quality characters of the selected accessions of *Plumbago rosea* at different locations at harvest after 18 MAP

Treatments	Characters at harvest (18 MAP)							
	Plant height (cm)*	No. of branches/plant*	Root length (cm)*	Root girth (cm)*	No. of roots*/plant	Root weight (fresh) (g)*/plant	Root weight (Dry) (g)*/plant	Plumbagin content (%)*
TCRPR 516	98.93	18.77	56.54	3.82	29.98	158.73	67.00	0.48
TCRPR 521	95.09	18.51	61.09	3.94	32.58	165.80	72.20	0.51
Mridhula	83.59	17.73	51.73	3.10	26.96	120.00	50.93	0.29
Agni	90.83	17.89	49.88	3.28	23.56	117.07	47.30	0.68
CD for treatments	4.9	NS	1.98	NS	1.89	0.54	2.58	0.01

(*) pooled over locations, MAP- Months after planting

From the results it could be concluded that the accession TCRPR 521 registered superior with respect

to root characters like root length (61.09 cm), root girth (3.94 cm), number of roots (32.58), root weight fresh (165.80 gm), root weight dry (72.20 gm) and moderately high Plumbagin content (0.51%). As root is the medicinal part sold as raw herbal drug in

markets, this promising accession with high root yield can be recommended for cultivation in farmers fields.

Acknowledgment: The financial assistance from AICRP on Medicinal, Aromatic Plants and Betelvine is gratefully acknowledged.

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