Electronic Journal of Plant Breeding, 8(1): 236-238 (March 2017)
ISSN 0975-928X
DOI: 10.5958/0975-928X.2017.00033.3

Research Note

Genetic evaluation of *Decalepis hamiltonii* Wight & Arn accessions for yield and related traits

G. Raviraja Shetty[1], Pranaykumar[*1], K. Souravi[2] and P.E. Rajasekharan[2]
[1]Dept. of Plantation, Spices, Medicinal & Aromatic crops, College of Horticulture, Mudigere, India
[2]Division of Plant Genetic Resources, Indian Institute of Horticultural Research, Hessarghatta, Bangalore, India
E-mail: bittu.bsb.007@gmail.com

(Received: 26 March 2015; Revised: 30 Jan 2017; Accepted: 05 Feb 2017)

Abstract
Six accessions of *Decalepis hamiltonii* Wight & Arn., a threatened species known for its medicinal properties, were evaluated for variability, heritability and genetic advance in respect to yield and its contributing traits. Genotypic coefficient of variation and phenotypic coefficient of variation were highest for pedicel length followed by fruit length and petiole length. High heritability and high genetic advance over mean were observed for petiole length (93.13%), fruit length (87.43%), fruit yield (80.63%) and leaf length (72.44%) thus indicating that these characters had additive gene effect and hence, they can be used for selection of superior genotypes.

Key words
Decalepis hamiltonii, Selection, crop improvement, yield

Decalepis hamiltonii Wight & Arn. also known as swallow root, is a woody climber belonging to the family Apocynaceae. It is widely found in moist as well as dry deciduous forest of peninsular India (Gamble and Fisher, 1957). It is seen growing along rocky slopes and rock crevices in wild (Vedavathy, 2004). In local languages, this plant is known as of Maredukommulu, Nannarikommulu, Madinakommulu, Barresugandhi and Maredugaddalu. The roots of this plant are of economic significance and used in number of medicinal and food preparations. Some of the medicinal properties are attributable to blood purification and antioxidant activity. It is a dry deciduous plant and leaf fall take place in winter. New foliage normally seen in the month of January and flowering takes place usually from February to April. Fruiting takes place during May to August (Reddy and Murthy, 2013).

After extensive exploration programmes, different accessions based on the morphological variability (collected from different locations of distribution, Table 1) of *D. hamiltonii* were established at the Field Gene Bank, Division of Plant Genetic Resources, Indian Institute of Horticultural Research, Bengaluru. The different accessions collected exhibited variability and hence providing good scope for improvement of this commercially important species in terms of yield and other characters of interest through selection. Magnitude of variability present in genetic stocks, heritability and genetic advance are important parameters for effective selection of superior genotypes. Therefore, the present investigation was undertaken with a view to assess the extent of genetic variation in some *D. hamiltonii* accessions.

The present investigation was conducted in the Field Gene Bank of Division of Plant Genetic Resources, Indian Institute of Horticultural Research, Bengaluru. Six different accessions of one RET,KAR-180, RET,KAR-172, RET,KAR-178, RET,KAR-175, RET,KAR-185 and RET,KAR-54 were grown in randomized block design with three replications. One year old saplings were planted in the year 2009, flowering and fruiting was witnessed within two years of establishment. Plants were maintained organically and recommended cultural practices were adopted for proper growth and stand of the plants. The observations were recorded on nine quantitative traits from five randomly selected plants from each of the accessions and its replications. The data were subjected to analysis of variance as per the procedure described by Panse and Sukhatme (1967). The coefficient of phenotypic and genotypic variations was calculated according to Burton and DeVane (1953). Heritability and genetic advance were calculated according to the formula of given by Johnson *et al.* (1955).

High genotypic and phenotypic coefficients of variation were recorded for pedicel length, petiole length, fruit length and fruit diameter and (Table 2). This shows greater genetic variability among accessions for these characters, to carry out further improvement by selection. Phenotypic and genotypic coefficients of variation were quite low for leaf length, leaf width, thickness of mesocarp and pericarp and fruit yield. The result obtained revealed that the estimates of phenotypic coefficient of variation (PCV) were higher than genotypic coefficient of variation (GCV).Although estimates of PCV were higher than that of GCV, they were close to one another which implies that the influence of environment on the expression of these characters were negligible and therefore selection based on phenotypic values is possible.

DOI: 10.5958/0975-928X.2017.00033.3

The lowest GCV was noticed for thickness of mesocarp.

The amount of genetic variation present for different desirable traits can be known by the estimation of genetic coefficient of variation whereas the proportion of variation which is inherent can be estimated by heritability. Heritability alone can be used to gather information of relative value of selection, but Johnson *et al*., (1955) had shown that for better and reliable conclusion, both heritability and genetic advance should be considered.

Heritability estimates were high for characters like petiole length, fruit length, fruit yield and leaf length. From the above heritability values, it can be concluded that these characters are less influenced by the environmental factors and are controlled by additive gene effect (Table 1). Plant height and pedicel length recorded moderate heritability while fruit diameter, thickness of pericarp and thickness of mesocarp recorded low heritability.

In the present experiment high genetic advance over mean coupled with high heritability was observed in characters like petiole length (93.13%), fruit length (87.43%), fruit yield (80.63%) and leaf length (72.44%). Hence, the present results show that the existing variability among the accessions with respect to these traits is mainly due to additive type of genes (Panse, 1957).

The obtained results in this study highlighten the scope for crop improvement in terms of yield and other characters of interest through conventional selection methods or by employing modern biotechnological tools such as Marker Assisted Selection.

References

Gamble, J.S. and Fisher, C.E.C. 1957, Flora of the presidency of madras, Adlard & Aon Ltd., London, 2.

Jadhav, S.N. and Reddy, K.N. 2002. *In situ* conservation of medicinal plants in Andhra Pradesh, Proceedings of the National Seminar on Conservation of Eastern Ghats, March 24-26, 34-54.

Johnson, H.W. Robinson, J.F. and Comstock, R.E. 1955. Estimation of genetic and environmental variability in soya bean, *Agron. J*., **7**: 314-318.

Naveen, S. and Khanam, F. 2009. Antidiabetic, Antiatherosclerotic and Hepatoprotective properties of *Decalepis hamiltonii* in streptozotocin-induced diabetic rats, *Journal of Food Biochemistry*, **34**: 1231-1248.

Nayar, R.C., PattanShetty, J.K., Mary, Z. and Yoganarasimhan, S.N. 1978. Pharmacognostical studies on the root of *Decalepis hamiltonii* Wight and Arn. and comparison with *Hemides musindicus* (L), *Proc. Nat. Acad. Sci.*, **87**: 37–48.

Panse, V.G. and Sukhatme, P.V. 1967. Statistical methods for agricultural workers, Indian Council of Agricultural Sciences, New Delhi.

Ragini, V., Bharathi, K., Prasad, K.V.S.R. G. And Sumalatha, G. 2010. Antidiabetic and Antioxidant Activities of *Decalepis hamiltonii* Wright & Arn., *International Journal of Innovative Pharmaceutical Research*, **1**(1): 1-10.

Reddy, M.C. and Murthy, K.S.R. 2013. A review on *Decalepis hamiltonii* Wight & Arn., *Journal of Medicinal Plants Research*, **7**(41): 3014-3029.

Vedavathy, S. 2004. *Decalepis hemiltonii* Wright & Arn. – An endangered source of indigenous health drink, *Natural Product Radiance*, **3**(1): 22-23.

Vijayakumar, R. and Pullaiah, T. 1998. An ethno-medico-botanical study of Prakasam district, Andhra Pradesh, India, *Fitoterapia*, **69**: 483-48.

Electronic Journal of Plant Breeding, 8(1): 236-238 (March 2017)
ISSN 0975-928X
DOI: 10.5958/0975-928X.2017.00033.3

Table 1. Geographical location, Latitude and Longitude of the different accessions

Sl. No.	Accession	Location	Latitude	Longitude
1.	RET,KAR-180	Banerghatta, Karnataka	120 46' 14.1''	77^0 34' 53.4''
2.	RET,KAR-172	Savandurga, Karnataka	12^0 54' 56.7''	77^0 18' 18.5''
3.	RET,KAR-178	Devarayanadurga, Karnataka	13^0 21' 59.7''	77^0 13' 09.3''
4.	RET,KAR-175	Chitradurga, Karnataka	14^0 11'40.9''	76^0 23' 50.1''
5.	RET,KAR-185	Chamarajanagar, Karnataka	12^0 01'16.1''	77^0 07' 27.8''
6.	RET,KAR-54	Savandurga, Karnataka	12^0 55'05.2''	77^0 18' 05''

Table 2. Variability, heritability and genetic advance for growth of 6 accessions of *Decalepis hamiltonii*

Sl. No.	Character	Mean	GV	PV	GCV	PCV	Heritability (%)	GAM (%)
1	Plant height	2.250	0.006	0.010	3.3450	4.380	58.320	5.262
2	Leaf length	8.809	0.009	0.012	1.100	1.292	72.440	1.928
3	Leaf width	4.184	0.005	0.009	1.763	2.318	57.840	2.762
4	Petiole length	1.145	0.004	0.004	5.480	5.679	93.130	10.895
5	Pedicel length	0.417	0.003	0.008	13.145	21.909	36.000	16.247
6	Fruit length	7.283	0.197	0.225	6.096	6.519	87.430	11.741
7	Thickness of mesocarp	0.494	0.000	0.006	0.039	15.520	0.000	0.000
8	Fruit yield	3.122	0.001	0.001	1.110	1.236	80.630	2.053