



Research Note

Character association for fruit yield and yield traits in *Decalepis hamiltonii* Wight & Arn

Raviraja Shetty G¹, Pranaykumar^{*1}, Souravi K² and Rajasekharan P.E²

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

*Email: bittu.bsb.007@gmail.com

(Received: March 2015; Accepted: July 2015)

Abstract

This experiment was undertaken to study the correlation and path analysis in six accessions of *Decalepishamiltonii*. Correlation study revealed that petiole length, pedicel length and fruit diameter had significant positive correlation with yield per plant. According to path analysis, leaf width, petiole length and fruit length had high positive direct effects on yield per plant. Plant height, leaf length, pedicel length, fruit diameter, thickness of pericarp and thickness of mesocarp had negative direct effects on yield. Thus based on correlation and path analysis, the traits viz., leaf width, petiole length, fruit length, plant height, leaf length, pedicel length, fruit diameter, thickness of pericarp and thickness of mesocarp may be considered as selection indices for high yield.

Keywords : *Decalepis hamiltonii*, Correlation, Path analysis, Fruit yield.

Decalepis hamiltonii Wight & Arn. belongs to the family Apocynaceae. It is a woody climber found mostly in moist as well as dry deciduous forests of peninsular India (Gamble and Fischer, 1957), found growing between altitudes of 300-1200mts (Reddy and Murthy, 2013). It has been widely studied for its medicinal properties and hence is commonly used in various drug preparations. The root of *D. hamiltonii* is used in herbal medicine, particularly Ayurveda and Unani. It is regarded as a blood purifier and general health tonic to boost the immune system. It is also found to be effective against diabetes and is having antibacterial nature.

As this is a threatened plant species globally and comes under the Red list of prepared by IUCN based on the threat they are facing for their existence, like habitat fragmentation and destructive harvesting, it could be concluded that very less attention has been paid for this species. The conservation of this species is possible through selection of superior types which in turn depends on the interrelationship of the number of component characters. In the present study an attempt was made to evaluate the direct and indirect association among the various variables of six *D. hamiltonii* accessions through correlation and path analysis.

This experiment was conducted at the Field Gene Bank of Division of Plant Genetic Resources, Indian Institute of Horticultural Research (IIHR), Bengaluru. The six accessions of *D. hamiltonii* viz., RET,KAR-180, RET,KAR-172, RET,KAR-178, RET,KAR-175, RET,KAR-185 and RET,KAR-54 were collected from wild by exploration (detailed in Table 1) and maintained here organically.

Recommended cultural practices were adopted for proper growth and stand of the plants.

The observations were recorded on 10 traits from five randomly selected plants from each of the accessions and its replications. The characters viz., plant height, leaf length, leaf width, petiole length, pedicel length, fruit length, fruit diameter, thickness of pericarp, thickness of mesocarp and fruit yield were studied. The recorded data were analyzed as suggested by Al-jibouri *et al.* (1958) for correlation coefficient analysis and by Dewey and Lu (1959) for path coefficient analysis.

The correlation study revealed the degree of interrelationship of plant characters for improvement of yield as well as important quality parameters in any breeding programme (Table 2). Fruit yield per plant had positive correlation with petiole length (0.17), pedicel length (0.28) and fruit diameter (0.14).

Linear relationship between these mentioned characters and fruit yield per plant suggested that selection method of crop improvement should mainly be focused over these characteristics. As the roots of *D.hamiltonii* is economically significant due to their medicinal properties, destructive harvesting is commonly practiced, in order for conservation and sustainable use, it is important to have more number of plants of *D.hamiltonii* which is usually propagated by seeds, thereby signifying the importance of superior genotypes with good fruit yield and seed set.

The path analysis showed that the association of the independent character with dependent variable was due to their direct effect on it. If the correlation between dependent variable and independent



character is due to direct effects of the character, it reflects a true relationship between them and hence selections can be made for such character to improve dependent variable. But, if the association is mainly through indirect effect of the character *i.e.*, through another component character, the breeder has to select for the later through which the direct effect is exerted. In the present experiment, path analysis was done for fruit yield per plant (Table 3). Leaf width (1.40383) had highest positive effect on fruit yield followed by petiole length (0.42992) and fruit length (0.24801). Plant height (-1.60440) had highest direct negative effect on fruit yield per plant followed by leaf length (-1.46785) and pedicel length (-0.71778).

Hence, based on correlation and path analysis, the characters *viz.*, leaf width, petiole length, fruit length, plant height, leaf length, pedicel length, fruit diameter, thickness of pericarp and thickness of mesocarp may be considered as selection indices for high fruit yield.

References

- Al-Jiboure, H.A., Miller, P. A. and Robinson, H. V., 1958, Genotypes and environmental variances and co-variances in an upland cotton of interspecific origin, *Agron. J.*, **50**: 633-636.
- Gamble, J. S. and Fisher, C. E. C., 1957, Flora of the presidency of madras, Adlard & Aon Ltd., London, **2**.
- Dewey, D.R and Lu, K. H., 1959, A correlation and path coefficient analysis of components of crested wheat grass seed production, *Agron. J.*, **51**: 515-518.
- Reddy, M. C. and Murthy, K. S. R., 2013, A review on *Decalepishamiltonii* Wight & Arn., *Journal of Medicinal Plants Research*, **7** (41): 3014-3029.



Table 1: Geographical coordinates of the different accessions of *Decalepis hamiltonii* collected

Sl.No	Accession	Location	Latitude	Longitude	Altitude
1	RET,KAR-180	Bannerghatta	12 ^o 46' 13.2''	77 ^o 35' 15.2''	933
2	RET,KAR-172	Savandurga	12 ^o 54' 56.7''	77 ^o 18' 18.5''	868
3	RET,KAR-178	Devarayanadurga	13 ^o 21' 59.7''	77 ^o 13' 09.3''	908
4	RET,KAR-175,	Chitradurga	14 ^o 11' 40.9''	76 ^o 23' 50.1''	825
5	RET,KAR-185	Chamarajanagar	12 ^o 01' 16.1''	77 ^o 07' 27.8''	886
6	RET,KAR-54	Savandurga	12 ^o 55' 05.2''	12 ^o 55' 05.2''	842

Table 2: Simple correlation co-efficient among important quantitative character in *Decalepis hamiltonii*.

	1	2	3	4	5	6	7	8	9	10
1	1	-0.05	0.15**	-0.43**	-0.66**	0.45**	-0.55**	-0.18**	-0.38**	-0.65**
2		1	0.97**	0.89**	0.54**	0.44**	0.13*	-0.65**	-0.1	0
3			1	0.8**	0.31**	0.42**	-0.11	-0.58**	-0.1	-0.12*
4				1	0.71**	0.1	0.29**	-0.4**	0.19**	0.17**
5					1	0.21**	0.88**	-0.44**	0.04	0.28**
6						1	0.18**	-0.94**	-0.88**	0.01
7							1	-0.28**	0	0.14*
8								1	0.79**	-0.21**
9									1	-0.32**
10										1

Critical r value@ 5%- 0.47 1%- 0.59

1. Plant height 2. Leaf length. 3. Leaf width. 4. Petiole length
5. Pedicel length 6. Fruit length. 7. Fruit diameter. 8. Thickness of pericarp
9. Thickness of mesocarp 10. Fruit yield

Table 3: Path analysis of various traits with fruit yield

	1	2	3	4	5	6	7	8	9
1	-1.60440	0.10699	0.14676	-0.22314	0.73134	0.12872	-0.04727	0.05871	0.00686
2	0.11694	-1.46785	1.41158	0.40062	-0.56212	0.11484	0.00123	-0.15379	0.12753
3	-0.16773	-1.47595	1.40383	0.35863	-0.32765	0.11297	-0.00854	-0.12282	0.08469
4	0.83272	-1.36783	1.17106	0.42992	-0.64042	0.02408	0.02960	-0.07892	-0.22179
5	1.63472	-1.14954	0.64082	0.38359	-0.71778	0.07479	0.11049	-0.05379	-0.47491
6	-0.83269	-0.67970	0.63948	0.04174	-0.21645	0.24801	0.01735	-0.20943	0.96392
7	0.65079	-0.01550	-0.10289	0.10919	-0.68046	0.03693	-0.11655	0.02960	0.06748
8	-0.69614	1.66848	-1.27440	-0.25079	0.28536	-0.38390	0.02550	-0.13530	0.31858
9	2.44689	2.06521	-1.58965	1.02536	-1.26548	-1.03564	-1.74772	-1.63254	-0.00450

Residual effect = 0.2713

1. Plant height 2. Leaf length 3. Leaf width 4. Petiole length 5. Pedicel length
6. Fruit length 7. Fruit diameter 8. Thickness of pericarp 9. Thickness of mesocarp