Research Note

Character association for seed yield and yield traits in *Saraca asoca* (Roxb.) De Wilde

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Abstract
An experiment was carried out to study the correlation and path analysis in six accessions of *Saraca asoca* at ICAR-Indian Institute of Horticultural Research, Bangalore during 2016-17. Correlation study revealed that the various parameters such as plant height, leaf length, leaf width, leaf area, pod length, pod width, number of pods per plant, number of seeds per pod, seed length and seed width had high significant positive correlation with seed yield per plant. As per the results obtained from path analysis, the plant height, leaf length, leaf width, pod length and number of pods per plant had high positive direct effects on yield per plant. Leaf area, pod width, number of seeds per pod, seed length and seed width had negative direct effects on yield. Thus based on correlation and path analysis, the traits *viz.*, leaf length, leaf width, pod length and number of pods per plant may be considered as selection indices for selecting high yielding accession(s) of *S. asoca*.

Key words
Saraca asoca, Correlation, Path analysis, Seed yield.

Saraca asoca (Roxb.) De Wilde is a threatened medicinal plant which belongs to the family *Ceasalpinaceae*. It is found in the Western Ghats and Deccan plateau and also found in Central and Eastern Himalayas. It is extended up to an elevation of about 750 meter above mean sea level (Bhalerao *et al*., 2014). It is one of the sacred plants of Hindus, and is especially sacred to the Hindu God of Love, Kamadeva (Pradhan *et al*., 2009). It is a small ever green tree growing to a height of about 7-10 m height. Bark of the tree is the economical part which is used to treat gynaecological problems viz. menorrhagia, leucorrhoea, internal bleeding, hemorrhoids, and hemorrhagic dysentery (Smitha, 2013).

Though it is a threatened medicinal species and comes under IUCN Red list, significant efforts have not been paid yet for its genetic improvement. The genetic improvement of this species could be achieved through breeding followed by selection of suitable parents, 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 *S. asoca a*ccessions through correlation and path analysis.

The six accessions of *S. asoca viz.,* KARRET-201, KARRET– 214, KARRET– 216, KARRET– 219, MSSRF and CMPR were maintained at ICAR- Indian Institute of Horticultural Research, Bengaluru and were used for this study. Recommended cultural practices were adopted for proper growth and development of the plants were followed .
The observations were recorded for eleven traits from 2 replications, belonging to the different accessions taken in study (Design RBD with 3 meter spacing between plants.) The characters *viz.*, plant height, leaf length, leaf width, leaf area, pod length, pod width, number of pods per plant, number of seeds per pod, seed length, seed width and seed yield. The recorded data were analysed by correlation coefficient analysis Al-jibouri *et al.* (1958) and path coefficient analysis Deway and Lu (1959).

The correlation study reveals the degree of interrelationship of plant characters for improvement of yield as well as important quality parameters in any breeding programme (Table 1). Seed yield per plant had high positive correlation with plant height (0.887), leaf length (0.904), leaf width (0.920), leaf area (0.938), pod length (0.954), pod width (0.758), number of pods per plant (0.992), number of seeds per pod (0.996), seed length (0.670) and seed width (0.718). The results are in agreement with the findings of Kakaraparthi *et al*. (2013), Ahmad and Khaliq, (2002), and Rahman *et al*. (2010) who had also noticed positive association of plant height, leaf length, leaf width, leaf area, fruit diameter and seed length on seed yield per plant in plants like ashwagandha, *Ocimum* and tea respectively.

Linear relationship between these mentioned characters and seed yield per plant suggest that selection method of crop improvement can mainly be focused over these characteristics.

The path analysis shows that the association of the independent character with dependent variable is 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 selection 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 seed yield per plant (Table 2). Plant height (0.0366), leaf length (0.2512), leaf width (0.0011), pod length (0.4582) and number of pods per plant (0.8314). The importance of pod length, fruit width, leaf width, leaf length has been highlighted on plants like *Jatropa curcus*, *Piper capense,* Safed musli and *Hypericum perforatum* by Mohapatra and Panda (2010), Abebe (2014), Yadav *et al*. (2007) and Riazi *et.al*.((2011) respectively. The path analysis confirms the earlier studies that leaf length, leaf width, pod length and number of pods per plant are important traits that contribute to seed yield(Velmurugan *et al* and . Leaf area (-0.1853), pod width (-0.1576), number of seeds per pod (-0.1319), seed length (-0.0358) and seed width (-0.0790) had negative direct effect on seed yield per plant.

Hence, based on correlation and path analysis, the characters *viz.,* leaf length, leaf width, pod length and number of pods per plant may be considered as selection indices for identifying and selecting high seed yielding variety. From our studies the accession, KARRET-201 is found promising.

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Table 1. Simple correlation co-efficient among important quantitative character in *Saraca asoca* accessions

@	Plant height (m)	Leaf length (cm)	Leaf width (cm)	Leaf area (cm^2)	Pod length (cm)	Pod width (cm)	Number of pods per plant	Number of seeds per pod	Seed length (cm)	Seed width (cm)	Seed yield (kg/plant)
Plant height (m)	1.000	0.906**	0.912**	0.892**	0.745**	0.650**	0.891**	0.884**	0.706**	0.667**	0.887**
Leaf length (cm)		1.000	0.981**	0.962**	0.765**	0.623**	0.886**	0.885**	0.517**	0.571**	0.904**
Leaf width (cm)			1.000	0.990**	0.807**	0.663**	0.909**	0.918**	0.566**	0.621**	0.920**
Leaf area (cm^2)				1.000	0.834**	0.625**	0.917**	0.939**	0.521**	0.579**	0.938**
Pod length (cm)					1.000	0.850**	0.965**	0.960**	0.726**	0.804**	0.954**
Pod width (cm)						1.000	0.829**	0.768**	0.921**	0.986**	0.758**
Number of pods per plant							1.000	0.992**	0.921**	0.798**	0.992**
Number of seeds per pod								1.000	0.921**	0.734**	0.996**
Seed length (cm)									1.000	0.972**	0.670**
Seed width (cm)										1.000	0.718**
Seed yield (kg/plant)											1.000

Critical r - 5% = 0.4043 1% = 0.5150   *Significant at 5%   **Significant at 1%   @ Characters

Table 2. Path coefficient of biometrical traits on seed yield

@	Plant height (m)	Leaf length (cm)	Leaf width (cm)	Leaf area (cm^2)	Pod length (cm)	Pod width (cm)	Number of pods per plant	Number of seeds per pod	Seed length (cm)	Seed width (cm)	Seed yield (kg/plant)
Plant height (m)	**0.0366**	0.2596	0.0010	-0.1757	0.3636	-0.1090	0.7766	-0.1217	-0.0267	-0.0598	0.887**
Leaf length (cm)	0.0378	**0.2512**	0.0013	-0.2061	0.4146	-0.1052	0.8265	-0.1376	-0.0219	-0.0597	0.904**
Leaf width (cm)	0.0355	0.2902	**0.0011**	-0.1883	0.3902	-0.1159	0.7754	-0.1228	-0.0223	-0.0604	0.920**
Leaf area (cm^2)	0.0347	0.2794	0.0011	**-0.1853**	0.3959	-0.1063	0.7873	-0.1280	-0.0209	-0.0560	0.938**
Pod length (cm)	0.0290	0.2273	0.0001	-0.1601	**0.4582**	-0.1447	0.8262	-0.1330	-0.0281	-0.0745	0.954**
Pod width (cm)	0.0253	0.1676	0.0008	-0.1249	0.4208	**-0.1576**	0.7228	-0.1138	-0.0356	-0.0920	0.758**
Number of pods per plant	0.0341	0.2497	0.0011	-0.1754	0.4554	-0.1370	**0.8314**	-0.1342	-0.0278	-0.0757	0.992**
Number of seeds per pod	0.0337	0.0378	0.0010	-0.1798	0.4620	-0.1360	0.8458	**-0.1319**	-0.0268	-0.0714	0.996**
Seed length (cm)	0.0273	0.1539	0.0007	-0.1084	0.3603	-0.1569	0.6468	-0.0987	**-0.0358**	-0.0898	0.670**
Seed width (cm)	0.0277	0.1898	0.0009	-0.1312	0.4324	-0.1836	0.7967	-0.1193	-0.0407	**-0.0790**	0.718**

Diagonal indicates direct effect @ Characters
Residual effect = 0.2147   *Significant at 5%   **Significant at 1%