Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; SP3: 498-500

Vinay S Patil
M. Sc (Hort.) Dept Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere, Karnataka, India

Sadashiv Nadukeri
Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere, Chickmagalur District, Karnataka, India

Shashikala Kolakar
Assistant Professor, Department of Crop Improvement and Biotechnology, College of Horticulture, Mudigere, Karnataka, India

Hanumanthappa M
Dean (Hort.) College of Horticulture, Mudigere, Karnataka, India

Himabindu K
Principal Scientist, ICAR- IIHR, Bengaluru, Karnataka, India

Shivaprasad M
Professor of Agronomy and Associate Director of Research, ZAHRS, Mudigere, Karnataka, India

Rakshithkumar R
M. Sc (Hort.) Dept Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere, Karnataka, India

Correspondence
Sadashiv Nadukeri
Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere, Chickmagalur District, Karnataka, India

National conference on "Conservation, Cultivation and Utilization of medicinal and Aromatic plants"
(College of Horticulture, Mudigere Karnataka, 2018)

Evaluation of cowhage (*mucuna pruriens* L.) genotypes for growth, fresh biomass and dry matter production in arecanut plantation under hill zone of Karnataka

Vinay S Patil, Sadashiv Nadukeri, Shashikala Kolakar, Hanumanthappa M, Himabindu K, Shivaprasad M and Rakshithkumar R

Abstract
Cowhage *(Mucuna pruriens* L.) is a leguminous, twining annual climber having wide distribution in tropical and subtropical areas of the world. An experiment was conducted to examine the performance of eight cowhage (*Mucuna pruriens* L.) genotypes for their growth, fresh biomass and dry matter production in arecanut plantation under hill zone of Karnataka. Significant differences were observed in genotypes with respect to growth, fresh biomass and dry matter production. The genotype Arka Dhanvantari recorded the maximum plant height (282.03 cm), number of trifoliate leaves (71.03) and stem girth (0.91 cm) at harvest. IIHR Selection-2 recorded the maximum number of branches at flowering (6.47). The maximum total fresh biomass at 80 and 120 DAS (121.63 and 348.67g/plant respectively) was recorded in the genotype IIHR Selection-2. The highest total dry matter production at 80 and 120 DAS was also recorded in the genotype IIHR Selection-2 (28.83 and 84.4067g/plant respectively).

Keywords: Cowhage, Evaluation, Growth, Fresh biomass, Dry matter production.

Introduction
Cowhage (*Mucuna pruriens* L.) is a leguminous, twining annual climber having wide distribution in tropical and subtropical areas of the world. It belongs to the family 'Fabaceae', sub family Papilionaceae. It is commonly known as velvet bean/cowitch/cowhedge in English, kapikacho/kevach in Hindi, atmagupta/kapikacchu in Sanskrit, nasugunni/turuchegida in Kannada. It is cultivated in Bangladesh, India, Sri Lanka, South East Asia and Malaysia. In India, 14 species are found in the foot hills of the Himalayas, the plains of West Bengal, Madhya Pradesh, Karnataka, Kerala, Andhra Pradesh, Uttar Pradesh, Andaman and Nicobar Islands (Farooqi and Sreeramu, 2001) [1]. Cowhage has gained commercial importance because of presence of L-DOPA (L-3, 4-dihydroxyphenylalanine), a precursor of dopamine in the seeds, the drug which is used to treat the Parkinson's disease in human beings (Nath *et al*., 1980) [2].

Cowhage can be grown as an intercrop in the arecanut plantation as it produces large quantities of biomass, helps in smothering of weed, improves organic matter of soil and also increases the yield of perennial crops like arecanut and coconut (Baijkya *et al*., 2005) [3]. No systematic information is available regarding the evaluation for commercial cultivation of definite cowhage genotype/accession. Hence, an attempt is made to evaluate eight genotypes of cowhage for growth, fresh biomass and dry matter production characters.

Materials and methods
A field experiment was conducted on "Evaluation of cowhage (*Mucuna pruriens* L.) genotypes in arecanut plantation under hill zone of Karnataka'' at experimental block of Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere, during the year 2014-2015. The experiment was laid out in randomized complete block design (RCBD) with three replications and eight treatments. Each treatment was allocated with thirty plants which were maintained at spacing of 60 cm x 45 cm between row and plant, respectively. Seeds were sown in the month of Nov-2014 and plots were irrigated immediately and other cultural practices were followed. Details of the genotypes used in study

are as follows.

T_1- Arka Aswini, T_2- Arka Dhanvantari, T_3- IIHR Selection -2, T_4-IIHR Selection -3, T_5- IIHR Selection -8, T_6- IIHR Selection -10, T_7- Farmer Selection-1 and T_8- Farmer Selection-2.

Observations were recorded on various growth, fresh biomass and dry matter production at different intervals of plant growth. Observations on plant height, number of trifoliate leaves and stem girth were made at the time of harvest and on number of branches at flowering stage. Fresh biomass and total dry matter production both were recorded at 80 and 120 DAS.

Result and discussion

The data pertaining to growth parameters of different genotypes of cowhageare presented in Table 1. At harvest, Arka Dhanvantari recorded significantly maximum vine length (282.03 cm) and number of trifoliate leaves per plant (71.03) and it was on par with genotypes IIHR Selection-2 (271.33 cm and 68.63 respectively), while the genotype Farmer Selection-1 recorded minimum vine length and number of trifoliate leaves (227.67cm and 56.7 respectively).Variations in vine length number of trifoliate leaves were mainly due to duration of the crop and genetic factor of the respective genotype as well as influence of the growing environmental conditions. Similar trend of variation in plant height was observed by Vadivel and Janardhan (2000) [4] in *Mucuna pruriens* L., Sarada *et al*. (2005) [5] in fenugreek and Das *et al*. (2014) [6] in french bean. Reduces number of leaves may be mainly attributed to decreased vine length, number of branches per plant and less number of root nodules per plant resulting in reduced growth and poor leaf production. Similar findings were reported by Pugalenthi and Vadivel (2007) [7] in *Mucuna pruriens* L. and Mamatha *et al.* (2010) [8] in *Mucuna utilis* L.

Number of branches per plant was maximum in the genotype IIHR Selection-2 (6.47) at flowering while, the genotype Farmer Selection-1 recorded the minimum (4.53) number of branches per plant. This might be due to the increased vegetative growth and crop duration, which facilitates accumulation of more photosynthates leading to production of more number of branches per plant. Similar variation for number of branches in different genotypes were reported by Alghamdi (2007) [9] in faba bean and Subramanian *et al*. (2005) [10] in fenugreek. Genotype IIHR Selection-2 recorded the maximum (0.93 cm) stem girth it may be due to long duration of genotype and better soil moisture availability whereas, minimum was recorded in genotype Farmer Selection-1 (0.61 cm). The variation in stem diameter among the genotypes might be due to genotypic differences. The results are in line with the findings of Agyeman *et al.* (2014) [11] in cowpea.

Table 1: Performance of cowhage (*Mucuna pruriens* L.) genotypes for growth parameters

Genotype	Growth parameters			
	Plant height (cm)	No. of trifoliate leaves	Stem girth (cm)	No. of branches
T_1 - Arka Aswini	247.10	61.17	0.69	5.37
T_2 - Arka Dhanvantari	282.03	71.03	0.91	6.03
T_3 - IIHR Selection-2	271.33	68.63	0.93	6.47
T_4 - IIHR Selection-3	256.00	60.10	0.73	5.40
T_5 - IIHR Selection-8	249.13	60.70	0.74	5.50
T_6 - IIHR Selection-10	264.40	63.53	0.75	6.07
T_7 - Farmer Selection-1	227.67	56.70	0.61	4.53
T_8 - Farmer Selection-2	253.00	59.90	0.65	5.03
S. Em ±	8.18	2.12	0.06	0.19
CD @ 5%	24.80	6.44	0.18	0.58

The data pertaining to fresh biomass and total dry matter production (g/plant) at 80 and 120 Days after sowing (DAS) of different genotypes of cowhage are presented in Table 2. Total fresh biomass of the plant was significantly maximum (121.63 g and 348.67 g at80 and 120 DAS respectively) in genotype IIHR Selection-2 and minimum in Farmer Selection-1 (91.24 g and 270.90 g at 80 and 120 DAS respectively). The presence of wide variation might be due to crop duration and varied amount of photosynthates accumulation leading to increase in number of leaves, flowers, plant size, number of root nodules per plant which in turn yields higher fresh biomass in the study material. Similar variation has been reported by chichi *et al.* (2002) [12] in *Mucuna pruriens* L. and Ullah *et al*. (2012) [13] in mung bean.

Total dry weight of the plant was significantly maximum (28.83 g and 84.40 g at80 and 120 Days after sowing respectively) in genotype IIHR Selection-2 and minimum in Farmer Selection-1 (22.27 g and 67.04 g at80 and 120 DAS respectively). This was mainly attributed by duration of the crop and increased growth characters such as vine length, production of number of branches, leaves and fresh biomass it also may be due to increased translocation and accumulation of more photosynthates in different parts of the plant which in turn yields higher total dry matter production of the plant. Similar variation has been reported by Chichi *et al*. (2002) [12] and Chikoye and Ekeleme (2012) [14] in *Mucuna pruriens* L.

Table 2: Performance of cowhage (*Mucuna pruriens* L.) genotypes for fresh biomass and total dry matter production (g/plant) at different stages of crop growth

Genotype	Fresh biomass (g/plant)		Total dry matter production (g/plant)	
	80 DAS	120 DAS	80 DAS	120 DAS
T_1 - Arka Aswini	98.03	292.03	24.27	70.30
T_2 - Arka Dhanvantari	110.14	331.14	27.60	81.40
T_3 - IIHR Selection-2	121.63	348.67	28.83	84.40
T_4 - IIHR Selection-3	95.61	285.83	22.97	70.57
T_5 - IIHR Selection-8	96.06	287.26	23.60	70.03
T_6 - IIHR Selection-10	108.10	321.66	26.70	78.64
T_7 - Farmer Selection-1	91.24	270.90	22.27	67.04
T_8 - Farmer Selection-2	94.33	280.40	23.40	70.15
S. Em ±	3.95	8.82	0.62	1.78
CD @ 5%	11.97	26.74	1.89	5.40

Conclusion

The present investigation was carried out to identify the suitable cowhage genotypes for higher biomass in arecanut plantation under hill zone of Karnataka which revealed that performance of the genotype IIHR Selection-2 and Arka Dhanvantari was better in terms of growth, fresh biomass and dry matter production parameters. IIHR Selection-2 and Arka Dhanvantari are long duration genotypes. Hence, these lines may be recommended in arecanut plantation as the crop is known for weed suppressing ability and adds higher biomass.

References

1. Farooqi AA, Sreeramu BS. Cultivation of Medicinal and Aromatic Crops. Universities Press (India) Ltd., Hyderabad, 2001, 72-76.
2. Nath C, Gupta GP, Bhargava KP, Lakshmi V, Singh S, Popli SP. Study of anti-Parkinson activity of seeds of Mucuna Prurita. National Seminaron Production Technology for Commercial Flower Crop. Tnau, Coimbatore, India, 1980, 127.
3. Baijkya FP, Ridder N, Giller KE. Managing Legume Cover Crops and Their Residues to Enhance Productivity of Degraded Soils in the Humid Tropics: A Case Study in Bukoba District, Tanzania. Nut. Cycl. Agroecosystems 2005; 73:75-87.
4. Vadivel V, Janardhanan K. Preliminary Agrobotanical Traits and Chemical Evaluation of Mucuna Pruriens (Itching Beans): A Less-Known Food and Medicinal Legume. J Med. Arom. Pl. Sci. 2000; 22:191-199.
5. Sarada C, Giridhar K, Hariprasada Rao N. Performance of Fenugreek Genotypes (Trigonella Foenum-Graecum Linn.) In Vertisols. Spice India. 2005; 18(2):46-49.
6. Das R, Thapa U, Debnath S, Lyngdoh YA, Mallick D. Evaluation of French bean (Phaseolus Vulgaris L.) Genotypes for Seed Production. J Appl. And Natural Sci. 2014; 6(2):594-598.
7. Pugalenthi M, Vadivel V. Agrobiodiversity of Eleven Accessions of Mucuna Pruriens (L.) Dc. Var. Utilis (Wall. Ex Wight) Baker Ex Burck (Velvet Bean) Collected From Four Districts of South India. Genet. Resour. Crop Evol. 2007; 54:1117-1124.
8. Mamatha BR, Siddaramappa R, Shivananda TN. Evaluation of Mucuna Utilis Germplasm for Higher Biomass Production, Active Principle and Seed Yield. J Med. Pl. Res. 2010; 4(13):1297-1300.
9. Alghamdi SS. Genetic Behavior of Some Selected Faba Bean Genotypes. African Crop Sci. Soc. 2007; 8:709-714.
10. Subramanlan S, Rajeswari E, Chezhiyan N. Evaluation of Fenugreek Germplasm for Morphological and Yield Characters. South Indian Hort. 2005; 3(1-6):172-174.
11. Agyeman K, Berchie JN, Bonsu I, Nartey TE, Fordjour JK. Growth and Yield Performance of Improved Cowpea (Vigna Unguiculata L.) Varieties in Ghana. Agric Sci. 2014; 2(4):44-52.
12. Chichi LA, Weaver DB, Morton CM. Agronomic And Genetic Attributes Of Velvet Bean (Mucuna Sp.): An Excellent Legume Cover Crop For Use In Sustainable Agriculture. Special Report No.1. Alabama Agric. Expt. Stn. And Auburn University, USA, 2002, 314-319.
13. Ullah H, Khalil IH, David AH, Nayab, Immdadullah. Selecting Mung Bean Genotypes for Fodder Production On The Basis Of Degree of Indeterminacy and Biomass. Pak. J Bot. 2012; 44(2):697-703.
14. Chikoye D, Ekeleme F. Growth Characteristics of Ten Mucuna Accessions and Their Effects on the Dry Matter of Imperata Cylindrica (L.) Rauesch. Int. Inst. Trop. Agric. 2012; 18:191-201.