

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 7, July 2017

Qualitative Data Analysis of selected *Amaranthus* species from Shirala Tahsil, Dist. Sangli, M.S., (India)

S.R. Kamble, D.K. Gaikwad*

Department of Botany, D.A.B.N. College, Chikhali. Tal. Shirala, Dist. Sangli, India

Professor, Department of Botany, Shivaji University Kolhapur, India*

ABSTRACT: Amaranths are an important group of plants exhibits a high degree of morphological diversity. *Amaranthus* species are distributed worldwide with an interesting diversity of landraces and cultivars whose leaves and seeds are consumed. Five species of *Amaranthus* were collected and identified from study area. *Amaranthus* species were characterised by interspecific variations on the basis of eighteen morphological characters. they exhibits green and red coloured form with some of the differences. the molecular evaluation of the species with specific differences of *Amaranthus* genus is in progress.

KEYWORDS: Amaranths, morphological variations, Shirala.

I. INTRODUCTION

In India, *Amaranthus* is mainly cultivated in the rural areas and is well adapted to diverse the climatic conditions, highly resistance to stresses (including diseases and pests), and high quality for specific purposes. *Amaranthus* is the largest genus of the family amaranthaceae. It is an ancient crop originating in America. *Amaranthus*, characterized by small, often green or reddish flowers arranged in dense clusters, stems and leaves that are likewise deeply pigmented, and dry, indehiscent, one-seeded fruit. Amaranth crop also have very high variability in leaf size, leaf shape, branching, flower colour and flowering pattern(Rashmi Yadav et al 2014). Khurana et al. (2013) also reported the phenotypic variability in the Amaranth germplasm. Amaranth seeds and leaves are a very good source of vitamins. Both the seeds and leaf are high in protein, including the amino acid lysine. They are rich in fiber, extremely low in fat and carbohydrates and provide an excellent source of protein (Rashid, 1999). *Amaranthus* L. (Amaranthaceae) is a genus of about 70 species of monoecious and dioecious usually annual species of worldwide distribution, about 40 of which are native to America, while the remaining ones are native to the other continents (Costea *et al.* 2001a). Amaranth species have been reported to be distributed and utilized for food as a vegetable worldwide (Muyonga et al. 2008). The genus *Amaranthus* is receiving increasing attention because of the nutritional properties of the grain and leaves and can now be found throughout the world (Stallknecht and Schulz-Schaeffer, 1993).

II. MATERIALS AND METHODS

A morphological characterization was carried out and observations were recorded from five selected plant species of *Amaranthus*. Five species of *Amaranthus* i.e. *A. spinosus*, *A. hypochondriacus*, *A. hybridus*, *A. cruentus* and *A. viridis* were taken for analysis. The species of amaranth were obtained from the different parts of Shirala tahsil . 5 plants of each species were selected for morphological characterization.

The major collection materials were identified and described up to species with the help of The Flora of The Presidency of Bombay (Theodore Cooke, 1967) and Sardesai and Yadav (2003).

Morphological Characterization-

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 7, July 2017

Morphological characterization was carried out using standard description for Amaranth. A total of 18 characters were scored including 10 characters for vegetative morphology, 6 for inflorescence, and 2 characters for the seed. Eighteen quantitative characters were observed. For the quantitative traits, 5 plants per species were analysed and the averages were computed.

III. RESULTS AND DISCUSSION

Morphological Characterization

A total of 18 quantitative traits were observed. The mean, standard deviation, high and low range of observation from five species are presented in Table 1. These were composed of plant height at flowering, leaf length, leaf width and petiole length and inflorescence length. Five species of amaranth indicated a high range of variability in terms of plant height (31-130 cm), leaf length (3.8-10.10 cm), leaf width (2-5.5 cm), petiole length (2.5-5.7 cm), inflorescence length (8.7-30.2 cm). The information generated from this characterization data is important to fully utilize the potential of promising amaranth accessions. The total variation observed in plant height at flowering, leaf length, petiole length, leaf width, terminal inflorescence length.

All *Amaranthus* species shows variations in plant height, leaf length, petiole length, leaf width and terminal inflorescence length is described in Table 1.

Table 1. Mean, standard deviation, and range of quantitative data of the Five species

Name of the plant	Character	Mean	Standard Deviation	High	Low
<i>Amaranthus spinosus</i>	Plant Height at flowering (cm)	99.6	5.53	110	95
	Leaf length (cm)	8.58	0.14	8.8	8.4
	Leaf width (cm)	2.58	0.16	2.8	2.4
	Leaf Petiole (cm)	5.3	0.2	5.6	5.0
	Inflorescence length (cm)	16.5	1.122	18.3	15.1
<i>Amaranthus hypochondriacus</i>	Plant Height at flowering (cm)	127.4	2.154	130	124
	Leaf length (cm)	6.36	0.19	6.6	6.1
	Leaf width (cm)	3.39	0.34	3.13	3.7
	Leaf petiole (cm)	2.44	0.24	2.8	2.1
	Inflorescence length (cm)	10.76	0.52	11.5	10
<i>Amaranthus viridis</i>	Plant Height at flowering (cm)	35.6	3.38	40	31
	Leaf length (cm)	2.28	0.20	4.4	3.8
	Leaf width (cm)	2.28	0.20	2.6	2
	Leaf Petiole (cm)	2.72	0.13	2.9	2.5
	Inflorescence length (cm)	8.98	0.25	9.4	8.7
<i>Amaranthus cruentus</i>	Plant Height at flowering (cm)	114.8	4.44	120	109
	Leaf length (cm)	10.62	0.28	10.10	10.7
	Leaf width (cm)	5.28	1.72	5.5	5
	Leaf Petiole (cm)	5.56	0.17	5.8	5.3
	Inflorescence length (cm)	27.2	1.96	30.2	24.2
<i>Amaranthus hybridus</i>	Plant Height at flowering (cm)	98.8	6.79	110	90
	Leaf length (cm)	5.62	0.21	5.9	5.3
	Leaf width (cm)	3.34	0.24	3.7	3
	Leaf Petiole (cm)	3.12	0.17	3.4	2.9
	Inflorescence length (cm)	9.96	0.58	10.9	9.2

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 7, July 2017

The diversity in leaves and stem of amaranth is shown in **Table 2**. Leaf variations include shapes (ovate and obovate), color (green and purple/red), and sizes (length and width). Differences in stem includes: colour of stem, size, and the presence or absence of spines. In five studied *Amaranthus* species only *Amaranthus spinosus* has spines while the remaining four species lack spines. *A. cruentus* is the only member among the studied species with purple stem. Only *Amaranthus hypochondriacus* have obovate leaf shape while the remaining 4 species have ovate leaf.

Table 2 : The Vegetative Morphological Characters of the Five studied Species of *Amaranthus*

Plant Species	Colour of the Root	Colour of Stem	Colour of Stem	Colour of Leaves	Shape of Leaves	Presence of Spines
<i>Amaranthus spinosus</i>	Yellow	Reddish Green	Reddish Green	Green	Ovate	Present
<i>Amaranthus hypochondriacus</i>	Yellow	Reddish Green	Reddish Green	Green	Obovate	Absent
<i>Amaranthus viridis</i>	White	Green	Green	Green	Ovate	Absent
<i>Amaranthus cruentus</i>	Purple	Purple	Purple	Reddish green	Ovate	Absent
<i>Amaranthus hybridus</i>	Yellowish green	Green	Green	Green	Ovate	Absent

The diversity in reproductive characters of amaranth is shown in **Table 3**. Reproductive characters include colour, compactness, shape, spininess and length of inflorescence. Seeds of five *Amaranthus* species shows variation in their colour and transparency.

Table 3 : Reproductive Characters of the Five Studied Species of *Amaranthus*

Plant species	Inflorescence					Seed	
	Colour	Compactness	Shape	Spininess	Length	Colour	Transparency
<i>Amaranthus spinosus</i>	Green	Dense	Semidrooping	Spiny	Medium	Brownish Black	Translucent
<i>Amaranthus hypochondriacus</i>	Green	Dense	Straight	Prickly	Short	Black	Translucent
<i>Amaranthus viridis</i>	Green	Lax	Straight	Smooth	Short	Glossy Black	Opaque
<i>Amaranthus cruentus</i>	Purple	Intermediate	Semidrooping	Smooth	Long	Dark Brown	Translucent
<i>Amaranthus hybridus</i>	Green	Intermediate	Straight	Spiny	Short	Black	Opaque

IV. CONCLUSION

From the above observations it is clear that different vegetative, morphological and reproductive characters were noticed from five studied *Amaranthus* species describes intraspecific variations among the species.

REFERENCES

- Costea M, Sanders A & Waines G. 2001a. Preliminary results toward a revision of the *Amaranthus hybridus* species complex (Amaranthaceae). *Sida* 19: 931-974.
- Khurana, D. S., Singh, J. and Kaur, B. 2013. Genetic variability, correlation and path coefficient analysis in amaranthus. *Vegetable Science*. 40(2): 238-240.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 7, July 2017

3. Muyonga, J.H., D. Nabakabya, D.N. Nakimbugwe, and D. Masinde. 2008. Efforts to promote amaranth production and consumption in Uganda to fight malnutrition. Chapter 8 from using Food Science and technology to improve Nutrition and Promote National Development, Robertson, G.L. & Lupie, J.R. (Eds). International Union of Food Science & Technology
4. Rashid, M.M. (1999): Sobgi Bijnan. Rashid Publishing House. Dhaka, Bangladesh
5. Rashmi Yadav, J.C. Rana¹ and J.K. Ranjan Analysis of variability parameters for morphological and agronomic traits in grain amaranth (amaranthus sp)
6. Stallknecht, G.E., Schulz-Schaeffer, J.R. 1993. Amaranth rediscovered. In: Janick J, Simon JE, editors. New crops. New York: J. Wiley and Sons. pp. 211-21.
7. Yadav S.R. and Sardesai M.M.(2002) Flora of Kolhapur District .Shivaji University Kolhapur.