Available online at www.ijpab.com

ISSN: 2320 – 7051
Int. J. Pure App. Biosci. **3 (2):** 321-324 (2015)

INTERNATIONAL JOURNAL OF PURE & APPLIED BIOSCIENCE

Research Article

OPEN ACCESS

Wild Relatives of some Crops in Mukundara Hills National Park of Rajasthan, India

Kiran Choudhary[1] and Dr. Krishnendra Singh Nama[2]*

[1]Lecturer M.B. P.G. College, Kota (Rajasthan) India

[2]Dept. of Life Science, Univ. of Kota (Rajasthan) India

*Corresponding Author E-mail: namasahib@gmail.com

ABSTRACT

Crop wild relatives can be used in botanical and conservation database, it describes cooperation between plant genetic resources and conservation planning. On the basis of floristic diversity Hadauti region can be demonstrated as biodiversity hot spot. It contains approximately 712 Angiosperic plant species and and among them 33 species can be considered as wild relatives of 27 cultivated plants.

Keywords: *Conservation, Cultivated plants, Crop wild relatives, Floristic diversity, Genetic resources, Hot spot.*

INTRODUCTION

Biodiversity is highly significant in securing different fundamental human needs[1,3,6]. Since time immemorial, people have gathered plant resources to fulfil various daily requirements. Hundreds of millions of people, mostly in developing countries, part derive a substantial of their subsistence and income from wild plant products[9]. This includes not just the genetic resource of the crops themselves, but also the genetic resource of Crop Wild Relatives (CWR), the wild plants from which our crop plants are descended, or to which they are related[4,13]. Crop wild ancestors are not always found in pristine semi-natural vegetation but often occur in highly anthropogenic disturbed habitats[5]. Crop Wild Relative populations contain far more genetic diversity than the domesticated crops. This is because they occur in a wide range of environments like contrasting soils, climate and other factors. Wild species can adapt to the environment in which they are found in, as climate and other environmental factors change.

Hadauti plateau of Rajasthan contains variable climatic with diverse flora and fauna. A lot of wild genetic resources are available here. Mukundara Hills National Park can be considered as hot spot in this sense. In order to regulate the exploration and commercial exploitation of bio resources of the area, we must have a comprehensive and up to date list of plants and animals of the region with particular interest to wild cultivars. The wild relatives are the source of natural germplasm for the new and improved varieties via breeding. By considering the importance of all these aspects, the present study aimed to identify the wild relatives of cultivars and their uses by localities.

Location, Topography, Soil and Climate

This study is carried out in Mukundara Hills National Park of Kota. Kota is one of the eastern districts of Rajasthan. This district is situated between 24.2° and 25.2° N and 75.37° and 77.26° S of south-east of Rajasthan. This region is quite unique not only because of its historical, cultural and geographical heritage but also for its perennial and seasonal rivers and water reservoirs. Besides this, the thick and dense forest supports the growth and development of different species of various plant groups.

The climate of this area is dry or semi humid. The mixed red, black and alluvial soils which have good water holding capacity are significantly recorded in the vast portion of the area. It is supposed to be suitable for oil yielding crops, fruit crops and crop plants as it has got a favourable character of moisture retention for oil yielding plants.

MATERIAL AND METHODS

Field Survey and Data Collection

A wide-spread field assessment was carried out in the Mukundara Hills National Park in every month during the session of 2009-2012. Plant specimens were collected and for the preparation of herbarium, plant specimens were mounted on mounting paper of 11½ x 16½ inches and kept for identification. Plants were identified with the help of Flora of Rajasthan[11,12] and The Flora of Rajasthan[10]. During field visits verbal conversation was done with local people for the dissemination of their traditional knowledge. A checklist was prepared for CWR and used to determine which part of the plant were used and for what purposes.

RESULT AND DISCUSSION

- **Floral diversity**

The study area is floristically rich and includes various plant species. A total of 712 Angiospermic species belonging to 125 families are recorded across the study sites, of which 110 are trees, 167 are shrubs, and 318 are herbs and 117 are grasses. Among these *Poaceae* (88), *Fabaceae* (77) *Asteraceae* (46), *Acanthaceae* (31), *Cyperaceae* (29) are the most abundant families. Except angiosperms 11 Pteridophytes and 1 Gymnosperm species was also recorded in the area.

- **Crop Wild Relatives and their uses**

In the biodiversity convention, the wild genetic materials have potentiality for the improvement of crops. The floristic diversity of Rajasthan revealed that moreover, 3.7% of total flora has agri-horticultural potentiality[11]. The study of floristic diversity of Mukundara Hills National Park of Rajasthan revealed that for 27 species of crop and other cultivated plants there are about 33 species of wild relatives which may be utilized for exchange of genetic material for the improvement of crop and other cultivated plants (Table-1). Out of these CWR 14 species are used as vegetables, 8 are used as fruits, 6 as fodder, 2 as spices and 2 as pulse crops (Table-2).

- **Implication for Genetic Improvement and Crop Production**

It has been estimated that there are around 216,000 wild relatives of crop species globally and that of these only 1200 are primary or secondary relatives[8]. Therefore, documentation and conservation of these species would ensure that the highest priority genetic diversity is preserved and made available for use in crop improvement programs as a contribution to future worldwide food security[2].

Plant Breeders require genetic resources from gene banks or they can collect the material from the natural habitat. Therefore, taxon inventories provide baseline data useful to the researchers. They provide the essential foundations for the formulation of strategies for *in situ* and *ex situ* conservation and on the species' current and potential use as novel crops or gene donors[7.]

Table- 1. Important Crop plant and their Wild Relatives

S. No.	Name of plant species	Wild relatives
1.	*Abelmoschus esculentus* (L.) Moench.	*Abelmoschus manihot* (L.) Medicus.
2.	*Amaranthus caudatus* L.	*Amaranthus spinosus* L., *Amaranthus tricolor* L. & *Amaranthus viridis* L.
3.	*Capsicum annum* L.	*Capsicum frutescens* L.
4.	*Citrullus lanatus* (Thunb) Matsum & Nakai	*Citrullus colocynthis* (L.) Schrad
5.	*Corchorus capsularis* L.	*Corchorus trilocularis* L.
6.	*Cucumis melo* L.	*Cucumis prophetarum* L.
7.	*Cucumis sativus* L.	*Cucumis callosus* (Rottl.) Cogn.
8.	*Curcuma longa* L.	*Curcuma amada* Roxb.
9.	*Echinochloa frumentacea* Link.	*Echinochloa crus-galli* (L.) Beauv.

10.	*Elusine coracana* Gaertn.	*Elusine indica* (L.) Gaertn.
11.	*Luffa acutangula* (L.) Roxb.	*Luffa acutangula* (L.) Roxb. var. *Amara* Clarke
12.	*Luffa cylindrical* (L.) Roem.	*Luffa echinata* Roxb.
13.	*Medicago sativa* L.	*Medicago laciniata* (L.) Miller
14.	*Momordica charantia* L.	*Momordica balsamina*,L. & *Momordica dioica* Roxb. ex Willd.
15.	*Murraya paniculata* (L.) Jack	*Murraya koenigi* (L.) Spreng
16.	*Oryza sativa* L.	*Oryza rufipogon*
17.	*Panicum sumatrense* Roth ex. Roem. & Schult.	*Digitaria cruciata* (Nees ex. Steud.) A. Camus
18.	*Pisum sativum* L.	*Lathyrus sativus* L.
19.	*Setaria italica (*L.) P. Beau.	*Setaria verticillata.* (L.)P. Beauv.
20.	*Sorghum bicolour* (L.) Moench	*Sorghum verticilliflorum.* (Steud.) Stapf
21.	*Syzygium cumini* (L.) Skeels	*Syzygium jambos.* (Alston) L.
22.	*Trichosanthes anguina* L.	*Trichosanthes cucumerina* L. & *Trichosanthes dioica.*Roxb.
23.	*Trifolium alexandrinum* L.	*Trifolium resupinatum* L.
24.	*Trigonella foenum-graecum* L.	*Trigonella corniculata* L.
25.	*Vigna radiate* (L.) R. Wilczek	*Vigna trilobata* (L.) Verd
26.	*Zea mays* L.	*Coix aquatic* Roxb & *Coix gigantean* Koen. Ex Roxb.
27.	*Ziziphus mauritiana* Linn.	*Ziziphus oenoplia.* (L.) Miller

Table-2 Crop Wild Relatives and Their Uses

S. No.	Crop Wild Relatives	Uses
1.	*Abelmoschus manihot* (L.) Medicus.	Fruits for food, used in bronchitis and toothache.
2.	*Amaranthus spinosus* L.	As Vegetable and for treatment of internal bleeding, diarrhoea, excessive menstruation, vaginal discharges, nasal bleeding and wounds.
3.	*Amaranthus tricolor* L.	Leaves used as vegetables
4.	*Amaranthus viridis* L.	Vegetable and skin cleansing, diuretic, galactagogue, snake bites, scorpion stings, dysentery and inflammation**.**
5.	*Capsicum frutescens* L.	Fruits used as vegetables
6.	*Citrullus colocynthis* (L.) Schrad	Fruit and for treatment of diabetes, purgative
7.	*Corchorus trilocularis* L.	mucilaginous product used as a sauce
8.	*Cucumis prophetarum* L.	Fruits edible
9.	*Cucumis callosus* (Rottl.) Cogn.	Paste of root is applied on scorpion sting, decoction of root is given in indigestion, dropsy, pulp of fruit is given women for abortion and to increase menses.
10.	*Curcuma amada* Roxb.	Used as spice in pickles and cytotoxic.
11.	*Echinochloa crus-galli* (L.) Beauv.	Cattle fodder, folk remedy for carbuncles, sores, cancer and wounds
12.	*Elusine indica* (L.) Gaertn.	Seeds edible
13.	*Luffa acutangula* (L.) Roxb.var. *amara* Clarke	As vegetable and for treatment of jaundice
14.	*Luffa echinata* Roxb.	As vegetable and As a purgative, in lung diseases, chronic bronchitis, dropsy, nephritis, jaundice.
15.	*Medicago laciniata* (L.) Miller	Vegetables
16.	*Momordica balsamina* L.	Vegetable and for Chronic diseases
17.	*Momordica dioica* Roxb. ex Willd.	Vegetable and Paste of root of male creeper is applied on scorpion sting, snake bite and rat bite. Fruits used in vegetable in anorexia, diabetes and coughs
18.	*Murraya koenigi* (L.) Spreng.	anti-diabetic, antioxidant,antimicrobial, anti-inflammatory,hepatoprotective, anti-hypercholesterolemic
19.	*Oryza rufipogon*	Fodder
20.	*Digitaria cruciata* (Nees ex. Steud.) A. Camus	Seeds edible
22.	*Lathyrus sativus* L.	Pulse crop
23.	*Setaria verticillata.* (L.)P. Beauv.	Seeds edible
24.	*Sorghum verticilliflorum.* (Steud.) Stapf	Fodder crop

25.	*Syzygium jambos* (Alston) L.	Fruits are edible
26.	*Trichosanthes cucumerina* L.	Fruits as vegetables; Rind of dried fruit pounded with water is applied on swollen neck glands
27.	*Trichosanthes dioica* Roxb	Fruits as vegetable; Used in Constipation, fever, skin infection, wounds.
28.	*Trifolium resupinatum* L.	Fodder crop
29.	*Trigonella corniculata* (L.) L.	Used as vegetable
30.	*Vigna trilobata* (L.) Verd	Pulse crop and Leaves sedative
31.	*Coix aquatica* Roxb.	Fodder crop; To cure painful urination and menstrual problems
32.	*Coix gigantea* Koen. Ex Roxb.	Fodder crop
33.	*Ziziphus oenoplia.* (L.) Miller	Edible fruit

CONCLUSION

The study conducted in Mukundara Hills National Park reveals that it is the cradle home for many economically plant species. Many of them are considered as Wild relatives of cultivated crop plants. Several CWR can benefit local people not only as food and fodder but also for their medicinal properties. But these multi-valued natural resources are threatened by several anthropogenic and natural causes such as land-use change, habitat destruction, over-harvesting, over-grazing, and invasive species. Therefore, sustainable management of these resources for the wellbeing of the local communities, genetic improvement as well as to conserve biodiversity is of the utmost importance and could also contribute to preserve cultural and genetic diversity.

REFERENCES

1. Coe, F.G. Anderson, G.J., Ethnobotany of the Garifuna of eastern Nicaragua. *Eco Bot*, **50**: 71-107 (1996)
2. CWRSG (Crop Wild Relative Specialist Group) 2008: *Crop wild relative.* IUCN-Crop Wild Relative Specialist Group.
3. Ehrlich, P.R. Ehrlich, A.H., The value of biodiversity. *AMBIO*, **21**: N219-226 (1992)
4. Godfray, H.C.J. Beddington J.R. Crute I.R. Haddad, L. Lawrence, D. Muir, J.F. Pretty, J. Robinson, S. Thomas, S.M. & Toulmin C., Food Security: The Challenge of Feeding 9 Billion People. *Science*, **327**: 812-818 (2010)
5. Jain, S.K. 1975. Genetic reserves. *In*: O.H. Frankel & J.G. Hawkes, eds. *Crop genetic resources for today and tomorrow,* 379–396. Cambridge: Cambridge University Press.
6. Kaimowitz, D., Douglas, S., Conserving what and for whom? Why conservation should help meet basic human needs in the tropics. *Biotrop*, **39**: 567-574 (2007)
7. Kell, S., Maxted, N. 2008: *Catalogue reveals stark statistics about crop wild relative conservation in Europe*. In Crop Wild Realtive, IUCN-Crop Wild Relative Specialist Group Newletter, IUCN.
8. Maxted, N., Kell, S. 2008: *Establishment of a network for the in situ conservation of crop wild relatives: status and needs*. Commission on Genetic Resources for Food and Agriculture, Food and Agriculture Organization of the United Nations.
9. Schippmann, U., Cunningham, A.B., Leaman, D.J. 2002: Impact of cultivation and gathering of medicinal plants on biodiversity: Global trends and issues. In *Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries*. FAO, Rome.
10. Sharma, N.K. 2002. The Flora of Rajasthan. Aavishkar Publishers, distributaries, Jaipur.
11. Singh, V. and R.P. Pandey, 1996. An assessment of wild relatives of cultivated plants in Indian Desert and their conservation. In *Scientific Horticulture* Singh, S.P. (Edt.) 5: 155-162. Scientific Publishers, Jodhpur.
12. Singh, V. and Shetty, B.V. 1987, 91,93. *Flora of Rajasthan* Vol. I, II & III, Botanical Survey of India, Kolkata.
13. Tester M. & Langridge P. 2010. Breeding technologies to increase crop production in a changing world. *Science*, 327, 818-822.