

New Frontiers of Knowledge on Nepalese Plant Science

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Glossary of Wild Relatives of Cultivated Agricultural Crop Plants in Nepal

ABSTRACT

Nepal, with its unique geographical and ecological features due to its abrupt rise in altitude, plays significant role in biological evolution. Existence of numerous wild relatives of the present-day cultivated agricultural crop plants in this small Himalayan nation may serve as a potential source of several yet unidentified desirable genes that are needed for future incorporation in the improvement of cultivated crop plants. This report includes 82 different wild relatives of 41 genera under 19 families of 37 agricultural crops of Nepal (Table 1). It serves as the sample of the glossary of these wild relatives of crop plants in Nepal.

Under food grain crop plants of gramineae, leguminoceae and polygonaceae families, 16 different wild species namely wild rices(7 species), wildrelatives of wheat plant(3 species), wild arhar(3 species), wild fingermillets(1 species) and wild buckwheat(2 species) have been identified in different parts of the country. Similarly, under vegetable crop plants of Araceae, Amaranthaceae, Crucifereae, Cucurbitaceae, Dioscoreaceae, Labiteae, Leguminosae, Liliaceae, Malvaceae, Polygonaceae, Solanaceae and Umbellifereae, 37 different wild species-wild colocasia(1 species), wild amaranths(3 species), wild leafy vegetables(2 species), wild gourds(3 species), wild cucumber (1 species), wild yams(4 species), wild mints(3 species), wild fenugreeks(4 species), wild pea(1 species), wild beans(3 species), wild garlics(2 species), wild spinach(3 species), wild lady's finger (1 species), wild spinach(3 species), wild eggplants(2 species) and wild carrot(one species) have also been identified. In case of wild relatives of cultivated orchard plants, 11 different wild species namely wild mango(one species), wild banana(one species), wild strawberry(one species), wild pear(one species), wild cherries(2 species), wild apple(one species) and wild grapes(3 species) have been identified. Among 19 different wild species of economic crop plants, five wild species of sugarcane, one species of wild sunhemp, two wild relatives of cotton, three wild relatives of rose, two wild species of tobacco, four wild species of turmeric and two wild species of tea have also been identified. This report includes only sample of the total wild species of the present-day cultivated agricultural crop plants. Further exploration on this economic botany will help the country in cataloguing the wild relatives of cultivated crop plants and their future use in crop improvement.

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〈1993. 9. 24. 접수〉

INTRODUCTION

Human society, from the very beginning of its appearance on this earth, has been indispensably associated with the plant kingdom for its survival. Almost all the kinds of plants are used by this human society either as food or for other purposes like housing, clothing, medicine, etc. In other words, plant is the paragon symbol of the super excellent virtues of mankind. Few species of some of the families became so much favorable from the food point of view that they occupy major area of the cultivated land in this world rice (*Oryza sativa* L.), wheat (*Triticum aestivum* L.), maize (*Zea mays* L.) and some other species of the gramineae family became the major source of food for human being. Similarly, major plant species serve as the sources of medicine for human use.

Wild species of these cultivated crop plants play an equally important role not only in the evolutionary processes, but also as potential sources of several yet unidentified desirable genes that we need for future improvement of those cultivated crop plants. Wild rice (*Oryza sativa* f. *spontaneum* Roschev.) is the most stable source of male sterility (Ms) gene to make the hybrid rice cultivation possible in China and in other countries (Virmani, 1987). Almost all the wild rice species (at least 22) have been identified as good sources of resistance to some major insect pests of rice (Heinrichs et al 1985). Such evidences are found in many wild species of different crop plants.

Nepal, though a small country in its physical size, has become the "Show room of the major world flora" because of its geological and ecological variations. The kingdom of Nepal has become the "Nature's Paradise" for tireless exploring biologists (Majpuria, 1984). Scientific plant collection and identification in Nepal has been started only since early 1950s, although some of the earlier taxonomists also tried to explore it (Bhatta, 1964, Don 1825, Hara 1966,

Kihara 1955, Numata 1965, Regmi 1982, 1984 and 1988 Regmi and Shimada 1976 Shrestha 1969, Shrestha 1988, Wallich 1824, Yoda 1967). Department of Medicinal Plants, HMG, Nepal (1967 and onward) has been doing tremendous job in exploring the utility of plants with medicinal values. Singh (1960) tried to list some of the wild plants that have the food value in Nepal. Regmi (1967, 1988) grouped the plants of food values and identified some of the wild species of those food crop plants. Manandhar (1978, 1980, 1984, 1985 and 1988) is making tremendous efforts in identifying Nepalese plants at different locations for different purposes. Manandhar (1980) and Singh (1960) identified many wild species of Plants with some food values.

MATERIALS AND METHODS

The authors surveyed different parts of the country since last two years, collected and identified different wild species of the cultivated crop plants. During October 1988, a special effort was made on collection and identification of wild relatives of rice in different parts of the country, and the first author also observed and identified several wild species of other crops. This was further verified in the herbarium of the Royal Botanic Garden, Godawari, Lalitpur. Some of the wild species preserved in the Royal Botanic Garden were also referred to during study period. The result has been compiled and presented in this report.

RESULTS AND DISCUSSION

A total number of 82 wild relatives under 41 genera of 19 families have been listed in this report including their cultivated species. Available local as well as English names one of these wild plants in Nepal are given in a wide range. References of wild relatives were also drawn from the Royal Botanic Garden, Lalitpur.

These wild relatives shown in Table 1. Among wild relatives of the food grain crop plants, wild rices play an important role. Four different wild rice species were collected and identified from different parts of the Tarai (Southern plain area) and inner Tarai (Valleys and river basin areas between Churiya range and Mahavarat range) regions, ranging from 67 to over 800 metre altitude.

Among them, *Oraza nivara* Sharma et Shastri and *O. rufipogon* Griff are natural parents of the present-day cultivated rice *O. sativa* L. Weedy rice *O. sativa* f. *spontanea* (Roshev) has been observed through out the rice field of the country. Two wild relatives of rice-*Hygroryza aristata* and *Leersia hexandra* (?) have also been found in different part of Nepal (Shrestha 1988b), Shrestha and Vaughan 1989). Wild rice possesses high cultural value in Nepalese society specially in the Tarai region and costs as high as five times than the normal rice.

At least three species of wild relatives *Agropyron* of wheat *Triticum aestivum* L. have been identified in the north-west high hills of Nepal (Kihara 1955)*. On this basis north western region of Jumla, Humla and Mugu districts has been recognized as the "Secondary Homeland of Wheat". However, so far no wild species of *Triticum* has been reported from Nepal. Wild finger-millet (Crab grass) *Eleusine indica* L. Gaertn is widely distributed through-out the country ranging from the Tarai region (67m altitude) to high hills of Jumla (Manandhar 1984). In Nepal language, it is called Kode Jhar (means finger millet grass). Its cultivated species is *E. Coracana* (L) Gaertn (Table 1). At least 2 species of wild buck wheat *Fagopyrum dibotrys* (D. Don) Hara and *F. megacarpum* Hara belonging to polygonaceae family have been identified in Nepal (Anonymous 1976). The former one has been reported from high altitude of Jumla valley, 2750 meter (Manandhar 1984). *F. esculentum* Moench (Sweet Buckwheat) and *F. tataricum* (L.)

Gaertn (bitter buckwheat) are intensively cultivated specially in the northern hills of Nepal. Buckwheat is known as "The poor man's food" in hills. Wild relatives of the present-day cultivated arher, *Cajanus cajan* (L.) Hill (*C. indicus* Spreng) are available in different parts of country. At least, 4 species of wild relatives of *Atylosia* have been reported (DMP 1976).

Different authors also cite numerous examples of different edible wild species of cultivated crop plants (DMP 1982, Manandhar 1978, 1980, 1984, 1985, Regmi 1982, 1988, Singh 1960). This report consists of only the list of those wild relatives of crop plants that the author observed and identified during different observational tours in Nepal. So far, DMP (1982) has published a book on "Wild Edible Plants of Nepal" that consists of at least 133 different wild edible plants. However, all of them do not belong to the agricultural crops. A systematic survey, collection and preservation of such wild relatives of cultivated crop plants in future will be extremely useful from the genetic improvement point of view. Moreover, these wild relatives are in vulnerable condition and they may be wiped out within limited time because of severe land encroachment by the ever growing population. Nepal needs even the natural conservation of such wild species wherever it is needed and possible.

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Table 1. Wild Relatives of the Present Day-Cultivated Crop Plants of Nepal (a) Wild Relatives of Food Grain Crop Plants.

No.	Local Name	English Name	Family Name	Botanical Name	Location
A. Wild Relatives of Food Grain Crop Plants					
1.	Jangali Dhan a/	Wild Rice	Gramineae	<i>O. nivara</i> Sharma et Shastry	Tarai and inner Tarai region
2.	"	"	"	<i>O. rufipogon</i> Griff	Tarai region
3.	"	"	"	(<i>O. perennis</i> Monnch emend Sampaths)	Western and Central and Inner Tarai
4.	Ban Dhan	"	"	<i>O. officinalis</i> Wall. ex Watt	
5.	Jharang, Nabo	Weedy rice	"	<i>O. granulata</i> Nees et Arn ex Watt	
6.	Ghans (weed)	Wild relative of rice	"	<i>O. sativa</i> f. spontanea Roschev	Through out the rice field of Nepal Tarai region
7.	Ghane (grass)	"	"	<i>Hydrolyza aristata</i>	
	Dhan	Cultivated rice (Asian cultivar)	"	<i>Leersia hexandra</i>	Throughout the rice field
8.	Jangali Gahun	Wild relative of wheat	"	<i>O. sativa</i> L.	More than 1,500 local varieties collected in Nepal
9.	"	"	"	<i>Agropyron nepalense</i> Meldertis	High Himalaya region
10.	"	"	"	<i>A. semicostatum</i> Nees ex steud.	"
	Gahun	Cultivated wheat	"	<i>A. thomsonii</i> Hook. F.	"
11.	Jangali kodo Kodejhar Ban Kande Kodo	Wild finger millet Crab grass Goose grass Cultivated finger millet	"	<i>Triticum aestivum</i> L.	At least 21 local varieties are identified
12.	Jangali Rahar	Wild Arhur	Leguminaceae	<i>Bleusine indica</i> (L.) Gaertn.	Tarai to high hill (variety may be different)
13.	"	"	"	<i>E. coracana</i> (L.) Gaertn.	Cultivated throughout to country
				<i>Atylosia elongata</i> Benth.	High hill of KTM (Kakani hill)
				<i>A. Scarabaeoides</i> (L.) Benth	at least 4 species of <i>Atylosia</i> is identified in Nepal

Note : a/ "Jangali" and "Ban" words are used for "Wild" species in Nepali language.

Table 1. Continued.

No.	Local Name	English Name	Family Name	Botanical Name	Location
14.	Jangali Rahar	Wild Arhur	Leguminosae	<i>A. mollis</i> Benth	Cultivated mainly in the Tarai and Inner Tarai region
	Rahar	Cultivated arhur	"	<i>Cajanus cajan</i> (L.) Mill	
	"	"	"	<i>C. indicus</i> Spreng	
15.	Ban fajar	Wild buckwheat	Polygonaceae	<i>Fagopyrum depotrys</i> (D. Don) Hara	Mid to high hill
	"	"	"	(<i>F. cymosum</i> Trev Heisn)	
16.	"	Perennial buck wheat	"	<i>F. megacarpum</i> Hara	"
	Mithe fajar	Cultivated (buck wheat)	"	<i>F. esculentum</i>	
	Tite fajar	" (bitter)	"	<i>F. tataricum</i> (L.) Gaerth	Tarai to high hills
B. Wild Relatives of Cultivated Vegetable Crop Plants					
1.	Ban Karkalo	Wild colocasia	Araceae	<i>Colocasia antiquorum</i> Schott	Tarai to high hills
	Karkalo	Cultivated	"	<i>C. esculenta</i> Schott	
2.	Lude	Pigweed (without thorn)	Amaranthaceae	<i>Amaranthus viridis</i> L.	Through the country
	"	"	"	<i>A. blitum</i> L.	"
3.	Lude	" (Thorny)	"	<i>A. spinosus</i> L.	"
4.	Lude	"	"	<i>A. caudatus</i> L.	"
5.	Jangali tori	Water cress	Crucifereae	<i>Nasturtium officinale</i> Br. ex Aiton	Tarai to temperate region
	"	"	"	<i>Rorippa indica</i> (L.) Heim	"
6.	Jangali tori (Banfayo)	"	"	<i>R. dubida</i> (Persoon) Hara	"
	"	"	"	(<i>Nasturtium indicum</i> DC Ssensu FBI)	
	"	"	"	<i>Brassica campestris</i> L. varotonia Duth and Full	
7.	Jangali ghiraunla	Wild spongegourd	Cucurbitaceae	<i>Luffa echinata</i> Roxb	Churia range (Lothar forest)
	Pate	Cultivated	"	<i>L. acutangulata</i> (L.) Roxb.	
	Ghiraunla	Rib-ground	"	<i>L. cylindrica</i> (L.) Roim	
	Ghiu toria	Cultivated	"	"	
	Ghiraunla	Sponge-gourd	"	"	

Table 1. Continued.

No.	Local Name	English Name	Family Name	Botanical Name	Location
8.	Jangali titakarela Titkarela	Wild bitter-gourd Cultivated bitter-gourd	Cucurbitaceae "	Momordica dioica Roxb. <i>M. charantia</i> L.	Churiya hill (Lothar forest)
9.	Ban Kakri Kankro	Wild cucumber Cultivated cucumber	Cucurbitaceae "	<i>Melothria heterophylla</i> (Loug) gogne (Zehneria umbellata) <i>Cucumis sativus</i> C. C. C.	Tarai to temperate region (Klein)
10.	Ban Chichindo	Wild snake-gourd	"	Trichoanthes cucumerina C.	Tropical to sub-tropical region
11.	Chichindo	Snake-gourd	"	<i>T. anguinea</i> ?	"
12.	Kukur tarul Bhyakur, Githha Ban tarul	Air potato, potato yam Wild yam	Dioscoreaceae "	<i>Dioscorea bulbifera</i> L. <i>D. deltoidea</i> Wall.	" "
13.	Chuiyan	"	"	<i>D. pentaphylla</i> L.	"
14.	Tarul	"	"	<i>D. sagittata</i> Royle <i>D. alata</i> L.	" Tropical to sub-tropical region
15.	Ban babari Pudime	Cultivated yam	Dioscoreaceae		Temperate region
16.	"	Wild mint	Labiatae	<i>Mentha spicata</i> L.	"
17.	"	"	"	<i>M. longifolia</i> (L.) Hudson <i>M. nepalensis</i> Kitamura et Murata <i>M. arvensis</i> Linn	" "
18.	Babari Pudina Jangali methi	Cultivated mint field mint Wild fenugreek	" " Leguminoceae		High hills (Jumla)
19.	"	"	"	<i>Trigonella emodi</i> Benth <i>T. gracilis</i> Benth	" "
20.	"	"	"	<i>T. corniculata</i> L.	"
21.	"	"	"	<i>T. pubescens</i>	"
	Methi	Cultivated fenugreek grass	"	<i>T. foenum</i> <i>graceu</i> Idann <i>Lathyrus aphace</i> L.	" Tarai region
22.	Jangali kerau (Kaibu) Khesary	Wild grass pea Grass pea Chickling vetch	" " "	<i>L. sativus</i> L.	"
23.	Kutule kosha	Wild broad bean	"	<i>Vicia sativa</i> L.	Tarai to temperate region
24.	Sano	" (hairy)	"	<i>V. hirsuta</i> L. Gray	"

Table 1. Continued.

No.	Local Name	English Name	Family Name	Botanical Name	Location
25.	Sano kosha Bakula	Wild broad (hairy) Broad bean, faba bean house bean	Leguminoceae "	<i>V. himalensis</i> (Camb) Bonth <i>V. faba</i> Linn	Tarai to temperate region "
26.	Jimbu (Jangali lasun)	Wild garlic	Liliaceae	<i>Allium wallichii</i> Kunth	High hills
27.	Ban lasun	Wild garlic	Liliaceae	<i>A. hypsistum</i> Stearn	High hills
28.	Lasun	Cultivated garlic	"	<i>A. sativum</i> L.	"
29.	Ban kurilo "	Wild asparagus "	"	<i>Asparagus racemosus</i> Willd <i>A. filicinus</i>	"
30.	Urilo "	Wild asparagus Cultivated "	Liliaceae "	Buch-Ham. ex D. Don <i>A. gracilis</i> Royle <i>A. officinalis</i> L. var. <i>atitilis</i> L. <i>Abelmoschus</i> <i>Moschthus</i> Moench	Tropical Churiya range Tarai region
31.	Bantoriya Ramtoriya (Bhindi)	Wild lady's finger Cultivated lady's finger	Malvaceae "	<i>A. esculentus</i> (L.) Moench.	Tarai region
32.	Bhote palungo (Halhalesag)	Cultivated bladder dock	Polygonaceae	<i>Rumex nepalensis</i> Spr-eng	Tropical to temperate region
33.	Aminale jhar	Garden sorrel	"	<i>R. hastatus</i> D. Don	"
34.	Kapu Bhote palungo	Jerusalem cherry shrub (wild egg plant)	" "	<i>R. acetosa</i> L. <i>R. vesicarius</i> L.	" "
35.	Jangali bhanta, Bihi	Cultivated egg plant	Solanaceae	<i>Solaum torvem</i> Sw.	Tarai region
36.	Kantakari Jangali bhanta Bhanta	Indian salamin (wild egg plant) Cultivated egg plant	" "	<i>S. Kanthocarpum</i> Wendle <i>S. Melongna</i> L.	Tarai region
37.	Jangali gajar Gajar	Wild carrot Cultivated carrot	Umbellifereae "	<i>Daucus carota</i> L. <i>D. carota</i> var. sativa DC.	High hill (Marpha area)

Table 1. Continued.

No.	Local Name	English Name	Family Name	Botanical Name	Location
C. Wild Relatives of Cultivated Orchard Plants					
1.	Jangali Anp	Wild mango	Anacardiaceae	<i>Mangifera Sylvatica</i> Roxb.	Churiya forest in Chitwaon
2.	Ban kera	Wild banana	Musaceae	<i>Musa superba</i> Roxb.	Churiya forest to Mahabharat forest
	Kera	Cultivated banana	"	<i>M. paradisiaca</i> L.	
3.	Sharpe Kafal (Jangali bhuin kafal)	Wild strawberry	Rosaceae	<i>Duchesnia indica</i> (Andr.) Focke	KTM valley and similar zone
	Bhuin Kafal	Cultivated strawberry	"	<i>Fragaria nubicola</i> Lindl ex Laciata (F. vesca var. nubicola Hook f)	
4.	Mevel	Wild pear	"	<i>Pyrus pashia</i> Buch Ham ox D. Don	Temperate zone
	Naspati	Cultivated pear	"	<i>P. communis</i> L.	
5.	Painyu, Jangali Aru	Wild cherry	"	<i>Prunus napaulensis</i> (ser) Steud	Mid to High hill
6.	Painyu	Wild apricot	"	<i>P. cornuta</i> (Wall. ex Royle Steud)	"
	Painyu	Cultivated cheery	"	<i>P. rufo</i> Hook f.	"
	Usya, Jangali Syau	Wild apple	Rosaceae	<i>Prunus Byrifolia</i> ? <i>Mulus baccata</i> <i>Borkh var.</i> , himalaica (Maxin) Schneider	Jumla high hills
	Syau	Cultivated apple	"	(<i>Pyrus baccatar</i> Sense FBI)	
8.	Ban angur	Wild grape	Vitaceae	<i>Vitis lanata</i> Roxb	Tarai to mid hill
9.	Jatil lahara	Wild grape	"	<i>V. adnata</i> wall	High hill of Jumla
10.	Jhulett Angur	"	"	<i>V. repanda</i> Wight et Arn	"
		Cultivated grape	"	<i>V. vitifera</i> ?	"
D. Wild Species of the Economic Agricultural Crops					
1.	Jangali Ukhoo	Wild sugercane	Gramineae	<i>Saccharum Bengalensis</i> Retz.	Tropical to subtropical elematic region
2.	"	"	"	(<i>S. rundinaceum</i> Hook f.) <i>S. longisetosum</i> (Address.) Narayanswami ex Bor.	"
3.	Munja	"	"	<i>S. munja</i> L.	Tarai
4.	Jangali Ukhoo	"	"	<i>S. rufipitum</i> Steud.	Nagarjun Hill of KTM

Table 1. Continued.

No.	Local Name	English Name	Family Name	Botanical Name	Location
5.	Kanch Ukhoo	Thach grass Cultivated sugarcane	Gramineae "	<i>S. spontanium</i> L. <i>S. officinarum</i> L.	Tarai and Inner Tarai
6.	Jangali Chhinchhine	Wild sunhemp	Legumineceae	<i>Crotalaria bialata</i> Schrank (<i>C. sericea</i> Retz.) <i>C. juncea</i> L.	Nagarjun hill of KTM
7.	Chhinchhine Ban kapas	Cultivated sunhemp Wild cotton	Malvaceae	<i>Thespesia lampas</i> (Cavan) Dals. et Gils	Tarai to temperate Tarai including KTM valley
8.	"	"	"	<i>T. populenea</i> Soland ex Correa	"
9.	Kapas Jangali gulaf	Cultivated cotton Wild rose	Rosaceae	<i>G. hervadeum</i> L. <i>Rosa macrophylla</i> Lindl.	Warm temperate to cold temperate region "
10.	Barhamashe gulaf	Wild rose	"	<i>R. moschata</i> Herrm	"
11.	Jangali gulaf Gulaf	" Cultivated rose	" "	<i>R. sericea</i> Lindl. <i>R. indica</i> L.	"
12.	Jangali Surti	Wild tobacco	Solanaiceae	<i>Nicotiana glauca</i>	KTM to Tarai
13.	Jangali Surti Surti	Wild tobacco Cultivated tobacco	"	<i>N. plumbaginifolia</i> Viviani <i>N. tabaccum</i> L.	"
14.	Ban besar (Harjor, Barkhe sarro)	Wild termeric	Zinziberaceae	<i>Curcuma angustifolia</i> Folic Roxb.	Churiya range
15.	Ban besar (Ban dale)	Wild termeric	"	<i>C. aromatica</i> Salisb	"
16.	Kalo haledo	"	"	<i>C. longa</i> Linn.	"
17.	Ban besar (Kachur) Besar	" Cultivated termeric	" "	<i>C. deadaric</i> Rose. <i>C. domestica</i>	"
18.	Chiyapate	Wild tea	Thaeceae	<i>Camellia caudata</i> Wall	"
19.	" Chiya	" Cultivated tea	" "	<i>C. kissi</i> Wall. <i>Thea sinensis</i> L.	"