



Inventorying of agro-biodiversity of Province Gilgit-Balistan Pakistan

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Abstract

The current baseline study of agro-diversity was carried out in the different seasons of the year 2013. The study area was thoroughly surveyed throughout the year to ensure the collection of maximum agro diversity. The current study focus to provide inventory of 74 cultivated flowering plant diversity exists in the study area. For this purpose we collected the plant specimen from different localities of the study area and identified with the help of Flora of Pakistan. Beside the inventory present study also provides the names of each species in four different locally spoken languages at Gilgit-Baltistan. The collected data was consisted 20 tree species which belongs to 13 genera and 9 families, while the cultivated crops were consisted 54 species which belongs to 42 genera and 17 families. The prime aim of this research is to provide the inclusive scientific inventory of agro-biodiversity with local names in dominantly spoken languages at Gilgit-Baltistan.

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Introduction

Human beings have been cultivating plants of their choice for food, fiber, oil-seeds, ornamental, and other purposes for the past 10000 years. The evolution of crops has been affected by both natural and artificial selection, isolation of stocks, migration of crop plants with human migration, and hybridization contributing to genetic diversity of crops and formation of ancient varieties on land-races (Mc Neely, 1995). However, the domesticated species are a tiny subset of Earth's biodiversity, equivalent to about 1 in 10,000 living species (Gadgil, 1995). In recent decades, a few modern high yielding varieties have replaced the ancient crop varieties therefore the modern agriculture suffers from the erosion of the genetic diversity of crop plants (Mc Neely 1995).

However, the small farmers in developing countries still maintain their traditional varieties, therefore serving as major repository of agricultural genetic resources (Johnson and Johnson 1995). Agricultural biodiversity provides the basis for human survival and well-being but the rapid loss of native species are alarming. Maintaining agrobiodiversity helps ensure the continuation of existing evolutionary processes. Agrobiodiversity encompasses the variety and variability of animals, plants and micro-organisms that are necessary for sustaining key functions of the agro-ecosystem, including its structure and processes for, and in support of, food production and food security (FAO, 1999a).

Any detail information of inventory about agro biodiversity at Gilgit-Baltistan is not available. Inventorying refers to the production of a list, usually focused on species diversity (Coddington *et al.* 1991), or systemic collection of data over space and time with effective and rigorous documentation of change (Kutt *et al.* 2009). Inventorying of any group of organisms is not complete in Pakistan,. Recently, Khan (2009), Hyder (2014) has done the inventorying and monitoring of floral biodiversity in the Haramosh, Bugrote and Hunza, Nagar valleys of Gilgit (northern Pakistan). Plant inventories are at the heart of conservation efforts (Lozano *et al.* 2012).

Materials and methods

Collection of plant specimen

Inventorying was carried out during the 2013. The study mainly focuses the agrodiversity of province Gilgit-Baltistan. The plant specimens were collected from various localities of Gilgit-Baltistan.

Identification of Plant specimen

The collected specimen were identified with the help of Flora of Pakistan (Nasir & Ali, 1970-1989) and Ali and Nasir 1989-1991 and using available literature and comparison of specimen at Karachi University Herbarium.. For the local names I interviewed the indigenous peoples in different parts of Gilgit-Baltistan who have the relevant knowledge.

Results and discussion

Agrodiversity

Agricultural biodiversity is the vital subset of plant biodiversity. It includes all forms of agricultural species and varieties. Most people of Gilgit-Baltistan practice agriculture for their livelihood. Fruit crops as well as annual crops of grains and vegetables are cultivated. There has been a loss of agricultural biodiversity, particularly in case of annual crops by the abandonment of local varieties and land races in favor of the high yielding varieties.

The introduction of high yielding varieties of wheat started from 1940; wile potato was introduced in the late nineteenth century, which has become a cash crop since 1980 (Kreutzmann 2006). For the effective conservation measures and sustainable use of biodiversity, it's inventorying and monitoring is necessary. Inventorying refers to the production of a list or inventory of biodiversity, usually focused on species diversity; monitoring on the other hand refers to the recording of changes in biodiversity (Coddington *et al.* 1991).

Inventory of agrodiversity

Inventorying of any group of organisms is not complete in Pakistan, and there is very little monitoring (Khatoon *et al.* 2004, 2005). Plant inventories are at the heart of conservation efforts

(Lozano *et al.* 2012). Agriculture is the livelihood of most people of the study area. People have nowadays adopted the high yielding cultivars of various crops and the local varieties and land races have been mostly abandoned. The cash crops include fresh fruits and potato. The perennial crops were mostly fruit trees, a good number of them belonging to the family Rosaceae; however a few species were also cultivated for nuts and timber i.e. Walnut, Almond, Poplar, etc.

(Table-1). All were trees except Grapes; the total 20 species of perennial crops belonged to 13 genera and 9 families of dicots. Among the annual crops, 5 were cereal crops, one pseudo-cereal, two oil-seed crops, and most of others were vegetables, melons, and few spices and fodder crops. In all the annual crops were 54 species in 42 genera and 17 families. Three families were monocots and 14 were dicots. (Table- 2).

Table 1. Detailed list of perennial crops and their local names.

S. No	Family Name	Species Name	Habit	Burushiski Name	Shena Names	Balti Names	English Name
1)	Ebenaceae	<i>Diospyros kaki</i> L.	Tree	Hermit	Hermit	Hermit	Persimmon
2)	Elaeagnaceae	<i>Elaeagnus angustifolia</i> L.	Tree	Ghindaver	Gonar	-	Silver berry
3)	Elaeagnaceae	<i>Elaeagnus 136talic136te</i> Thunb.	Tree	Failse	Failse	-	Autumn-olive
4)	Juglandaceae	<i>Juglans regia</i> L.	Tree	Telley	Khakaye	Staga	Walnut
5)	Moraceae	<i>Ficus carica</i> L.	Tree	Phake	Phake	-	Fig
6)	Moraceae	<i>Morus alba</i> L.	Tree	Bernach	Maronch	Osay	Mulberry
7)	Platanaceae	<i>Platanus orientalis</i> L.	Tree	Boche	Bocho	-	Planes tree
8)	Punicaceae	<i>Punica granatum</i> L.	Tree	Bechill	Danoo	Suo	Pomegranate
9)	Rosaceae	<i>Cydonia oblonga</i> Mill.	Tree	Ghaoti	Phecho	-	Quince
10)	Rosaceae	<i>Malus pumila</i> Mill.	Tree	Baalt	Phala	Kushu	Apple
11)	Rosaceae	<i>Prunus armenica</i> L.	Tree	Joo	Joroti	Chulu	Apricots
12)	Rosaceae	<i>Prunus cerasifera</i> Ehrhart.	Tree	Alobukhara	Alobukhara	Alobukhara	Plum
13)	Rosaceae	<i>Prunus domestica</i> L.	Tree	Alobukhara	do	Do	Plum
14)	Rosaceae	<i>Prunus dulcis</i> (Miller) Webb.	Tree	Badam	Badm	Badam	Almond
15)	Rosaceae	<i>Prunus avium</i> L.	Tree	Glass	Glass	Cherry	Cherry
16)	Rosaceae	<i>Prunus persica</i> (L.) Batsch.	Tree	Chukdar	Chuknar	-	Peach
17)	Rosaceae	<i>Pyrus communis</i> L.	Tree	Shogri	Shogri	Nuro	Pear
18)	Rosaceae	<i>Pyrus persica</i>	Tree	Chukdar	Chuknar	-	Almond-leaf pear
19)	Salicaceae	<i>Populus alba</i> L.	Tree	Berpeya	Phalcho	Barpha	Poplar
20)	Vitaceae	<i>Vitis alba</i>	Climber	Gheeng	Zache	Goron	Grape

Table 2. Details of commonly cultivated cereals and vegetables, crops and their local names.

S. No.	Family	Name of plant	Burushiski Names	Shena Names of crops	Balti Names	English Names
1.	Dicots- Species					
2.	Brassicaceae	<i>Brassic napus</i> L.	Kayem	Kayem	Surbo	Rape seed
3.	Brassicaceae	<i>Brassica juncea</i> (Linn.) Czern. et Coss.	Kayem	Kayem	Do	Mustard green
4.	Brassicaceae	<i>Brassica oleracea</i> L. var. captata	Gobi	Gobi	Gobi	Cabbage
5.		<i>Brassicarapa</i> L.	Moloo	Moloo	Molaq	Turnip
6.		<i>Brassica oleracea</i> L var. botrytis	Gobi	Gobi	Gobi	Cauliflower
7.	Brassicaceae	<i>Raphanussativus</i> L.	Son moloo	Son melo	Molo	Radish
8.	Cannabaceae	<i>Cannabis sativa</i> L.	Thonch	Thunche	-	Hemp
9.	Chenopodiaceae	<i>Beta vulgaris</i> L.	Chiqander	Chiqander	Chiqander	Chiqander
10.	Chenopodiaceae	<i>Spinacia oleracea</i> L.	Palak	Palak	Palak	Palak
11.	Compositae	<i>Carthamus tinctorius</i> .L.	Pong	Pong	-	Pong
12.	Compositae	<i>Lactuca sativa</i> L.	Kayem/ salad	Kayem/ salad	Salad	Kayem/ salad
13.	Cucurbitaceae	<i>Citrullus lanatus</i> (Thunb.) Nakai	Mats & Buver	Buver	Buver	Watermelon

14.	Cucurbitaceae	<i>Cucumis melo</i> L.	Ghoon	Galati	Ghoon	Melon
15.	Cucurbitaceae	<i>Cucumis sativus</i> L.	Laye	Laye	Laro	Cucumber
16.	Cucurbitaceae	<i>Cucurbita maxima</i> Duch. Ex Lam.	Hoser	Hoser	-	Squash
17.	Cucurbitaceae	<i>Cucurbita moschata</i> Duch ez Poir	Von	Von	-	Small pump kin
18.	Labiatae	<i>Mentha arvensis</i> L.	Podina	Podina	Foling	Mint
19.	Labiatae	<i>Mentha royleana</i> Benth.	Phelal	Phelile	Foling	Mentha
20.	Linaceae	<i>Linum usitatissimum</i> L.	Homan	Homan	-	Lin seed / Flax
21.	Malvaceae	<i>Abelmoschus esculentus</i> (L.)Moench	Bendi	Bendi	Bendi	Okra
22.	Malvaceae	<i>Malva verticillata</i> L.	Shovenchal	Shovenchal	-	Cluster mallow
23.	Myrtaceae	<i>Syzygium aromaticum</i> (L.) Merrill & Perry	Laung	Laung	-	Clove
24.	Papaveraceae	<i>Papaver somniferum</i> L.	Mardakhy	Mardakhy	-	Poppy
25.	<u>Papilionaceae</u>	<i>Arachis hypogaea</i> L.	Mongphali	Mongphali	Mongphali	Peanut
26.	Papilionaceae	<i>Cicer arietinum</i> L.	Chana dal	Chana dal	Chana dal	
27.	Papilionaceae	<i>Lablab purpureus</i> (L.)Sweat subsp. <i>bengalensis</i> (Jacq.) Verdc.	Rabong	Rabong	Mootho	Bean
28.	Papilionaceae	<i>Lens culinaris</i> L.	Baleye dal	Baleye dal	Saboth masoor	Brown lentil
29.	Papilionaceae	<i>Medicago sativa</i> L.	Shpiting	Shpiting	Buksuk	Alfalfa
30.	Papilionaceae	<i>Pisum sativum</i> L.	Gherk	Kukhun	Strenma	Pea
31.	Papilionaceae	<i>Trifolium repens</i> L.	Shaptal	Shaptal	Buksuk	Clover
32.	Papilionaceae	<i>Trigonella foenum graecum</i> L.	Shekrkuch	Mathi	Shalmilk	Fenugreek
33.	Papilionaceae	<i>Vicia faba</i> L.	Bokak	Kukhun	Strrmuma	Broad Bean
34.	Papilionaceae	<i>Vigna mungo</i> L.	Kala dal	Kala dal	Kala dal	Black gram
35.	Papilionaceae	<i>Vigna radiate</i> L.	Mong dal	Mong dal	Mong dal	
36.	Papilionaceae	<i>Vigna unguiculata</i> L.	Rabong Phali	Rabong Phali	Lobia	Dry cowpea
37.	Poaceae	<i>Hordeum vulgare</i> L.	Hari	Sharae	Nus	Barley
38.	Poaceae	<i>Oryza sativa</i> L.	Brew	Brew	Brus	Rice
39.	Poaceae	<i>Panicum miliaceum</i> L.	Baeye	Bare	-	Common millet
40.	Poaceae	<i>Setaria talic</i> (L.)P.Beauv.	Cha	-	Cha	Foxtail millet
41.	Poaceae	<i>Triticum aestivum</i> L.	Gur	Goom	Kro	Wheat
42.	Poaceae	<i>Zea mays</i> L.	Makye	Makye	Makye	Maiz
43.	Polygonaceae	<i>Fagopyrum esculentum</i> Moench	Baro	Barow	-	Buck wheat
44.	Solanaceae	<i>Capsicum annuum</i> L.	Maruch	Maruch	Snearrma	Chilly
45.	Solanaceae	<i>Solanum lycopersicon</i> L.	Balogan	Balogan	Phagam	Tomato
46.	Solanaceae	<i>Solanum melongena</i> L.	Bangun	Bangun	Bangun	Brinjal
47.	Solanaceae	<i>Solanum tuberosum</i> L.	Alo	Alo	Alo	Potato
48.	Umbelliferae	<i>Bunium persicum</i> (Boiss.) B. Fedtsch	Hayawo	Hayawo	-	Zeera
49.	Umbelliferae	<i>Coriandrum sativum</i> L.	Thone	Naski	Zahmic	Coriander
50.	Umbelliferae	<i>Daucus carota</i> L.	Ghason	Ghason	Walpo	Carrot
51.	Umbelliferae	<i>Trachyspermum ammi</i> (L) Sprague	Ajwain	Ajwain	Ajwain	Ajwain
52.	Monocots-Species					
53.	Alliaceae	<i>Allium cepa</i> L.	Ghashue	Qushu	Xong	Onion
54.	Alliaceae	<i>Alliumsativum</i> L.	Pokhpa	Baqpa	Zhoqpa	Garlic
55.	Zingiberaceae	<i>Curcuma longa</i> L.	Halidi	Haligi	-	Turmeric
56.	Zingiberaceae	<i>Zingiber officinale</i> L.	Shengor	Shengor	-	Jinger

Importance of current study

The present work provides the common names of all these plants in the locally spoken language Burushski, Shena and Balti for the first time, while the scientific community identifies plants by their scientific names, common people recognize the plants around them by their common names. Obtaining ethnobotanical information from people or searching certain required plant with the help of local people may not be possible without knowing the common name in their language. The common names therefore have a

practical value in that they are essential for connecting specialists and lay people (Sarasa *et al.* 2012). One can say that common name is the key to the treasure of ethnobotanical knowledge. The knowledge is however unfortunately fading away with time. With modern education, better income, and accessibility to modern products including food and medicine, people gradually abandon the traditional uses of local plants. According to Sheil and Salim (2012), communities with less wealth and less

schooling generally reported a higher proportion of the useful species.

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