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AQUATIC AND SEMI-AQUATIC MACROPHYTIC DIVERSITY OF THE RIVER KARALA AT JALPAIGURI, WEST BENGAL, INDIA AND THEIR GROWTH FORM ANALYSIS

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ABSTRACT

River Karala is the most important natural drainage channel of Jalpaiguri town, West Bengal, India. At present the river is draining about 5.20 sq km or 40 % of the total municipal area. It originates from the Baikunthapur reserve forest. Due to its slow flowing nature, a large number of macrophytes grow abundantly. During our survey, 137 macrophytic species belonging to 107 genera are reported and classified according to their growth form and enumerated with floral diversity. Due to anthropogenic activity, the macrophytic diversity of the river is highly disturbed. The present status and need of conservation are also discussed in this paper.

KEYWORDS : Karala River, Diversity, Growth form, Stress.

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INTRODUCTION

The river *Karala*, also known as *Kalla,* is one of the tributaries of the river Teesta. The river divides Jalpaiguri divisional town [West Bengal, India] into two halves, the left bank i.e., Karala-Teesta interfluves, having administrative offices and the right bank, occupied by markets, residential and commercial areas. The present study area is around 141 sq km and is covered with forests and open land. This river has originated at 26°46′49.70″ N latitude and 88°32′03.49″ E longitude [inside Baikunthapur Forest] and then merged with the river Teesta at Das Para near the Jalpaiguri city at 26°28′43.04″ N latitude and 88°44′26.61″ E longitude. Near Jalpaiguri town, the river Karala maintains a good flow as it receives discharges from the nearby rivers Chukchuka and Rukruka and also due to seepage from the Teesta and the sewerage and the run-off rain water from the town area. The river Chukchuka is a small (10.98 sq km) left-hand tributary of the river Karala (Sarkar *et al.,* 2001). In 1968, Jalpaiguri town was affected by devastating flood and the life of at least 216 persons and 1370 cattle were lost (Sarkar *et al*., 2001). In aquatic systems, respond to changes in water quality are used as bioindicator of pollution (Tripathi & Shukla, 1991). The objectives of the present study are to understand the floristic diversity and growth-form analysis of macrophytes in the Karala River.

MATERIALS AND METHODS

The periodical survey and sampling of the vegetation was done during December 2009 to March 2012 in the entire stretch of the Karala River. The Growth-form classification of Hartog & Segal (1964) was followed. For basic Habit-group classification, plants were categorized into 5 groups viz., free floating, rooted floating, submerged, emergent, and marginal types (after Sculthrope, 1967). Geographical locations of different places of the study area were determined using Garmin GPS. Collected specimens were processed and mounted on herbarium sheets following Jain & Rao (1977) and the specimens were identified by matching at CAL and NBU herbaria and also using different published literature. Information on the uses of these plants was basically collected from the local people and through the survey in the local markets.

RESULTS AND DISCUSSION

During the present study, a total of 137 species covering 107 genera in 52 families of macrophytes were recorded (Table 1). There were 10 free floating, 9 rooted floating, 5 submerged, 8 emergent and 105 marginal types of plants (Table 2). All the recorded species were classified into 15 growth forms (Table 3). However, the analysis of data, it is evident that there are 11 species of Ceratophyllids, 3Parvopotamids, 6Nymphaeids, 2Utriculareids, 46Helophytes, 4Marselids, 3Lemnids, 4Magnolemnids, 22Psuedohydrophytes, 17Rhizopleaustohelophytes, 15Tenagophytes and one species each for Eichhornids, Vallisnerids, Trapids and Myriophyllids. Information contained in Table 1 and 2 may be included in the text.

Table 1
Numerical taxonomic analysis of recorded aquatic plants

Taxa	Family	Genus	Species
Dicotyledons	34	71	87
Monocotyledons	12	30	42
Pteridophytes	5	5	7
Bryophyte	1	1	1
Total	**52**	**107**	**137**

Table 2
Presentation of Different Categories of Collected Specimens

Habit group		No. of species
Floating	Free floating	10
	Rooted floating	09
Submerged		05
Emergent		08
Marginal		105
	Total:	137

In table 3, author name may be mentioned in the standard abbreviated form.

Table 3
Analytical data of the collected specimens according to their habit group and growth form [FF = Free floating, RF = Rooted floating, SM = Submerged, EM = Emergent, M = Marginal]

Name [Family]; Voucher no.	Local Name	Habit group	Growth Form	Use
Acmella calva (DC.) R.K. Jansen [Asteraceae]; *Anurag & A.P. Das 101*	*Jang*	M	Hel	Pig's fodder & Inflorescence is edible
Ageratum conyzoides L. [Asteraceae]; *Anurag & A.P. Das 209*	*Elame Jhar*	M	Hel	Medicinal and pig's fodder
Alternanthera philoxeroides (C. Mart.) Griseb. [Amaranthaceae]; *Anurag & A.P. Das 097*	*Nunia*	M	Rhi	Leafy vegetables and medicinal
Alternanthera sessilis (L.) R. Br. *ex* DC. [Amaranthaceae]; *Anurag & A.P. Das 096*	*Nunia Saak*	M	Rhi	Leafy vegetables, medicinal
Amaranthus spionosus L. [Amaranthaceae]; *Anurag & A.P. Das 111*	*Knata Notey*	M	Hel	Leafy vegetables, fodder and medicinal
Amaranthus viridis L. [Amaranthaceae]; *Anurag & A.P. Das 227*	*Notey*	M	Hel	Leafy vegetables, fodder and medicinal
Amischotolype hookeri (Hassk.) Hara [Commelinaceae] ; *Anurag & A.P. Das 123*	*Panijhar*	M	Ten	Specially fodder for cow and pig's
Aponogeton crispus C.P. Thunb. [Aponogetonaceae]; *Anurag & A.P. Das 220*	*Ghenchu*	EM	Par	Stolons are edible & Tuber used as pig's fodder
Aponogeton undulatus Roxb. [Aponogetonaceae]; *Anurag & A.P. Das 194*	*Ghenchu*	EM	Par	Tuber used as pig's fodder & root stock is edible
Axonopus compressus (Sw.) P. Beauv. [Poaceae]; *Anurag & A.P. Das 100*	*Chepti*	M	Ten	Specially fodder for cow and goats
Azolla pinnata R. Br. [Azollaceae]; *Anurag & A.P. Das 092*	-	FF	Lem	Used as a fertilizer in Potato field.
Blumea lacera (~~N.L.~~ Burm. *f.*) DC. [Asteraceae]; *Anurag & A.P. Das 200*	-	M	Psu	Specially fodder for cow and goats
Bulbostylis barbata (Rottb.) C.B. Clarke [Cyperaceae]; *Anurag & A.P. Das 140*	-	M	Ten	Specially fodder for cow and goats
Cardamine hirsuta L. [Brassicaceae]; *Anurag & A.P. Das 134*	-	M	Hel	Specially fodder for cow and goats
Centella asiatica (L.) Urban [Apiaceae]; *Anurag & A.P. Das 106*	*Thankuni*	M	Hel	Leafy vegetables and medicinal
Ceratophyllum demersum L. [Ceratophyllaceae]; *Anurag & A.P. Das 094*	*Jhungi*	RF	Cer	Leafy vegetables, medicinal and fish fodder
Ceratopteris thalictroides (L.) Brongn. [Pteridaceae]; *Anurag & A.P. Das 107*	-	RF	Cer	Leafy vegetables, medicinal and fish fodder
Chenopodium album L. [Amaranthaceae]; *Anurag & A.P. Das 185*	*Bathua saak*	M	Hel	Leafy vegetables and fodder for cow and goats
Chenopodium ambrosioides L. [Amaranthaceae]; *Anurag & A.P. Das 203*	-	M	Hel	Leafy vegetables
Chrozophora rottleri A. Juss. [Euphorbiaceae]; *Anurag & A.P. Das 217*	-	M	Psu	Specially fodder for cow and goats
Colocasia esculenta (L) Schott [Araceae]; *Anurag & A.P. Das 212*	*Shola Kachu*	M	Rhi	Vegetables, medicinal
Commelina benghalensis L. [Commelinaceae]; *Anurag & A.P. Das 170*	*Kanshira*	M	Rhi	Specially fodder for cow and goats and medicinal
Commelina diffusa N.L. Burm.*f* [Commelinaceae]; *Anurag & A.P. Das 181*	*Kanshira*	M	Rhi	Specially fodder for cow and goats and

				medicinal
Commelina suffrusticosa Blume [Commelinaceae]; *Anurag & A.P. Das 108*	*Kanshira*	M	Cer	Fodder for cow, goats and pigs
Croton bonplandianus Bail. [Euphorbiaceae]; *Anurag & A.P. Das 117*	*Jhunjhuni*	M	Hel	-
Cuphea procumbens Ortega [Lythraceae]; *Anurag & A.P. Das 099*	-	M	Hel	Fodder for cow, goats and pigs
Cyanotis cristata (L.) D. Don [Commelinaceae]; *Anurag & A.P. Das 115*	-	M	Hel	Specially fodder for cow and goats, medicinal
Cynodon dactylon (L.) Pers. [Poaceae]; *Anurag & A.P. Das 190*	*Durba Ghas*	M	Ten	Specially fodder for cow and goats, medicinal
Cyperus cephalotes Vahl [Cyperaceae]; *Anurag & A.P. Das 176*	*Gota-habi*	M	Ten	Specially fodder for cow and goats and medicinal
Cyperus compressus L. [Cyperaceae]; *Anurag & A.P. Das 196*	*Gola-methi*	M	Ten	Specially fodder for cow and goats and medicinal
Cyperus cyperoides (L.) Kuntze [Cyperaceae]; *Anurag & A.P. Das 199*	-	M	Ten	Specially fodder for cow and goats and medicinal
Cyperus difformis L. [Cyperaceae]; *Anurag & A.P. Das 224*	*Behua ghass*	M	Ten	Fodder and soil cover
Cyperus haspan L. [Cyperaceae]; *Anurag & A.P. Das 221*	*Beretha*	M	Ten	Specially fodder for cow and goats and medicinal
Cyperus pilosus Vahl [Cyperaceae]; *Anurag & A.P. Das 126*	-	M	Ten	Specially fodder for cow and goats
Cyperus rotundus L. [Cyperaceae]; *Anurag & A.P. Das 192*	*Mutha Ghas*	M	Ten	Specially fodder for cow and goats and medicinal
Datura stramonium L. [Solanaceae]; *Anurag & A.P. Das 165*	*Kalo-dhutra*	M	Hel	Medicinal
Dentella repens (L.)J. R. Forst. & G. Forst. [Rubiaceae]; *Anurag & A.P. Das 137*	*Papri Ghas*	M	Myr	Specially fodder for cow and goats
Desmodium gangeticum (L.) DC. [Leguminosae]; *Anurag & A.P. Das 125*	*Salparni*	M	Psu	Medicinal and fodder
Desmodium triflorum (L.) DC.andolle [Leguminosae]; *Anurag & A.P. Das 112*	-	M	Psu	Medicinal and fodder
Diplazium esculentum (Retz.) Sw. [Woodsiaceae]; *Anurag & A.P. Das 103*	*Dhneki Saak*	M	Rhi	Leafy vegetables
Drymaria cordata (L.) Willd. *ex* Schult. [Caryophyllaceae]; *Anurag & A.P. Das 118*	*Abhijal*	M	Hel	Medicinal and fodder
Eclipta prostrata (L.) L. [Asteraceae]; *Anurag & A.P. Das 179*	*Kesut*	M	Hel	Medicinal and leafy vegetables
Eichhornia crassipes (Mart.) Solms [Pontederiaceae]; *Anurag & A.P. Das 183*	*Kachuri Pana*	FF	Eic	Fodder and used as a manure in specially potato field
Eleocharis retroflexa (Poir.) Urban [Cyperaceae]; *Anurag & A.P. Das 201*	*Chen-chka*	M	Psu	-
Elephantopus scaber L. [Asteraceae]; *Anurag & A.P. Das 207*	*Samdulun*	M	Hel	Specially fodder for cow and goats
Eleusine indica (L.) Gaertn. [Poaceae]; *Anurag & A.P. Das 215*	-	M	Cer	Specially fodder for cow and goats
Emelia shonchifolia (L.) DC. [Asteraceae]; *Anurag & A.P. Das 218*	*Sedi-modi*	M	Psu	Specially fodder for cow and goats
Enydra fluctuans DC. [Asteraceae]; *Anurag & A.P. Das 175*	*Helencha*	RF	Rhi	Leafy vegetables and medicinal
Eragrostis tenella (L.) Roem. & Schult. [Poaceae]; *Anurag & A.P. Das 155*	-	M	Cer	-
Eupatorium odoratum L. [Asteraceae]; *Anurag & A.P. Das 127*	-	M	Hel	-
Euryale ferox W. Salisb., Koenig & Sims [Nymphaeaceae]; *Anurag & A.P. Das 144*	*Makhna*	RF	Nym	Vegetables and medicinal
Evolvulus nummularius (L.) L. [Convolvulaceae]; *Anurag & A.P. Das 210*	-	M	Hel	Specially fodder for cow and goats
Glinus oppositifolius (L.) A. DC. [Molluginaceae]; *Anurag & A.P. Das 216*	*Gimma Saak*	M	Psu	Leafy vegetables and medicinal
Gnaphalium indicum L. [Asteraceae]; *Anurag & A.P. Das 213*	-	M	Psu	Pigs fodder
Grangea maderaspatana (L.) Desf. [Asteraceae]; *Anurag & A.P. Das 226*	*Namuti*	M	Rhi	Specially fodder for cow and goats
Heliotropium indicum L. [Boraginaceae]; *Anurag & A.P. Das 223*	*Hati Snurh*	M	Hel	-
Hydrilla verticillata (L. *f.)* Royle	*Jhangi*	SM	Cer	Medicinal

[Hydrocharitaceae]; *Anurag & A.P. Das 135*				
Hydrocotyle javanica C. P. Thunb. [Apiaceae]; *Anurag & A.P. Das 171*	-	M	Psu	Medicinal
Hygrophila auriculata (Schum.) Heine [Acanthaceae]; *Anurag & A.P. Das 187*	*Kulekhara*	EM	Rhi	Leafy vegetables and medicinal
Hygrophila polysperma (Roxb.) T. Anders. [Acanthaceae]; *Anurag & A.P. Das 204*	*Chhato khara*	M	Rhi	Specially fodder for cow and goats
Hypericum japonicum C. P. Thunb. [Hypericaceae]; *Anurag & A.P. Das 219*	-	M	Rhi	-
Ipomoea carnea N. Jacq. [Convolvulaceae]; *Anurag & A.P. Das 160*	*Dahl-kalmi*	M	Cer	Fencing materials
Ipomoea aquatica Forssk. [Convolvulaceae]; *Anurag & A.P. Das 149*	*Jal-Kalmi*	M	Rhi	Leafy vegetables and medicinal
Justicia diffusa Willd. [Acanthaceae]; *Anurag & A.P. Das 139*	*Gandha-rusa*	M	Rhi	-
Kyllinga brevifolia Rottb. [Cyperaceae]; *Anurag & A.P. Das 116*	*Gothubi*	M	Hel	Specially fodder for cow and goats
Kyllinga nemoralis (J. R. Forst. & G. Forst.) Dandy *ex* Hutch & Dalz. [Cyperaceae]; *Anurag & A.P. Das 105*	-	M	Hel	Specially fodder for cow and goats
Lasia spinosa (L.)Thwait. [Araceae]; *Anurag & A.P. Das 091*	*Kanta-kachu*	M	Rhi	Potted as ornamental
Lemna minor L. [Araceae]; *Anurag & A.P. Das 119*	*Topa Pana*	FF	Lem	Used as a manure in agricultural field
Leucas indica (L.) R. Br. [Lamiaceae]; *Anurag & A.P. Das 142*	*Danda-Kalas*	M	Hel	Leafy vegetables and medicinal
Limnophila heterophylla Benth. [Plantaginaceae]; *Anurag & A.P. Das 158*	*Karpur*	EM	Cer	-
Lindenbergia indica Kuntze [Scrophulariaceae]; *Anurag & A.P. Das 162*	*Halud basanto*	M	Hel	-
Lindernia crustacea (L.) F. Muel. [Linderniaceae]; *Anurag & A.P. Das 177*	*Bhumi-nim*	M	Hel	-
Ludwigia adscendens (L.) H. Hara [Onagraceae]; *Anurag & A.P. Das 214*	*Kessardam*	M	Rhi	Specially fodder for cow and goats
Ludwigia octovalvis (N. Jaqin) Raven [Onagraceae]; *Anurag & A.P. Das 173*	-	M	Hel	Specially fodder for cow and goats
Ludwigia perennis L. [Onagraceae]; *Anurag & A.P. Das 147*	*Polte Pata*	M	Hel	Fodder for pigs
Malva verticillata L. [Malvaceae]; *Anurag & A.P. Das 152*	*Lapha Saak*	M	Hel	Leafy vegetables
Marsilea minuta L. [Marsileaceae]; *Anurag & A.P. Das 130*	*Susni Saak*	M	Mar	Medicinal & leafy vegetables
Marsilea quadrifoliata L. [Marseliaceae]; *Anurag & A.P. Das 133*	*Shusni Saak*	RF	Mar	Pollution indicator
Mazus pumilus (Burm.*f.*) van Steen. [Phrymaceae] ; *Anurag & A.P. Das 090*	-	M	Hel	-
Mecardonia procumbens J. Small [Plantaginaceae] ; *Anurag & A.P. Das 205*	-	M	Psu	-
Melochia corchorifolia L. [Malvaceae]; *Anurag & A.P. Das 197*	*Tiki-okra*	M	Psu	Specially fodder for cow and goats
Mikania micrantha Kunth [Asteraceae] ; *Anurag & A.P. Das 182*	*Halkalmi*	M	Hel	-
Mimosa pudica L. [Mimosaceae] ; *Anurag & A.P. Das 163*	*Lajjabati*	M	Hel	Medicinal and fodder
Monochoria hastata (L.) Solms. [Pontederiaceae] ; *Anurag & A.P. Das 169*	*Bara nukha*	M	Psu	Medicinal and fodder
Monochoria vaginalis (Burm. *f.*) C. Presl [Pontederiaceae] ; *Anurag & A.P. Das 132*	*Chatto nukha*	EM	Psu	Medicinal and fodder
Najas indica (Willd.) Chamisso [Hydrocharitaceae] ; *Anurag & A.P. Das 141*	*Kanta-jhangi*	SM	Cer	Fish food
Nicotiana plumbaginifolia Viv. [Solanaceae] ; *Anurag & A.P. Das 128*	*Ban tamak*	M	Hel	Specially fodder for cow and goats
Nymphaea nouchali Burm.*f.* [Nymphaeaceae] ; *Anurag & A.P. Das 095*	*Nil Shapla*	RF	Nym	Medicinal and religious
Nymphaea pubescens Willd. [Nymphaeaceae] ; *Anurag & A.P. Das 110*	*Sada Shapla*	RF	Nym	Medicinal and religious
Nymphaea rubra Roxb. *ex* Andr. [Nymphaeaceae] ; *Anurag & A.P. Das 193*	*Lal Shapla*	RF	Nym	Medicinal and religious
Nymphoides hydrophylla (Lour.) Kuntze [Menyanthaceae] ; *Anurag & A.P. Das 186*	*Pan-chuli*	FF	Nym	Specially fodder for cow and goats
Nymphoides indica (L.) Kuntze [Menyanthaceae] ; *Anurag & A.P. Das 153*	*Bara-panchuli*	FF	Nym	Medicinal
Oenanthe benghalensis (Roxb.) Benth. & Hook. *f.* [Apiaceae] ; *Anurag & A.P. Das 168*	*Pan-turasi*	M	Rhi	Specially fodder for cow and goats
Oldenlandia corymbosa L. [Rubiaceae] ; *Anurag & A.P. Das 166*	*Khet-papra*	M	Hel	Specially fodder for cow and goats
Oryza rufipogon Griff. [Poaceae] ; *Anurag*	*Buno-Dhan*	M	Hel	Used as fencing and

& A.P. Das 122				fuel materials
Oxalis corniculata L. [Oxalidaceae] ; *Anurag & A.P. Das 195*	*Amrul*	M	Mar	Leafy vegetables
Panicum repens L. [Poaceae] ; *Anurag & A.P. Das 172*	-	M	Ten	Specially fodder for cow and goats
Parthenium hysterophorus L. [Asteraceae] ; *Anurag & A.P. Das 121*	*Congress ghass*	M	Hel	Fish poison
Paspalum conjugatum P.J. Berg. [Poaceae] ; *Anurag & A.P. Das 138*	-	M	Hel	Specially fodder for cow and goats
Peperomia pellucida (L.) Kunth [Piperaceae] ; *Anurag & A.P. Das 156*	*Luchi pata*	M	Mar	Bio- indicator
Persicaria barbata (L.) H. Hara [Polygonaceae] ; *Anurag & A.P. Das 136*	*Bekh-unjubaz*	M	Psu	It is used to increase the goats milk
Persicaria chinensis (L.) H. Gross [Polygonaceae] ; *Anurag & A.P. Das 145*	-	M	Psu	-
Persicaria hydropiper (L.) Delarbre [Polygonaceae] ; *Anurag & A.P. Das 154*	*Bish Katali*	M	Hel	Specially fodder for cow and goats
Persicaria orientalis (L.) Spach [Polygonaceae] ; *Anurag & A.P. Das 202*	*Bara panimarich*	M	Psu	-
Phyla nodiflora (L.) Greene [Verbenaceae] ; *Anurag & A.P. Das 150*	*Bhui-okra*	M	Hel	Increases yield of goat milk
Pistia stratiotes L. [Araceae] ; *Anurag & A.P. Das 161*	*Baro Pana*	FF	Mag	Bio-fertilizer and medicinal
Polycarpon prostratum (Forssk.) Aschers. & Schweinf. [Caryophyllaceae] ; *Anurag & A.P. Das 211*	*Ginna*	M	Hel	Specially fodder for cow and goats
Portulaca oleracea L. [Portulacaceae] ; *Anurag & A.P. Das 198*	*Bara Laniya*	M	Hel	Specially fodder for cow and goats
Potamogeton crispus L. [Potamogetonaceae] ; *Anurag & A.P. Das 188*	-	EM	Cer	Tuber is edible
Potamogeton octandrus Poir. [Potamogetonaceae] ; *Anurag & A.P. Das 164*	-	EM	Cer	Tuber is edible
Ranunculus sceleratus L. [Ranunculaceae] ; *Anurag & A.P. Das 148*	*Polica*	M	Rhi	Root stock poisonous
Riccia fluitans L. [Ricciaceae] ; *Anurag & A.P. Das 151*	-	FF	Mag	Specially fodder for cow, goats and pigs
Ricinus communis L. [Euphorbiaceae] ; *Anurag & A.P. Das 109*	*Rehrhi*	M	Hel	Oil is prepared from seed locally
Rorippa indica (L.) Hiern [Brassicaceae] ; *Anurag & A.P. Das 124*	-	M	Psu	-
Rotala rotundifolia (Buch. – Ham. *ex* Roxb.) Koehne [Lythraceae] ; *Anurag & A.P. Das 191*	-	M	Ten	Medicinal
Rumex dentatus L. [Polygonaceae] ; *Anurag & A.P. Das 159*	*Pahari palong*	M	Psu	Specially fodder for cow and goats and also medicinal
Rungia pectinata (L.) Nees [Acanthaceae] ; *Anurag & A.P. Das 146*		M	Hel	Specially fodder for cow and goats and medicinal
Sagittaria sagittifolia L. [Alismataceae] ; *Anurag & A.P. Das 143*	*Chhota-kut*	M	Ten	Medicinal
Salvinia cuculata Roxb. *ex* Bory [Salviniaceae] ; *Anurag & A.P. Das 093*	*Cup-pana*	FF	Mag	Used as manure
Salvinia natans All. [Salviniaceae] ; *Anurag & A.P. Das 113*	*Pana*	FF	Mag	Used as manure
Scirpus articulates L. [Cyperaceae] ; *Anurag & A.P. Das 102*	*Pappati-chikha*	M	Hel	Increases yield of cow milk
Scoparia dulcis L. [Plantaginaceae] ; *Anurag & A.P. Das 208*	*Ban-dhane*	M	Hel	Specially fodder for cow and goats and also medicinal
Setaria glauca (L.) P. Beauv. [Poaceae] ; *Anurag & A.P. Das 189*	*Dhoti-sara*	M	Par	Fodder
Solanum nigrum L. [Solanaceae] ; *Anurag & A.P. Das 180*	*Kak-machi*	M	Psu	Specially fodder for cow and goats
Solanum torvum Sw. [Solanaceae] ; *Anurag & A.P. Das 174*	*Gota-begun*	M	Psu	Specially fodder for cow and goats
Spermacoce alata Aubl. [Rubiaceae]; *Anurag & A.P. Das 167*	-	M	Hel	Pig's fodder
Spilanthes uliginosa Sw. [Asteraceae] ; *Anurag & A.P. Das 222*	*Piraj*	M	Hel	Medicinal
Spriodela polyrrhiza L. [Lemnaceae] ; *Anurag & A.P. Das 206*	*Khudi-pana*	FF	Lem	-
Torenia cordifolia Benth. [Liderniaceae] ; *Anurag & A.P. Das 178*	-	M	Hel	Specially fodder for cow and goats
Trapa natans L. [Lythraceae]; *Anurag & A.P. Das 129*	*Jal Singara*	RF	Tra	Edible and medicinal

Typha angustifolia L. [Typhaceae]; *Anurag & A.P. Das 114*	*Hogla*	EM	Ten	Fencing materials
Utricularia aurea Lour. [Lentibulariaceae]; *Anurag & A.P. Das 104*	*Jhanji*	SM	Utr	Catching fishes
Utricularia inflexa Forssk. [Lentibulariaceae]; *Anurag & A.P. Das 098*	*Jhanji*	SM	Utr	-
Vallisneria spiralis L. [Hydrocharitaceae]; *Anurag & A.P. Das 184*	*Pata Saoula*	SM	Val	Medicinal and fodder
Vernonia cinerea (L.) Less. [Aasteraceae]; *Anurag & A.P. Das 157*	*Kuk-shim*	M	Hel	Specially fodder for cow and goats
Wahlenbergia marginata (C. P. Thunb.) A. DC. [Campanulaceae]; *Anurag & A.P. Das 120*	-	M	Psu	Specially fodder for cow and goats and little bit used as medicinal
Xanthium indicum Koenig ex Roxb. [Asteraceae]; *Anurag & A.P. Das 131*	*Ban Onkra*	M	Psu	Vegetable in remote areas

Due to its slow flowing nature a rich aquatic and semi aquatic vegetation has developed in the river Karala. Among the recorded families of true aquatic plants there are 6 monocotyledonous, 5 dicotyledonous, 4 pteridophytic and 1 bryophyte families. Some terrestrial plant species have been found to grow in this river bed such as *Xanthium indicum, Vernonia cinerea, Wahlenbergia marginata, Torenia cordifolia, Scoparia dulcis, Solanum nigrum, Rungia pectinata, Ricinus communis, Malva vertcillata, Melochia corchorifolia* etc**.** Of these, 25 species are medicinal and 41 species are fodder plants. According to the growth from analysis Helophytes are dominating with 46 species, followed by Psuedohydrophytes (22) and Rhizopleaustohelophytes (17). Tenagophytes (15) are also remarkable. *Aponogeton crispus*, rare and endemic to India and wild rice variety *Oryza rufipogon* have also been recorded. Due to fast pace of urbanization in the vicinity of river sides, excessive agricultural activities in riverine belt and addition of municipal waste are responsible for degradation of the river. There is an urgent need of developing proper strategies for the conservation of macrophytes in the river Karala.

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