Floristic Diversity in the Lake Cluster of Pokhara Valley, Central Nepal

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ABSTRACT

Wetlands support exceptionally high biodiversity and provide valuable ecosystem services, yet they are among the most threatened habitats due to anthropogenic activities. Conservation and management planning of wetlands requires, among others, a comprehensive floristic account. In this study, we prepared a checklist of the flowering plants found in the wetlands of the Lake Cluster of Pokhara Valley (LCPV), a Ramsar site of Nepal, located in a rapidly urbanizing capital city of Gandaki Province in Central Nepal. Voucher specimens were collected from the study sites through multiple visits during the monsoon (June-August) and autumn (September-November) seasons. Species were categorized based on their life forms (Raunkiaer’s classification) and native distribution range (native, naturalized, invasive). Ethno-botanical uses of the plant species were compiled from the published literature. We identified 230 plant species belonging to 70 families and 177 genera. Asteraceae (25 species), Poaceae (22 species), Fabaceae (18 species), Cyperaceae (16 species), and Lamiaceae (11 species) were species-rich families. Therophytes (30%) were the dominant life form followed by Hemicryptophytes (27%). Among 230 species, 183 species were native and 47 species naturalized; among the naturalized species, 21 species were invasive. Most of the plant species (61%) have medicinal values while others have food (24%) and fodder values (13%).

Keywords: invasive alien species, Ramsar site, Raunkiaer’s life form, wetland flora
INTRODUCTION

Wetlands are areas of marsh, fen, peatland, or sea, whether natural or artificial, permanent or temporary, with fresh, brackish, or saltwater that is stagnant or flowing, including areas of marine water not exceeding six meters in depth at low tide (Ramsar Convention Secretariat, 2013). Wetlands are also called nature’s supermarkets as they provide diverse goods and services to mankind and kidney of nature as they purify and filter water (Mandal & Mukherjee, 2012). For example, 21 ethnic communities out of 101 in Nepal depend on wetland resources for their subsistence (Lamsal et al., 2014). Wetlands are among the most productive life support systems in the world which are also immensely important for mankind as they provide humanity the freshwater supply, food and construction materials, and biodiversity, flood control, groundwater recharge, and climate change mitigation (Halls, 1997, https://www.ramsar.org). Wetlands that are the habitat of threatened species and provide valuable ecosystem services are designated as a Ramsar site under the Ramsar Convention on Wetlands (https://www.ramsar.org/). There are over 2400 Ramsar sites in the world including 10 sites in Nepal. The total area covered by all Ramsar sites in the world exceeds 2.5 million square kilometers (https://www.ramsar.org/about/wetlands-of-international-importance-ramsar-sites). Ramsar sites in Nepal occupy 605.61 square kilometers (MoFE, 2018a).

Wetlands support exceptionally high biodiversity and provide habitats to both water and land organisms (Denny, 1994). Floral diversity constitute a major resource in wetlands. A prerequisite to understanding the ecosystem type and biodiversity pattern of the region is a knowledge of the floral diversity of any region (Singh et al., 2017). Such floristic data will be useful for tracking changes in the pattern of vegetation in the future. In Nepal, the analysis of wetland flora is limited. A specific gap exists for the floristic studies in LCPV. Ethno-botanical studies of plants and plant products are essential for proper management of plant resources, in addition to the flora research (Cunningham, 2001).

Lake Cluster of Pokhara Valley (LCPV) is the most recently declared Ramsar site of Nepal (MoFE, 2018b). The LCPV includes nine lakes located in Pokhara Metropolitan, a rapidly urbanizing city of touristic attraction in Central Nepal. This study was carried out to prepare a checklist of the flowering plants found in the LCPV and analyzes their
taxonomic diversity, life forms, biogeographic status, and ethnobotanical uses. The results of this study are useful for the management and conservation planning of the LCPV.

**Study area**

The study was carried out in the Lake Cluster of Pokhara Valley (LCPV) which includes nine lakes located within Pokhara Metropolitan City, central Nepal (fig. 1). The Valley is located between 27°55'-28°23' N latitude and 83°48'-84°11' E longitude, with an area of 133.41 sq. km in Pokhara Metropolitan City (Shrestha & Kshetri, 2008). Pokhara is one of the most popular tourist destinations in Nepal, and a provincial capital of Gandaki Province. Of the nine lakes (table. 1), Phewa, Begnas, Rupa, and Deepang are visited by tourists frequently for natural beauty, fishing, and boating. The lakes and other water bodies are important sources of drinking water, fishery, irrigation, and hydropower (MoFE, 2018b). Besides they provide recreational, religious, spiritual, and inspirational values to local people and tourists.

**Table 1. General information on the Lake Cluster of Pokhara Valley (MoFE, 2018b).**

| SN | Attributes                      | Phewa | Begnas | Rupa | Dipang | Maidi | Kamal pokhari | Gunde | Neureni | Khaste |
|----|--------------------------------|-------|--------|------|--------|-------|--------------|-------|---------|--------|
| 1  | Ward number                    | 6     | 31     | 33   | 27     | 28    | 13           | 26    | 26      | 26     |
| 2  | Area occupied by water (Km²)   | 4.33  | 3.13   | 1.11 | 0.14   | 0.007 | 0.013        | 0.08  | 0.027   | 0.13   |
| 3  | Catchment area (Km²)           | 119.39| 18.6   | 26.02| 2.39   | 1.6   | 1.35         | 0.61  | 0.18    | 2.69   |
| 4  | Lowest elevation (m asl)       | 763   | 647    | 580  | 687    | 672   | 822          | 741   | 742     | 739    |
Fig. 1. Lake Cluster of Pokhara Valley, Kaski District, Gandaki Province, Nepal. (Numerical values in Pokhara Metropolitan City map represent different lakes: 1. Phewa, 2. Begnas, 3. Rupa, 4. Khaste, 5. Maida, 6. Deepang, 7. Kamalpokhari, 8. Gunde, 9. Niuren).}

Fig. 2. Ombrothermic diagram of the climatic data between 2010 to 2019 at Begnas and Pokhara airport.
Pokhara Valley lies in a subtropical region dominated by *Schima-Castanopsis* vegetation, while small patches of the riverine forest dominated by *Acacia catechu, Alnus nepalensis, Pandanus furcatus* are also found in the gorges of Seti and other associated rivers. The minimum temperature was recorded at 6.5°C at the Begnas weather station and 7°C at the Pokhara airport. Similarly, the maximum temperature recorded at Begnas was 33°C and 31.4°C at the airport. The mean annual temperatures were 22.3°C and 21.8°C, respectively at Begnas and the airport. Similarly, average annual precipitation was 3201 mm and 3515 mm at Begnas and Pokhara airport respectively (fig. 2). Dry periods are from mid-November to mid-February and the wet periods from mid-February to mid-November. The extreme wet periods extend between March to October and peak in June/July.

**MATERIALS AND METHODS**

**Specimen collection and identification**

Lakes of LCPV were visited for six times from June 2018 to December 2020, representing two different seasons: monsoon (June-August) and autumn (September-November) because they are the peak flowering seasons of the wetland flora. Voucher specimens of flowering plant species were collected along the shore, inside the lakes, and around the lakes. The free-floating and submerged species growing within the territory of the lakeshore were collected following Haynes (1974). The collected specimens were pressed and dried using newspaper and herbarium pressure. The prepared specimens were identified consulting regional and national floras (Grierson & Long, 1983-2001; Wu *et al.*, 1994-2008; Watson *et al.*, 2011). During the identification process, the collected samples were also cross-checked with the specimens available at the National Herbarium and Plant Laboratories (KATH) and Tribhuvan University Central Herbarium (TUCH). For some doubtful species, expert views were also considered. The nomenclature of the families followed APG-IV (Angiosperm Phylogeny Group, version IV) (Chase *et al.*, 2016), while the nomenclature of the genera and species followed Roskov *et al.* (2020). Identified specimens were deposited in TUCH and KATH.

**Species categorization and ethnobotanical use**

Habits of the species (herb, shrub or tree; annual or perennial) were determined based on field observations of the flora (Grierson & Long, 1983-2001, Wu *et al.*, 1994-2008, Watson *et al.*, 2011). The life forms of the identified species were classified following
Raunkiaer’s classification as Phanerophytes (Perennating buds from aerial parts more than 2m from the soil surface), Chamaephytes (Perennating buds on aerial parts less than 2m from the soil surface), Hemicryptophytes (Buds at ground level), Cryptophytes (Buds below ground or water), and Therophytes (Plants that survive unfavourable conditions as seeds) (Kent, 2012). The native ranges were extracted from Wu et al. (1994-2008) and Plants of the World Online (2020) (http://www.plantsoftheworldonline.org/); for some species with uncertain native range, experts’ advice was also solicited. Continents (e.g. Europe, Americas) of the native distribution range of the naturalized alien species were identified. Some of the naturalized alien species were categorized as ‘invasive’ following the list of invasive alien plants of Nepal by Shrestha (2019). International Union for Conservation of Nature (IUCN) threatened categories were identified for each species (www.iucnredlist.org). The collected plant species were compared with the list of species reported by the Ministry of Forests and environment (MoFE, 2018b) from the LCPV. Ethnobotanical uses of the collected plant species in Nepal were obtained from the following references: Manandhar (2002), Sah et al. (2002), Bishokarma et al. (2005), Baral & Kurmi (2006), Acharya (2009), Joshi & Joshi (2009), Kunwar et al. (2010), Niroula & Singh (2011), Lamsal et al. (2014), Kunwar et al. (2015), Adhikari et al. (2019), Budha-Magar et al. (2020), Bhatt & Kunwar, (2020), and Sharma et al. (2020).

Uses of the plant species were grouped into the following categories: medicines, food, forage, fodder, fiber yielders, rituals plants, fish poisons, timber yielders, fuel-woods, ornamentals, dye yielders, construction materials, green manures, hedge plants, tannin yielders, soaping agents and fermenting agents. Use percent was calculated by dividing the number of times the plant used (e.g. as medicine) by total plant species enumerated (e.g. 216) multiplied by hundred. Due to multiple uses of single plant species, a sum of the percentage values of the different use categories was more than 100%.

RESULTS AND DISCUSSION

Altogether 230 flowering plant species were collected belonging to 177 genera and 70 families from the LCPV (Appendix I). Among them, 168 species were dicots and 62 species monocots. Out of 177 genera, 34 genera had two or more than two species while the rest of others was represented by a single species. Asteraceae (25 species), Poaceae (22 species), Fabaceae (18 species), Cyperaceae (16 species) and Lamiaceae (11 species) were the species-rich families (table 2). Analysis of the floristic composition
of the LCPV revealed Asteraceae and Poaceaeae as the dominant families, which agree with the general floral composition of Nepal (Press et al., 2000). Poaceae was also reported as a dominant family in the wetlands of other parts of Nepal (e.g. Chitwan by Dangol et al., 2014). In Nepal, the analysis of wetland flora is limited. Sah et al. (2002) reported altogether 401 plant species belonging to 264 genera under 84 families from the Ghodaghodi lake area. Altogether 115 species belonging to 45 families were recorded from the wetland flora of Rupandehi district (Sharma et al., 2019). A total of 108 plant species were recorded from the wetland and periphery of Raja-Rani Tal, Morang (Sharma et al., 2020). Dangol et al. (2014) documented 117 plant species belonging to 39 families and 92 genera in the area of Rampurghol, Chitwan. Compared to the list of 436 plant species reported in the management plan of the LCPV (MoFE, 2018b), this research revealed the presence of 155 additional plant species suggesting that previous floristic studies of the LCPV are far from complete. Regarding habits, 167 species were herbs, 38 shrubs and 25 trees. Out of the total, 76 were annuals and 154 perennials.

Table 2. Number of species recorded from the Lake Cluster of Pokhara Valley that belong to different families.

| S.N. | Family                                                                 | Number of species |
|------|------------------------------------------------------------------------|-------------------|
| 1.   | Asteraceae                                                             | 25                |
| 2.   | Poaceae                                                                | 22                |
| 3.   | Fabaceae                                                               | 18                |
| 4.   | Cyperaceae                                                             | 16                |
| 5.   | Lamiaceae                                                              | 11                |
| 6.   | Polygonaceae, Rubiaceae                                                | 8                 |
| 7.   | Malvaceae                                                              | 6                 |
| 8.   | Acanthaceae, Euphorbiaceae, Moraceae, Orchidaceae                      | 5                 |
| 9.   | Amaranthaceae, Commelinaceae, Rosaceae, Solanaceae, Urticaceae          | 4                 |
| 10.  | Hypericaceae, Phyllanthaceae,                                          | 3                 |
| 11.  | Apocynaceae, Araceae, Boraginaceae, Caryophyllaceae, Convolvulaceae,   | 2                 |
|      | Dioscoreaceae, Fagaceae, Lauraceae, Linderniaceae, Lythraceae,         |                   |
|      | Melastomataceae, Myrtaceae, Oleaceae, Onagraceae, Oxalidaceae,          |                   |
|      | Plantaginaceae, Pontederiaceae, Primulaceae, Vitaceae                  |                   |
| 12.  | Remaining 32 families                                                   | 1                 |
The IUCN red list category of the plant species were attempted to find. Out of the 230 species, 67 plant species were under the Least Concern category and the rest of the others (163 species) were not assessed to any threat category. None of the plants were government protected. However, the ecosystems maintained by these plant species are the habitat of several threatened animal species (MoFE, 2018b).

The majority of the species were native (183 species) while 47 species were naturalized alien species. Out of them, 21 naturalized species were invasive (table 3). Though the flora of LCPV was dominated by the native species, the presence of naturalized species contributing to one-fifth of the total flora recorded during the present study could not be underestimated. Furthermore, globally worst invasive species such as *Eichornia crassipes*, *Chromolaena odorata*, *Lantana camara* and *Mikania micrantha* (Lowe *et al.*, 2000) had already invaded LCPV. The majority of the naturalized species (81%) and all of the invasive alien species were native of the Americas (fig. 3, table 3). The dominance of the American native plant species in the naturalized flora has been also reported at the national level (Bhattarai *et al.*, 2012).

Fig. 3. Number of naturalized species with their place of origin.
Table 3. Floristic diversity of invasive alien plant species in Lake Cluster of Pokhara Valley. RC- Raunkiaer’s life form classification: He-hemicryptophyte, Ch-Chamaephytes, Th-Therophyte, Cr-Cryptophyte, Ph-Phanerophyte; Uses: Me-Medicine, Fr-forage, Fd-fodder, Gm-green manure.

| SN | Latin name                                      | Family            | Native range          | Collection sites | RC | Herb (H)/ Shrub (S) | Annual (A)/ Perennial (P) | Uses | References for uses                      |
|----|------------------------------------------------|-------------------|-----------------------|------------------|----|---------------------|---------------------------|------|-----------------------------------------|
| 1  | *Ageratina adenophora* (Spreng.) R.M.King & H.Rob. | Asteraceae        | Mexico                | Rupa             | Ch | H                   | P                          | Me   | Acharya (2009), Adhikari et al. (2019), Budhamagar et al. (2020) |
| 2  | *Ageratum conyzoides* L.                         | Asteraceae        | Mexico                | Kamal pokhari    | Th | H                   | A                          | Me, Fr | Lamsal et al. (2014), Kunwar et al. (2010), Bhatt et al. (2020) |
| 3  | *Ageratum houstonianum* Mill.                   | Asteraceae        | Mexico to Central America | Maida             | Th | H                   | A                          | Me   | Baral et al. (2006), Joshi et al. (2009) |
| 4  | *Alternanthera philoxeroides* (Mart.) Griseb.   | Amaranthaceae     | Trinidad to N. Argentina | Phewa             | He | H                   | P                          |      |                                         |
| 5  | *Amaranthus spinosus* L.                        | Amaranthaceae     | Mexico to Tropical America | Rupa              | Th | H                   | A                          | Fd, Me, Fr | Manandhar (2002), Joshi et al. (2009) |
| 6  | *Bidens pilosa* L.                              | Asteraceae        | Tropical & Subtropical America | Khaste            | Th | H                   | A                          | Fd, Me, Fr | Manandhar (2002), Baral et al. (2006), Sharma et al. (2020) |
| Chromolaena odorata (L.) R.M.King & H.Rob. | Eichhornia crassipes (Mart.) Solms | Galinsoga quadriradiata Ruiz & Pav. | Ipomoea carnea subsp. fistulosa (Mart. ex Choisy) D.F.Austin | Lantana camara L. | Mesosphaerum suaveolens (L.) Kunth | Mikania micrantha | Mimosa pudica L. |
|------------------------------------------|-----------------------------------|-----------------------------------|-------------------------------------------------|-----------------|---------------------------------|----------------|----------------|
| Chromolaena | Eichhornia | Galinsoga | Ipomoea carnea | Lantana camara | Mesosphaerum | Mikania | Mimosa |
| Floristic Diversity in the Lake Cluster of Pokhara Valley, Central Nepal | Pathak et al. | 10 | Joshi et al. (2009), Sah et al. (2002) | Manandhar (2002), Baral et al. (2006), Kunwar et al. (2015) | Manandhar (2002), Baral et al. (2006), Kunwar et al. (2015) | Sharma et al. (2020) | Manandhar (2002), Baral et al. (2006), Kunwar et al. (2010) |
| Phewa | Phewa | Khaste | Phewa | Rupa | Phewa | Phewa | Phewa |
| Chromolaena | Eichhornia | Galinsoga | Ipomoea carnea | Lantana camara | Mesosphaerum | Mikania | Mimosa |
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| Phewa | Phewa | Khaste | Phewa | Rupa | Phewa | Phewa | Phewa |
| Chromolaena | Eichhornia | Galinsoga | Ipomoea carnea | Lantana camara | Mesosphaerum | Mikania | Mimosa |
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| Phewa | Phewa | Khaste | Phewa | Rupa | Phewa | Phewa | Phewa |
| Chromolaena | Eichhornia | Galinsoga | Ipomoea carnea | Lantana camara | Mesosphaerum | Mikania | Mimosa |
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| Phewa | Phewa | Khaste | Phewa | Rupa | Phewa | Phewa | Phewa |
| No. | Species Name                           | Family  | Subtropical America | Manandhar (2002), Baral et al. (2006) | Manandhar (2002), Bishwakarma (2005), Baral et al. (2006) | Manandhar (2002), Sah et al. (2002) |
|-----|---------------------------------------|---------|---------------------|---------------------------------------|-------------------------------------------------------------|-------------------------------------|
| 15  | Oxalis latifolia Kunth                | Oxalidaceae | Tropical & Subtropical America |                                 |                                              | Phewa Th H Cr                                   |
| 16  | Parthenium hysterophorum L.           | Asteraceae | Tropical & Subtropical America |                                 |                                              | Phewa Th H Cr                                   |
| 17  | Pistia stratiotes L.                  | Araceae  | South America       |                                       |                                              | Phewa Th H Cr                                   |
| 18  | Senna occidentalis (L.) Link          | Fabaceae | Tropical & Subtropical America |                                 |                                              | Phewa Th H Cr                                   |
| 19  | Senna tora (L.) Roxb.                | Fabaceae | Central America     |                                       |                                              | Phewa Th H Cr                                   |
| 20  | Spermacoce alata Aubl.               | Rubiaceae | N. America to South America and W. Brazil | |                                              | Phewa Th H Cr                                   |
| 21  | Xanthium strumarium L.                | Asteraceae | Colombia to Peru and Brazil | |                                              | Phewa Th H Cr                                   |
The life form of dominant plant species is one of the basic physiognomic attributes (Beard, 1978), which show the plant-environment interaction, and it helps to understand the micro and macroclimate under which plant species flourish (Khan et al., 2018). The vegetation in our study area ranged from phanerophytes to therophytes with the dominance of therophytes and hemicryptophytes (fig. 4). The hemicryptophytes and cryptophytes constituted the species of the herb. The chamaephytes observed were mainly woody shrub species while the phanerophytes constituted the trees and the associated epiphytes and climbers, growing in the adjoining areas of wetlands. Hydrophytes (a component of Cryptophytes) constituted 10 species; common among them were *Trapa natans*, *Eichhormia crassispes*, *Pistia stratiotes*, *Hydrilla verticillata*, *Leersia hexandra* and *Ludwigia adscendens*. Such dominancy of hydrophytes was also reported from a study in wetlands of Central Nepal (Burlakoti & Karmacharya, 2004).

![Raunkiaer's life forms](image-url)

**Fig. 4. Percentage of native and naturalized aline plant species in each life form.**
**Values inside the bars represents the number of species.**

A review of the previous studies revealed that about 71% (166 species) of the flowering plants recorded in the LCPV have one or more use values (table 4). Most of them (59%) were used as medicines, followed by food (25%) and forage and fodder (13%). This suggests that the LCPV provides important provisioning services to the people living in the landscape surrounding the LCPV. A similar type of research was reported by Sah et al. (2002) in the Ghodaghodi lake area and Dangol (2014) in Rampur Ghol, Chitwan.
Table 4. Uses of the plant species reported from the LCPV. Uses of the species have been compiled from the previous studies (See Appendix I and II for details).

| S.N. | Use category          | Number of species | Percentage of species |
|------|-----------------------|-------------------|-----------------------|
| 1.   | Medicinal uses        | 141               | 61.30                 |
| 2.   | Food value            | 57                | 24.78                 |
| 3.   | Fodder and forage     | 31                | 13.47                 |
| 5.   | Fiber yielders        | 8                 | 3.47                  |
| 6.   | Rituals plants        | 4                 | 1.73                  |
| 7.   | Fish poisons          | 4                 | 1.73                  |
| 8.   | Timber yielders       | 3                 | 1.30                  |
| 9.   | Fuelwood              | 2                 | 0.86                  |
| 10.  | Ornamental plants     | 2                 | 0.86                  |
| 11.  | Dye yielders          | 2                 | 0.86                  |
| 12.  | Use in construction   | 2                 | 0.86                  |
| 13.  | Green manure          | 1                 | 0.43                  |
| 14.  | Hedge plant           | 1                 | 0.43                  |
| 15.  | Tannin yielders       | 1                 | 0.43                  |
| 16.  | Soaping agent         | 1                 | 0.43                  |
| 17.  | Fermenting agent      | 1                 | 0.43                  |

This study gives an insight into floral diversity in the LCPV, their biogeography, as well as their uses. Most of the species were native, perennial, and Therophytes. The LCPV provides habitat for several plant species with medicinal values. The presence of several invasive alien plant species, some of them being globally worst, suggests that the wetland habitats of LCPV have been degrading. Management responses to plant invasions, together with other drives of degradation, will help to restore the habitats and ensure the continuous supply of ecosystem services. This will provide both economic as well as conservation benefits.
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## APPENDIX 1. Checklist of plant species reported from the Lake Cluster of Pokhara Valley.

| SN | Family       | Latin name                                      | IUCN categ | N/E | D/M | NRR | RC | H/S | A/P | Use value | References for uses | Wetland | Coll. Num. |
|----|--------------|-------------------------------------------------|------------|-----|-----|-----|----|-----|-----|-----------|---------------------|----------|------------|
| 1  | Acanthaceae  | *Justicia gendarussa* Burm. f.                  | N/D        | 1   | He  | Sh  |    |    | P   | Me        |                     | Phewa    | F 131      |
| 2  | Acanthaceae  | *Justicia simplex* D.Don                       | N/D        | 1   | He  | He  | P  |    | Me  | 1, 2      | Niureni             | 140      |            |
| 3  | Acanthaceae  | *Lepidagathis incurva* Buch.-Ham. ex D.Don     | N/D        | 1   | He  | He  | P  |    | Fd  | 1, 2      | Maidi               | M104     |            |
| 4  | Acanthaceae  | *Strobilanthes atropurpurea* Nees              | N/D        | 1   | He  | He  | P  |    | Me  | 1, 2      | Dipang              | 92       |            |
| 5  | Acanthaceae  | *Thunbergia fragrans* Roxb.                    | N/D        | 1   | He  | He  | P  |    |     |           |                     | Phewa    | 4          |
| 6  | Acoraceae    | *Acorus calamus* L.                             | LC         | N   | M   | 1   | Cr | He  | P   | Me        | 1, 2, 3, 7, 9, 11, 14 | Rupa     | R152       |
| 7  | Amaranthaceae| *Alternanthera philoxeroides* (Mart.) Griseb.   | E/D        | 1   | He  | He  | P  |    |     |           | Phewa               | 152      |            |
| 8  | Amaranthaceae| *Alternanthera sessilis* (L.) R.Br. ex DC.      | LC         | E   | D   | 1   | He  | He  | P   | Fd, Me, Fr| 1, 2, 4, 7, 9, 12, 14, 15 | Phewa    | 70         |
| 9  | Amaranthaceae| *Amaranthus spinosus* L.                        | E/D        | 1   | Th  | He  | A  |    | Fd  | Me        | 1, 4                | Rupa     | R124       |
| 10 | Amaranthaceae| *Dysphania ambrosioides* (L.) Mosyakin & Clements| E/D        | 1   | He  | He  | P  |    | Fd, Me | Fr        | 1, 2                | Niureni  | N 267      |
| 11 | Amaryllidaceae| *Crinum amoenum* Ker Gawl. ex Roxb.            | N/M        | 1   | Cr  | He  | P  |    | Me  | 1, 2      | Phewa               | 153      |            |
| 12 | Apiaceae     | *Centella asiatica* (L.) Urb.                  | LC         | N   | D   | 1   | He  | He  | P   | Me, Fd   | 1, 4, 5, 6, 7, 9, 12, 14 | Phewa    | 154       |
| 13 | Apocynaceae  | *Cryptolepis buchananii* Schult. ex Roem. & Schult.| N/D        | 1   | Ph  | Sh  | P  |    | Me, Fo | Fi        | 1, 2                | Gunde    | G117       |
| 14 | Apocynaceae  | *Ichnocarpus frutescens* (L.) W.T.Aiton         | N/D        | 1   | Ph  | Sh  | P  |    | Fd, Me | Fi        | 1, 2                | Maidi    | M151       |
| 15 | Araceae      | *Colocasia fallax* Schott                      | LC         | N   | M   | 1   | Cr | He  | P   |           |                     | Rupa     | R229       |
| No. | Family          | Species                                    | Synonyms                                      | Subspecies | Map | P | M | He | D | E | Cr | Th | A | P |
|-----|-----------------|--------------------------------------------|-----------------------------------------------|------------|-----|---|---|----|---|----|----|----|---|---|---|---|---|
| 16  | Araceae         | Pistia stratiotes L.                       |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |
| 17  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 18  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 19  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 20  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 21  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 22  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 23  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 24  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 25  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 26  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 27  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 28  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 29  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 30  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 31  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 32  | Araceae         | Aponogeton lirioideus (L.) Kuntze          |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| 33  | Araceae         | Aponogeton peltatus (Wall. ex DC.)         |                                               |            |     |   |   |    |    |    |    |    |    |    |    |    |    |
| No. | Family         | Species                                    | Author        | Th | He | Me | Fr | P  |
|-----|---------------|--------------------------------------------|---------------|----|----|----|----|----|
| 34  | Asteraceae    | Parthenium hysterophorum L.                |              |    |    |    |    |    |
| 35  | Asteraceae    | Pseudognaphalium affine (D.Don) Anderb.    |              |    |    |    |    |    |
| 36  | Asteraceae    | Sonchus arvensis L.                        |              |    |    |    |    |    |
| 37  | Asteraceae    | Sonchus asper (L.) Hill                    |              |    |    |    |    |    |
| 38  | Asteraceae    | Synedrella nodiflora (L.) Gaertn.          |              |    |    |    |    |    |
| 39  | Asteraceae    | Tridax procumbens L.                       |              |    |    |    |    |    |
| 40  | Asteraceae    | Sonchus arvensis L.                        |              |    |    |    |    |    |
| 41  | Balsaminaceae | Impatiens insignis DC.                     |              |    |    |    |    |    |
| 42  | Balsaminaceae | Orychophragmus virginicus (Vahl) Harris    |              |    |    |    |    |    |
| 43  | Bignoniaceae  | Xanthium strumarium L.                     |              |    |    |    |    |    |
| 44  | Boraginaceae  | Drymaria cordata (L.) Willd. ex Roem. & Schult. | N          |    |    |    |    |    |
| 45  | Boraginaceae  | Drymaria cordata (L.) Willd. ex Roem. & Schult. | N          |    |    |    |    |    |
| 46  | Brassicaceae  | Cynoglossum wallichii G. Don               |              |    |    |    |    |    |
| 47  | Caryophyllaceae | Caryophyllum maritimum Cham.              |              |    |    |    |    |    |
| 48  | Caryophyllaceae | Caryophyllum maritimum Cham.              |              |    |    |    |    |    |
| 49  | Commelinaceae | Commelina paludosa Blume                   |              |    |    |    |    |    |
| 50  | Commelinaceae | Commelina paludosa Blume                   |              |    |    |    |    |    |
| 51  | Commelinaceae | Commelina paludosa Blume                   |              |    |    |    |    |    |
| 52  | Commelinaceae | Commelina paludosa Blume                   |              |    |    |    |    |    |
| Page | Section | Title                                      | Authors                                      | Journal | Volume | Year | Page | Location |
|------|---------|--------------------------------------------|----------------------------------------------|---------|--------|------|------|----------|
| 53   | Commelinaceae | *Murdannia nudiflora* (L.) Brenan | N M 1 Th He A | Begnas | B145   |      |      |          |
| 54   | Convolvulaceae | *Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F. Austin | E D 1 Ch He P Me He, Me | Phewa | 101    |      |      |          |
| 55   | Convolvulaceae | *Ipomoea purpurea* (L.) Roth | E D 1 Ch He P Me He, Me, Fo | Phewa | K100   |      |      |          |
| 56   | Costaceae | *Helleborus speciosus* (L.Koeng) S.R.Dutta | E D 1 Ch He P Me He, Me | Phewa | 168    |      |      |          |
| 57   | Costaceae | *Solenolaterifolia* Lour. | E D 1 Ch He P Me He, Me | Phewa | R128   |      |      |          |
| 58   | Costaceae | *Actinocirca reptans* (L.) Goeh. | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 59   | Costaceae | *Carex criocarpa* Wahlb. | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 60   | Costaceae | *Carex alba* (Steud.) Kuntze | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 61   | Costaceae | *Carex breviglumis* (Reichb.) Hasse. | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 62   | Costaceae | *Carex scirpoides* (L.) Kunte | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 63   | Costaceae | *Carex tenuiflora* | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 64   | Costaceae | *Carex tenuis* | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 65   | Costaceae | *Carex platystylis* R.Br. | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 66   | Costaceae | *Eleocharis congesta* D.Don | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 67   | Costaceae | *Filicaeae dichotoma* (L.) Wahl | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 68   | Costaceae | *Schoenoplectella juncoides* (Reckb.) Lye | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 69   | Costaceae | *Schoenoplectella lateriflora* (J.F.Gmel.) Lye | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| 70   | Costaceae | *Schoenoplectella nigropelliculosa* | E D 1 Ch He P Me He, Me | Phewa | 169    |      |      |          |
| No. | Family   | Species                                | Locality | Growth Form | Date | Phenology | Travel | Notes     |
|-----|----------|----------------------------------------|----------|-------------|------|-----------|--------|-----------|
| 71  | Cyperaceae | *Schoenoplectiella mucronata* (L.) J.Jung & H.K.Choi | LC N M 1 Cr He P | Fi, Fo | 1, 4, 14 | Rupa | R198     |
| 72  | Cyperaceae | *Scleria biflora* Roxb.                | LC N M 1 Cr He P | Fo    | 1, 2     | Khaste | K102     |
| 73  | Cyperaceae | *Scleria levis* Retz.                  | N M 1 Cr He P | Me, Fo, Cm, Fd, Fr, Me | 1, 2 | K109     |
| 74  | Dioscoreaceae | *Dioscorea bulbifera* L. | N D 1 He He P | 1, 2 | Rupa | R103     |
| 75  | Dioscoreaceae | *Dioscorea pubera* Blume | N D 1 He He P | Niuren | 182     |
| 76  | Dipterocarpaceae | *Shorea robusta* Gaertn. | LC N D 1 Ph Tr P | Me, Ti, Tag | 1, 2, 13 | Maidi | 191     |
| 77  | Eriocaulaceae | *Eriocaulon nepalense* Prescott ex Bong. | LC N M 1 Th He A Me 1 | Phewa | P226     |
| 78  | Euphorbiaceae | *Alchornea mollis* (Benth.) Müll.Arg. | N D 1 Ch Sh P | Maidi | M124     |
| 79  | Euphorbiaceae | *Euphorbia hirta* L. | N D 1 Th He A Me 2 | Phewa | 185     |
| 80  | Euphorbiaceae | *Euphorbia pulcherrima* Willd. ex Klotzsch | LC N D 1 Ch Sh P | Me, Or | 1 | Rupa | R104     |
| 81  | Euphorbiaceae | *Falconeria insignis* Royle | N D 1 Ph Tr P | Me, Fp | 1, 2 | Begnas | B24     |
| 82  | Euphorbiaceae | *Macaranga denticulata* (Blume) Müll.Arg. | LC N D 1 Ph Tr P | Me, Fo | 1, 2 | Phewa | 184     |
| 83  | Fabaceae | *Aeschynomene indica* L. | LC N D 1 He Sh P | Me | 2 | Gunde | G68     |
| 84  | Fabaceae | *Bauhinia purpurea* L | Lc N D 1 Ph Tr P | Fo, Cm, Fd, Fr, Me | 1, 2 | Rupa | R61     |
| 85  | Fabaceae | *Chamaecrista leschenaultiana* (DC.) O.Deg. | N D 1 He He P | Phewa | 41     |
| 86  | Fabaceae | *Chamaecrista rotundifolia* (Pers.) Greene | E D 1 He He P | Phewa | 46     |
| 87  | Fabaceae | *Crotalaria alata* D.Ddon | N D 1 He Sh P | Me | 1 | Khaste | 187     |
| 88  | Fabaceae | *Crotalaria pallida* Aiton | N D 1 He Sh P | Dipang | 93     |
| Page | Fabaceae | Fagaceae | Gesneriaceae | Hydrocharitaceae | Hypericaceae |
|------|----------|----------|-------------|----------------|-------------|
| 89   | Crotalaria sessiliflora L. | Castanopsis indica (J.Roxb. ex Lindl.) A.DC. | Aeschynanthus parviflorus (D.Don) Spreng. | Hydrocharis verticillata (L.f.) Royle | Hypericum japonicum Thunb. |
| 90   | Desmodium concinum DC. |  |  |  |  |
| 91   | Desmodium heterocarpum (L.) DC. |  |  |  |  |
| 92   | Desmodium laxiflorum DC. |  |  |  |  |
| 93   | Desmodium multiflorum DC. |  |  |  |  |
| 94   |  |  |  |  |  |
| 95   |  |  |  |  |  |
| 96   |  |  |  |  |  |
| 97   |  |  |  |  |  |
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| 103  |  |  |  |  |  |
| 104  |  |  |  |  |  |
| 105  |  |  |  |  |  |
| No. | Genus                  | Species                             | Authority               | Location       | Dominance | Frequency | Phenology | Ecological | Notes       |
|-----|------------------------|-------------------------------------|-------------------------|----------------|-----------|-----------|-----------|------------|-------------|
| 106 | Hypericum              | podocarpoides                       | N.Robson ex Buch.-Ham.  | Begnas         | P         | D         | 1         | Tr         |             |
| 107 | Hypericum              | uralam                             | D. Don ex Buch.-Ham.    | Begnas         | Me        | D         | 1         | Ch         |             |
| 108 | Juncus                 | prismatocarpus                      | R.Br. ex D. Don         | Rupa           | Me        | F, Fo     | 1, 2      | P          |             |
| 109 | Juncus                 | bracteatum                          | Wall. ex Walp.          | Phewa          | Me        | F         | 1         | He         |             |
| 110 | Lamiaceae              | Hypericum podocarpoides             | N.Robson ex Buch.-Ham.  | Begnas         | P         | D         | 1         | Tr         |             |
| 111 | Lamiaceae              | Hypericum uralum                    | Buch.-Ham. ex D. Don    | Maidi          | Me        | F, Fo     | 1, 2      | P          |             |
| 112 | Lamiaceae              | Clerodendrum bracteatum             | Wall. ex Walp.          | Rupa           | Me        | F         | 1         | He         |             |
| 113 | Lamiaceae              | Colebrookia oppositifolia           | Sm.                     | Phewa          | Me        | F         | 1         | He         |             |
| 114 | Lamiaceae              | Melissa arillaris                   | (Benth.) Balch.         | Rupa           | Me        | F         | 1         | He         |             |
| 115 | Lamiaceae              | Ocimum gratissimum                  | L.                      | Nai reni       | Me        | Fo, Me    | 1, 2      | P          |             |
| 116 | Lamiaceae              | Ocimum tenuiflorum                  | L.                      | Phewa          | Me        | F         | 1         | He         |             |
| 117 | Lamiaceae              | Mesosphaerum suaveolens             | L.                      | Phewa          | Me        | F         | 1         | He         |             |
| 118 | Lamiaceae              | Melissa arillaris                   | (Benth.) Balch.         | Phewa          | Me        | F         | 1         | He         |             |
| 119 | Lamiaceae              | Melissa arillaris                   | (Benth.) Balch.         | Phewa          | Me        | F         | 1         | He         |             |
| 120 | Lauraceae              | Plectranthus mollis                 | Aiton ex Spreng.        | Phewa          | Me        | F         | 1         | He         |             |
| 121 | Lauraceae              | Plectranthus arborescens            | Aiton ex Spreng.        | Phewa          | Me        | F         | 1         | He         |             |
| 122 | Lentibulariaceae        | Utricularia australis               | R.Br.                   | Gunde          | P         | Me        | 1, 2      | Ph         |             |
| 123 | Linaceae               | Reinwardtia indica                  | Dumort.                 | Gunde          | P         | Me        | 1, 2      | Ph         |             |
| 124 | Linderniaceae          | Torenia asiatica                    | L.                      | Gunde          | P         | Me        | 1, 2      | Ph         |             |
| Family            | Species                          | Genus                  | Code |
|-------------------|----------------------------------|------------------------|------|
| Linderniaceae     | Bonaya ciliata (Colesm. Spreng.) | A Me, Fd, 2, 14         | 109  |
| Lythraceae        | Cuphea procumbens  | A Me, Fd, 2, 14         | 109  |
| | Woodfordia fruticosa (L.) Kurz | A Me, Fd, 2, 14         | 109  |
| | Magnolia campaca (L.) Baill. ex Pierre | A Me, Fd, 2, 14         | 109  |
| | Abelmoschus rosi-sinensis L. | A Me, Fd, 2, 14         | 109  |
| | Sida acuta | A Me, Fd, 2, 14         | 109  |
| | Sida rhombifolia L. | A Me, Fd, 2, 14         | 109  |
| | Urena lobata L. | A Me, Fd, 2, 14         | 109  |
| | Osbeckia nepalensis Hook. | A Me, Fd, 2, 14         | 109  |
| | Osbeckia stellata Buch.-Ham. ex D.Don | A Me, Fd, 2, 14         | 109  |
| | Toona ciliata M. Roem. | A Me, Fd, 2, 14         | 109  |
| | Ficus benjamina L. | A Me, Fd, 2, 14         | 109  |
| | Ficus racemosa L. | A Me, Fd, 2, 14         | 109  |
| | Ficus religiosa L. | A Me, Fd, 2, 14         | 109  |
| | Ficus sarmentosa Buch.-Ham. ex Sm. | A Me, Fd, 2, 14         | 109  |
| No. | Family               | Species                                      | Genus                        | Common Name       | Species Code | District | Lake | Species Code | District | Lake |
|-----|----------------------|----------------------------------------------|-------------------------------|-------------------|--------------|---------|------|--------------|---------|------|
| 144 | Moraceae             | Morus indica                                  | M. indica                     | Indigo Plum       | IC           | 1, 2    | Phewa|              |         |      |
| 145 | Myrtaceae            | Syzygium cumini                               | S. cumini                     | Jackfruit         | IC           | 1, 2    | Phewa|              |         |      |
| 146 | Myrtaceae            | Syzygium cumini                               | S. cumini                     | Jackfruit         | IC           | 1, 2    | Phewa|              |         |      |
| 147 | Myrtaceae            | Syzygium cumini                               | S. cumini                     | Jackfruit         | IC           | 1, 2    | Phewa|              |         |      |
| 148 | Nyctaginaceae        | Nyctagine violacea                            | N. violacea                   | Nightshade        | IC           | 1, 2    | Phewa|              |         |      |
| 149 | Nyctaginaceae        | Nyctagine violacea                            | N. violacea                   | Nightshade        | IC           | 1, 2    | Phewa|              |         |      |
| 150 | Olacaceae            | Olea europaea                                 | O. europaea                   | Olive             | IC           | 1, 2    | Phewa|              |         |      |
| 151 | Olacaceae            | Olea europaea                                 | O. europaea                   | Olive             | IC           | 1, 2    | Phewa|              |         |      |
| 152 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 153 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 154 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 155 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 156 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 157 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 158 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 159 | Orchidaceae          | Orchis mascula                                | O. mascula                    | Lady’s Tresses    | IC           | 1, 2    | Phewa|              |         |      |
| 160 | Oxalidaceae          | Oxalis corniculata                            | O. corniculata                | Oxalis            | IC           | 1, 2    | Phewa|              |         |      |
| Page | Family | Genus | Species | Authority | Location | Collection |
|------|--------|-------|---------|-----------|----------|------------|
| 161  | Oxalidaceae | Oxalis | latifolia | | Kamal pokhari | Rupa lake |
| 166  | Pentaphyllaceae | Eurya | cerasifolia | (D. Don) Kobuski | Rupa | Phewa |
| 167  | Phyllanthaceae | Phyllanthus | urinaria | L. | Bhadgaon | Khaste |
| 168  | Phyllanthaceae | Phyllanthus | virgatus | G.Forst | Kamal pokhari | Phewa |
| 169  | Plantaginaceae | Limnophila | chinensis | (Osbeck) Merr. | Kamal pokhari | Phewa |
| 170  | Plantaginaceae | Limnophila | sessiliflora | Blume | Kamal pokhari | Phewa |
| 172  | Poaceae | Cymbopogon | pendulus | (Nees ex Steud.) W.Watson | Kamal pokhari | Phewa |
| 173  | Poaceae | Digitaria | dichotoma | (Retz.) Koeler | Kamal pokhari | Phewa |
| 174  | Poaceae | Eleusine | indica | (L.) Gaertn. | Kamal pokhari | Phewa |
| 175  | Poaceae | Eragrostis | atrorivens | (Desf.) Trin. ex Steud. | Kamal pokhari | Phewa |
| 176  | Poaceae | Eragrostis | tenella | (L.) P.Beauv. ex Roem. & Schult. | Kamal pokhari | Phewa |
| 177  | Poaceae | Eragrostis | unioloides | (Retz.) Nees ex Steud. | Kamal pokhari | Phewa |
| 178  | Poaceae | Imperata | cylindrica | (L.) P.Beauv. | Kamal pokhari | Phewa |
| 179  | Poaceae | Leersia | hexandra | Sw. | Kamal pokhari | Phewa |
| No. | Family          | Species Name and Author | Distribution | Location  |
|-----|-----------------|-------------------------|-------------|-----------|
| 180 | Poaceae         | *Sacciolepis indica* (L.) Chase | N | Khaste  |
| 181 | Poaceae         | *Phewa*                | M | Phewa  |
| 182 | Poaceae         | *Oryza rufipogon* Griff. | M | Phewa  |
| 183 | Poaceae         | *Pennisetum densiflorum* L. | M | Phewa  |
| 184 | Poaceae         | *Panicum miliaceum* Poir. | M | Phewa  |
| 185 | Poaceae         | *Paspalum dilatatum* Poir. | E | Phewa  |
| 186 | Poaceae         | *Paspalum scrobiculatum* L. | M | Phewa  |
| 187 | Poaceae         | *Setaria pumila* (Poir.) Roem. & Schult. | M | Phewa  |
| 188 | Poaceae         | *Sporobolus fertilis* Steud. | M | Phewa  |
| 189 | Poaceae         | *Themeda triandra* Forssk. | M | Phewa  |
| 190 | Polygonaceae    | *Polygonum plebejum* R.Br. | M | Phewa  |
| 191 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| 192 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| 193 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| 194 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| 195 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| 196 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| 197 | Polygonaceae    | *Polygonum perfoliatum* (L.) H.Gross | M | Phewa  |
| No. | Family               | Species Name                                                                 | Genera       | Specific Name | Hosts | Collection Sites | District |
|-----|----------------------|------------------------------------------------------------------------------|--------------|---------------|-------|-----------------|----------|
| 198 | Polygonaceae         | *Koenigia campanulata* (Hook.fil.) T.M. Schust. & Reveal                   | N M 1 He    | Me, Fo       |        | Niuren Ci        | 95       |
| 199 | Pontederiaceae       | *Eichhornia crassipes* (Mart.) Solms                                       | E M 1 Cr    | He            |        | Phewa Po         | 31       |
| 200 | Pontederiaceae       | *Pontederia hastata* L.                                                      | N M 1 Cr    | He            |        | Gunde Pu         | 122      |
| 201 | Potamogetonaceae     | *Potamogetoncrispus* L                                                       | N M 1 Cr    | He            |        | Kamal Po         | 355      |
| 202 | Primulaceae          | *Maesa macrophylla* Wall. ex Roxb.                                          | N D 1 Ph    | Sh            |        | Rupa R162       |          |
| 203 | Primulaceae          | *Maesa chisia* D Don                                                          | N D 1 Ch    | Sh            |        | Maidi M83       |          |
| 204 | Ranunculaceae        | *Ranunculus sceleratus* L.                                                   | LC N D Th   | Th            |        | Kamal Po         | 28       |
| 205 | Rosaceae             | *Rubus ellipticus* Sm.                                                        | LC N D 1 Ch | Sh            |        | Phewa 366       |          |
| 206 | Rosaceae             | *Rubus kumaonensis* Balakr.                                                  | N D 1 Ch    | Sh            |        | Maidi M119      |          |
| 207 | Rosaceae             | *Potentilla indica* (Andr.) Wolf                                             | N D 1 He    | He            |        | Maidi M120      |          |
| 208 | Rosaceae             | *Pyracantha crenulata* (D.Don) M.Roem.                                       | N D 1 Ch    | Sh            |        | Rupa R64        |          |
| 209 | Rubiaceae            | *Dimetia scandens* (Roxb.) R.J.Wang                                          | N D 1 He    | He            |        | Begnas B25      |          |
| 210 | Rubiaceae            | *Exallage auricularia* (L.) Bremek.                                          | N D 1 He    | He            |        | Gunde G231      |          |
| 211 | Rubiaceae            | *Galium aparine* L.                                                           | N D 1 Th    | He            |        | Phewa 130       |          |
| 212 | Rubiaceae            | *Knoxia sumatrensis* (Retz.) DC.                                            | N D 1 He    | He            |        | Phewa 367       |          |
| 213 | Rubiaceae            | *Mussaenda frondosa* L.                                                       | N D 1 Ch    | Sh            |        | Maidi M84       |          |
| 214 | Rubiaceae            | *Oldenlandia corymbosa* L.                                                   | LC N D 1 Th | He            |        | Rupa R167       |          |
| 215 | Rubiaceae            | *Scleromitrion verticillatum* (L.) R.J.Wang                                  | N D 1 He    | He            |        | Khaste 206      |          |
| 216 | Rubiaceae            | *Spermacoce alata* Aubl.                                                     | E D 1 He    | He            |        | Phewa 40        |          |
|   | Family          | Species & Authors                          | Cr | N | D | H | S | T | A/P | Redlist | Abbreviations                                                                 |
|---|----------------|--------------------------------------------|----|---|---|---|---|---|-----|---------|--------------------------------------------------------------------------------|
| 217| Solanaceae     | *Datura metel* L.                          |    |   |   |   |   |   |     |         |                                                                               |
| 218| Solanaceae     | *Solanum nigrum* L.                        |    |   |   |   |   |   |     |         |                                                                               |
| 219| Solanaceae     | *Solanum torvum* Sw.                      |    |   |   |   |   |   |     |         |                                                                               |
| 220| Solanaceae     | *Solanum virginianum* L.                  |    |   |   |   |   |   |     |         |                                                                               |
| 221| Theaceae       | *Schima wallichii* (DC.) Korth.            |    |   |   |   |   |   |     |         |                                                                               |
| 222| Trapaceae      | *Trapa natans* L.                         |    |   |   |   |   |   |     |         |                                                                               |
| 223| Urticaceae     | *Boehmeria virgata* (G.Forst.) Guill.     |    |   |   |   |   |   |     |         |                                                                               |
| 224| Urticaceae     | *Gonostegia hirta* (Blume ex Hassk.) Miq. |    |   |   |   |   |   |     |         |                                                                               |
| 225| Urticaceae     | *Pilea scripta* (Buch.-Ham. ex D.Don) Wedd. |    |   |   |   |   |   |     |         |                                                                               |
| 226| Urticaceae     | *Pouzolzia zeylanica* (L.) Benn. & R.Br.  |    |   |   |   |   |   |     |         |                                                                               |
| 227| Verbenaceae    | *Lantana camara* L.                       |    |   |   |   |   |   |     |         |                                                                               |
| 228| Vitaceae       | *Cissus javana* DC.                        |    |   |   |   |   |   |     |         |                                                                               |
| 229| Vitaceae       | *Leea asiatica* (L.) Ridsdale             |    |   |   |   |   |   |     |         |                                                                               |
| 230| Zingiberaceae  | *Hedychium ellipticum* Buch.-Ham. ex Sm.  |    |   |   |   |   |   |     |         |                                                                               |

Abbreviations: N/E-Native exotic; RC-Raunkiaer’s classification, i.e. Ph-Phanerophyte, Ch-Chamaephyte, Cr-Cryptophyte, He-Hemicryptophyte, Th-Therophyte; H/S/T-Herb, shrub or tree; A/P-Annual/Perennial. Native range reference (NRR): 1 (POWO, www.plantsoftheworldonline.org/), 2 (Weeds of Australia, www.weeds.org.au), 3(www.eflora.org), 4(GRIIS, www.griis.org); Redlist categories are LC (Least concerned); D/M-Dicots & Monocots; IUCN categ-IUCN threatened categories.
### Appendix II

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