

A PRELIMINARY CHECKLIST OF THE VASCULAR FLORA OF KABAL VALLEY, SWAT, PAKISTAN

MOHAMMAD ILYAS¹, RAHMATULLAH QURESHI^{1*}, MUHAMMAD ARSHAD¹
AND SARWAT NAZ MIRZA²

¹Department of Botany, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan.

²Faculty of Forestry, Range Management & Wildlife, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan.

*Corresponding author e-mail: rahmatullahq@yahoo.com

Abstract

The floristic survey of Kabal valley, Swat was carried out during 2009-2012 and a total of 593 species belonging to 408 genera and 130 families have been identified. Of them, 20 species of ferns, 8 species of Gymnosperms and 565 species of angiosperms (128 species of Monocotyledons and 437 species of Dicotyledons) were recognized. Poaceae was the largest family which contributed 65 grasses (10.96%), followed by Asteraceae (44 spp., 7.42%), while 13 largest families represented by 10 or more species accounted for 53.1% of the species. The largest genera were: *Cyperus*, *Persicaria* (7 spp. each), *Euphorbia*, *Solanum* (6 spp. each), *Impatiens*, *Prunus*, *Allium* and *Amaranthus* (5 spp. each). This checklist will provide a useful starting point for further ecological and bioprospective research of the area.

Introduction

Kabal valley is located in the North West of District Swat at a distance of about 15 Km from Saidu Sharif, Khyber Pakhtunkhwa, Pakistan. The area lies between 34°40' to 34°60' North and 72°0' to 72°30' East in Swat district. The average elevation of the area varies from 995 to 2892 meters from the mean sea level. The valley is U-shaped and open on southern side towards the river Swat, while from three sides i.e., east, north and west it is surrounded by an arc shaped series of hills having different elevations and aspects. The series of hills are offshoots of the Hindu Kush mountain range (Ahmed & Sirajuddin, 1996). The low lying areas of the valley are alluvial pans traversed by seasonal streams. These areas are very fertile supporting a variety of crops, vegetables and fruit orchards. The soils of hills are of the mountain type and are residual as well as transported (Hussain & Ilaahi, 1991). Climatically the area falls in the temperate zone with four clearly defined seasons. Winters are harsh and long, while summers are mild and short. Total area of tehsil Kabal is 40026 hectares of which 20722 hectares is cultivated and 19304 hectares is uncultivated. The human population is approximately 0.4 million (Anon., 1999).

Floristic checklists are often the only source of botanical information for a particular area and may serve as a useful starting point for more detailed study (Keith, 1988). Because of their conciseness, the listing of species is easy to handle and less time consuming (Saima *et al.*, 2010) that aids in the identification and correct naming of species, essential resources for biodiversity estimates and biogeographic studies. Furthermore, this information provides important public outreach and fundamental information to use in addressing the biodiversity crisis (Funk *et al.*, 2007).

Many workers have contributed comprehensive checklists to the local floras. These include Qureshi (2008), Jafari & Akhiani (2008), Djaha *et al.*, (2008), Saima *et al.*, (2009), Saima *et al.*, (2010), Fazal *et al.*, (2010), Qureshi & Bhatti (2010), Haq *et al.*, (2010), Qureshi *et al.*, (2011a,b) and Yalcin *et al.*, (2011). Related works from adjoining areas include Stewart (1967) and Rashid *et al.*, (1987). Because of the diverse topographic features and micro-habitats, the study area had a great

potential for flourishing a rich plant biodiversity. Keeping into consideration, present study was planned with the objective to identify and enlist the vascular flora to provide a baseline for further ecological investigations and conservation measures.

Materials and Methods

The collection of plant specimens of vascular flora of Kabal valley was made during 2009-2012. For this purpose, the whole study area was thoroughly visited covering each season by walking method (Nazar *et al.*, 2008). During the survey, plant specimens were collected in triplicate, pressed, dried and mounted on standard herbarium sheets. Angiosperms and Gymnosperms were identified with the help of *Flora of Pakistan* (Nasir & Ali, 1970-1989; Ali & Nasir, 1989-1991; Ali & Qaiser, 1995-2012), while Pteridophytes were identified with the help of Cryptogamic Flora of Pakistan (Nakaiki & Malik, 1992, 1993). Nomenclature for taxa basically follows the abovementioned Floras but the accepted names were further validated from The Plant List and The International Plant Names Index (Anon., 2012a, b). All plant names were family-wise alphabetically arranged and provided in the result. The prepared voucher specimens were deposited in the herbarium of Department of Botany, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Pakistan for record.

Results and Discussion

During the survey a total of 593 vascular plant species belonging to 408 genera and 130 families were recorded. It also includes 20 species of Pteridophytic species (ferns) and 8 gymnosperms. Amongst angiosperms, monocotyledons consisted of 128 species of 90 genera and 26 families, while dicotyledons group belonged 437 species of 299 genera and 93 families. Poaceae was the largest family represented by 65 species (10.96%), followed by Asteraceae (44 spp., 7.42%), Rosaceae (33 spp., 5.56%), Papilionaceae (32 spp., 5.4%) and Lamiaceae (30 spp., 5.06%). Other larger families represented by 10 or more species are Brassicaceae (22 spp.), Cyperaceae (18 spp.),

Solanaceae (15 spp.), Polygonaceae (14 spp.), Amaranthaceae (12 spp.), Ranunculaceae, Boraginaceae and Euphorbiaceae (10 spp. each). All these larger families collectively contributed 53.1% of the total species (Fig. 1). The families and plants in each group of vascular plants are arranged in alphabetical order. The numbers in parenthesis, with prefix MI are voucher numbers of the collected specimens, while the bold letters are the abbreviations of the major habitat types of the species. The abbreviations are: **A**-Agricultural fields, **W**-Waste places, **G**-Grasslands, **O**-Orchards, **F**-Forests, **M**-Marshes, **WC**-Water courses, **D**-Drier slopes, **S**-Sandy stream sides, **C**- cliffs, **MS**-Moist shady places, **R**-Rock crevices, **I**-Introduced species, **E**-Exposed ridges, **GY**-Graveyards and **P**-Parasites. Cultivated Species are marked with asterisk (*).

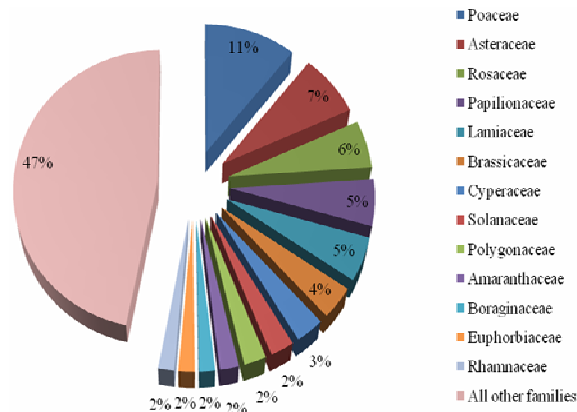


Fig. 1. Spectra of families in Kabal valley, Swat.

Pteridophytes

1. Adiantaceae

1. *Adiantum capillus-veneris* L. (MI-1009/ **MS**)
2. *A. caudatum* L. (MI-1010, **MS**)
3. *A. cuneatum* Langsd. et Frisch. (MI-1011/**C**)
4. *A. venustum* D. Don (MI-1012, **F**)
5. *Cheilanthes argentea* (Gmel.) Kunze (MI-1014/**R**)
6. *C. acrostica* (Balb.) Tod. (MI-1013/ **R**)
7. *Onychium japonicum* (Thunb.) Kze. (MI-1015/**F**)

2. Aspleniaceae

8. *Asplenium adiantum-nigrum* L. (MI-1066/ **R**)
9. *A. trichomanes* L. (MI-1067, **R**)
10. *Ceterach dalhousiae* (Hook.) C. Chr. (MI-1068/**R**)

3. Dennstaedtiaceae

11. *Microlepia strigosa* (Thunb.) Presl (MI-1224/**F**)
12. *Pteridium aquilinum* (L.) Kuhn (MI-1225/**F**)

4. Dryopteridaceae

13. *Dryopteris filix-mas* (L.) Schott (MI-1227/**MS**)
14. *D. juxtaposita* Christ (MI-1228/ **F**)

5. Equisetaceae

15. *Equisetum arvense* L. (MI-1234/**S**)
16. *E. hyemale* L. (MI-1235/**WC**)

6. Hypodematiaceae

17. *Hypodematium crenatum* (Forsk.) Kuhn (MI-1266/**R**)

7. Marsileaceae

18. *Marsilea quadrifolia* L. (MI-1315/**M**)

8. Pteridaceae

19. *Pteris cretica* L. (MI-1274/**WC**)
20. *P. vittata* L. (MI-1275/**MS**)

Gymnosperms

9. Cupressaceae

21. **Cupressus sempervirens* L. (MI-1202/**I**)
22. *Juniperus communis* L. var. *saxatilis* Pallas (MI-1203/**E**)

10. Pinaceae

23. *Abies pindrow* Royle (MI-1375/**F**)
24. *Cedrus deodara* (Roxb. ex D. Don) G. Don (MI-1376/**F**)
25. *Picea smithiana* (Wall.) Boiss (MI-1377/**F**)
26. *Pinus roxburghii* Sargent (MI-1378, **F**)
27. *P. wallichiana* A. B. Jackson (MI-1379/**F**)

11. Taxaceae

28. *Taxus wallichiana* Zucc (MI-1566/**F**)

Monocotyledons

12. Agavaceae

29. **Agave americana* L. (MI-1016/**I**)

13. Alismataceae

30. *Alisma plantago-aquatica* L. (MI-1018/**M**)
31. *Sagittaria trifolia* L. (MI-1019/**M**)

14. Alliaceae

32. *Allium ampeloprasum* var. *porrum* (L.) Regel (MI-1020/**A**)
33. **A. cepa* L (MI-102/**A**)
34. *A. jacquemontii* Kunth (MI-1022/**D**)
35. *A. porrum* L. (MI-1023/**D**)
36. **A. sativum* L. (MI-1024/**A**)

15. Amaryllidaceae

37. *Ixiolirion tataricum* (Pall.) Herb. (MI-1037/**A**)
38. *Narcissus tazetta* L. (MI-1038/**A, GY**)

16. Araceae

39. *Acorus calamus* L. (MI-1052/WC)
 40. *Arisaema flavum* (Forsk.) Schott (MI-1053/F)
 41. *A. jacquemontii* Blume (MI-1054/F)
 42. **Colocasia esculenta* (L.) Schott (MI-1055/M)

17. Asparagaceae

43. *Asparagus adscendens* Roxb. (MI-1062/D)
 44. *A. filicinus* Buch.-Ham. ex D. Don (MI-1063/F)
 45. **A. officinalis* L. (MI-1064/I)

18. Asphodelaceae

46. **Aloe vera* (L.) Burm. f. (MI-1065/I)

19. Cannaceae

47. **Canna indica* L. (MI-1159/I)

20. Colchicaceae

48. *Colchicum luteum* Baker (MI-1181/D)

21. Commelinaceae

49. *Commelina benghalensis* L. (MI-1182/A)
 50. *C. paludosa* Blume (MI-1183, M)
 51. **Tradescantia pallida* (Rose) D.Hunt (MI-1184/I)

22. Convallariaceae

52. *Polygonatum multiflorum* (L.) All. (MI-1185/F)
 53. *Polygonatum verticillatum* (L.) All. (MI-1186/F)

23. Cyperaceae

54. *Carex acutiformis* Ehrh. (MI-1206/WC)
 55. *Cyperus alopecuroides* Rottb. (MI-1207/WC)
 56. *C. articulatus* L. (MI-1208/WC)
 57. *C. compressus* L. (MI-1209/WC)
 58. *C. corymbosus* Rottb. (MI-1210/WC)
 59. *C. difformis* L. (MI-1211/M)
 60. *C. niveus* Retz. (MI-1212/D)
 61. *C. rotundus* L. (MI-1213/W,A)
 62. *Eleocharis palustris* (L.) Roem. & Schult. (MI-1214/M)
 63. *Erioscirpus comosus* (Wall.) Palla (MI-1215/WC)
 64. *Fimbristylis dichotoma* (L.) Vahl (MI-1216/D)
 65. *Kyllinga brevifolia* Rottb. (MI-1217/M)
 66. *K. nemoralis* (J.R.Forster & G. Forster) Dandy ex Hutch. & Dalziel (MI-1218/M)
 67. *Pycreus flavescens* (L.) Reichenb (MI-1219/WC)
 68. *P. polystachyos* (Rottb.) P. Beauv. (MI-1220/WC)
 69. *P. pumilus* (L.) Nees (MI-1221/WC)
 70. *P. sanguin* (Vahl) Nees (MI-1222/WC)
 71. *Schoenoplectus mucronatus* (L.) Palla (MI-1223/M)

24. Haemodoraceae

72. *Ophiopogon intermedius* D. Don (MI-1260/D)

25. Hyacinthaceae

73. *Scilla griffithii* Hochr. (MI-1263/W)

26. Hydrocharitaceae

74. *Hydrilla verticillata* (L. f.) Royle (MI-1264/M)

27. Iridaceae

75. *Iris germanica* L. (MI-1267/GY)
 76. *I. hookeriana* Foster (MI-1268/E)
 77. *Moraea sisyrinchium* (L.) Ker Gawl. (MI-1269/A, WP)

28. Juncaceae

78. *Juncus articulatus* L. (MI-1271/S)
 79. *J. bufonius* L. (MI-1272/S)
 80. *J. inflexus* L. (MI-1273/WC)

29. Lemnaceae

81. *Lemna minor* L. (MI-1304/M)

30. Liliaceae

82. *Notholirion thomsonianum* (D. Don) Stapf (MI-1305/WC)
 83. *Tulipa clusiana* DC (MI-1306/A)

31. Orchidaceae

84. *Habenaria digitata* Lindl. (MI-1337/F)

32. Poaceae

85. *Acrachne racemosa* (Heyne ex Roem. & Schult.) Ohwi (MI-1384/A,W)
 86. *Agrostis stolonifera* L. (MI-1385/E)
 87. *Alopecurus myosuroides* Huds. (MI-1386/M)
 88. *Apluda mutica* L. (MI-1387/A, W)
 89. *Aristida adscensionis* L. (MI-1388/D)
 90. *A. cyanantha* Nees ex Steud. (MI-1389/D)
 91. *Arthraxon prionodes* (Steud.) Dandy (MI-1390/A)
 92. **Arundo donax* L. (MI-1391/WC)
 93. *Avena fatua* L. (MI-1392/A)
 94. *Bothriochloa ischaemum* (L.) Keng (MI-1393/D)
 95. *Brachiaria ramosa* (L.) Stapf (MI-1394/A, W)
 96. *B. sylvaticum* (Huds.) P. Beauv. (MI-1395/A, W)
 97. *Bromus pectinatus* Thunb. (MI-1396/W)
 98. *Cenchrus ciliaris* L. (MI-1397/D)
 99. *Chrysopogon gryllus* (L.) Trin. (MI-1398/ F, G)
 100. *Cymbopogon commutatus* (Steud.) Stapf (MI-1399/ D, G)
 101. *Cynodon dactylon* (L.) Pers. (MI-1400/W, S, G)
 102. *Dactylis glomerata* L. (MI-1401/F, G)
 103. *Dactyloctenium aegyptium* (L.) Willd. (MI-1402/A, W)
 104. *Desmostachya bipinnata* (L.) Stapf (MI-1403, D)
 105. *Dichanthium annulatum* (Forssk.) Stapf (MI-1404/W, D, G)

106. *Digitaria ciliaris* (Retz.) Koel (MI-1405/A, W)
 107. *D. violascens* Link (MI-1406/A, W)
 108. *Echinochloa colona* (L.) Link (MI-1407/A, M)
 109. *E. crus-galli* (L.) P. Beauv. (MI-1408/M)
 110. *Eleusine indica* (L.) Gaertn. (MI-1409/W)
 111. *Eragrostis ciliaris* (L.) R.Br. (MI-1410/A, W)
 112. *E. pilosa* (L.) P. Beauv. (MI-1411/A, W)
 113. *Eulaliopsis binata* (Retz.) C.E. Hubbard. (MI-1412/D)
 114. *Hemarthria compressa* (L.f) R. Br. (MI-1413/A, WC)
 115. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. (MI-1414/D, G)
 116. *Hordeum murinum* L. (MI-1415/W, GY)
 117. *Hyparrhenia hirta* (L.) Stapf. (MI-1416/D)
 118. *Imperata cylindrica* (L.) Raeuschel. (MI-1417/W, S)
 119. *Isachne himalaica* Hook.f. (MI-1418/M)
 120. *Leptochloa panicea* (Retz.) Ohwi (MI-1419/W)
 121. *Lolium multiflorum* Lam. (MI-1420/A, W)
 122. *L. perenne* L. (MI-1421/GY)
 123. *L. temulentum* L. (MI-1422/A, W)
 124. *Oplismenus compositus* (L.) P. Beauv. (MI-1423/F)
 125. *Panicum antidotale* Retz. (MI-1424/D)
 126. *Paspalidium flavidum* (Retz.) A. Camus (MI-1425/D)
 127. *Paspalum dilatatum* Poir. (MI-1426/A)
 128. *P. paspalodes* (Michx.) Scribner (MI-1427/M)
 129. **Pennisetum glaucum* (L.) R. Br. (MI-1428/I)
 130. *P. orientale* L.C. Rich. (MI-1429/D, W)
 131. *Phalaris minor* Retz. (MI-1430/A)
 132. *Phleum alpinum* L. (MI-1431/E)
 133. *Piptatherum gracile* Mez (MI-1432/GY)
 134. *Poa alpina* L. (MI-1433/E)
 135. *P. annua* L. (MI-1434/A, W)
 136. *P. bulbosa* L. (MI-1435/WC)
 137. *P. infirma* H. B. K. (MI-1436/A, W)
 138. *Polypogon fugax* Ness ex Steud. (MI-1437/W, S)
 139. *P. monspeliensis* (L.) Desf. (MI-1438/W)
 140. *Saccharum spontaneum* L. (MI-1439/W, S)
 141. *Sclerochloa dura* (L.) P. Beauv. (MI-1440/W)
 142. *Setaria pumila* (Poir.) Roem. & Schult. (MI-1441/A)
 143. *S. verticillata* (L.) P. Beauv. (MI-1442/W)
 144. *S. viridis* (L.) P. Beauv. (MI-1443/A, W)
 145. **Sorghum bicolor* (L.) Moench. (MI-1444/I)
 146. *S. halepense* (L.) Pers. (MI-1445/A)
 147. *Themeda anathera* (Nees ex Steud.) Hack. (MI-1446/D, G)
 148. *Tragus roxburghii* Panigrahi (MI-1447/G)
 149. *Vulpia myuros* (L.) C.C. Gmel. (MI-1448/S)

33. Potamogetonaceae

150. *Potamogeton crispus* L. (MI-1467/M)
 151. *P. nodosus* Poirlet (MI-1468/M)
 152. *P. perfoliatus* L. (MI-1469/M)

34. Smilacaceae

153. *Smilax glaucophylla* Klotzsch (MI-1550/D)

35. Trilliaceae

154. *Trillium govanianum* Wall. ex Royle (MI-1571/F)

36. Typhaceae

155. *Typha latifolia* L. (MI-1572/M)

37. Xanthorrhoeaceae

156. *Hemerocallis fulva* (L.) L. (MI-1592/WC)

Dicotyledons

38. Acanthaceae

157. *Barleria cristata* L. (MI-1001/D)
 158. *Dicliptera bupleuroides* Nees in Wall. (MI-1002/W, GY)
 159. *Justicia adhatoda* L. (MI-1003/D, GY)
 160. *J. peploides* (Nees) T. Anders. (MI-1004/A)
 161. *J. vahlii* Roth (MI-1005/A)
 162. *Ruellia tuberosa* L. (MI-1006/GY)
 163. *Strobilanthes urticifolia* Wall. ex Kuntze (MI-1007/F)

39. Aceraceae

164. *Acer cappadocicum* Gleditsch (MI-1008/F)

40. Aizoaceae

165. *Trianthema portulacastrum* L. (MI-1017/A)

41. Amaranthaceae

166. *Achyranthes aspera* L. (MI-1025/W, GY)
 167. *A. bidentata* Blume (MI-1026/F)
 168. *Alternanthera pungens* Kunth (MI-1027/W)
 169. *A. sessilis* (L.) DC. (MI-1028/W, S)
 170. *Amaranthus graecizans* L. (MI-1029/W)
 171. *A. hybridus* L. (MI-1030/W, S)
 172. *A. retroflexus* L. (MI-1031/W)
 173. *A. spinosus* L. (MI-1032/A, W)
 174. *A. viridis* L. (MI-1033/A)
 175. *Bosea amherstiana* (Moq.) Hook. f. (MI-1034/GY)
 176. *Celosia argentea* L. (MI-1035/A)
 177. *Digera muricata* (L.) Mart. (MI-1036/A)

42. Anacardiaceae

178. *Cotinus coggyria* Scop. (MI-1039/F)
 179. *Pistacia integerrima* J. L. Stewart ex Brandis (MI-1040/F)
 180. *Rhus javanica* L. (MI-1041/F)

43. Apiaceae

181. *Aegopodium alpestre* Ledeb. (MI-1042/D)
 182. *Bupleurum falcatum* L. (MI-1043/D)
 183. **Coriandrum sativum* L. (MI-1044/A)
 184. *Eryngium coeruleum* M. Bieb. (MI-1045/W)
 185. **Foeniculum vulgare* Mill. (MI-1046/A)
 186. *Heracleum canescens* Lindl. (MI-1047/F)
 187. *Prangos pabularia* Lindl. (MI-1048/D)
 188. *Scandix pecten-veneris* L. (MI-1049/A, W)
 189. *Sium latijugum* C.B. Clarke (MI-1050/D)

44. Apocynaceae190. *Nerium oleander* L. (MI-1051/ WC)**45. Araliaceae**191. *Hedera nepalensis* K. Koch (MI-1056/F)**46. Asclepiadaceae**192. *Calotropis procera* subsp. *hamiltonii* (Wight) Ali (MI-1057/D)193. *Cynanchum dalhousiae* Wight. (MI-1058/D)194. *Oxystelma esculentum* (L. f.) R. Brown (MI-1059/D, C)195. *Periploca aphylla* Dcne (MI-1060, D)196. *Vincetoxicum hirundinaria* Medicus (MI-1061/D)**47. Asteraceae**197. *Achillea millefolium* L. (MI-1069/E)198. *Anaphalis margaritacea* (L.) Benth. (MI-1070/C)199. *A. viridis* Cumm. (MI-1071/F)200. *Artemisia scoparia* Waldst. & Kit. (MI-1072/D, W, S)201. *A. vulgaris* L. (MI-1073/D)202. *Aster alpinus* L. (MI-1074/E)203. *A. altaicus* Willd. (MI-1075/D)204. *Bidens biternata* (Lour.) Merr. et Sherff (MI-1076/W)205. *Calendula arvensis* L. (MI-1077/W, A)206. *Carpesium abrotanoides* L. (MI-1078/O, WC)207. *C. cernuum* L. (MI-1079, O, WC)208. *Carthamus lanatus* L. (MI-1080/A, W)209. *C. oxyacantha* Bieb. (MI-1081/A, D)210. *Centaurea iberica* Trev. (MI-1082/W, S)211. *Cichorium intybus* L. (MI-1083, S)212. *Cirsium arvense* (L.) Scop. (MI-1084/D)213. *C. falconeri* (Hook. f.) Petr. (MI-1085/E, F)214. *Cnicus benedictus* L. (MI-1086/A, S)215. *Conyza bonariensis* (L.) Cronq. (MI-1087/A, W)216. *C. canadensis* (L.) Cronq. (MI-1088/A, W)217. *C. stricta* Willd. (MI-1089, S)218. *Echinops sphaerocephalus* L. (MI-1090/D)219. *Eclipta prostrata* (L.) L. (MI-1091/M)220. *Galinsoga parviflora* Cav. (MI-1092/A)221. *Gnaphalium uliginosum* L. (MI-1093/F)222. **Helianthus annuus* L. (MI-1094, A)223. *H. tuberosus* L. (MI-1095, W)224. *Lactuca floridana* (L.) Gaertn. (MI-1096/W)225. *L. serriola* L. (MI-1097, D)226. *Launaea procumbens* (Roxb.) Ramayya & Rajagopal, (MI-1098/W)227. *Leontopodium alpinum* Cass. (MI-1099/F)228. *Matricaria aurea* (Loefl.) Schultz-Bip. (MI-1100/W)229. *M. matricarioides* (Less.) Porter ex Britton (MI-1101/W, F)230. *Onopordium acanthium* L. (MI-1102/W, S)231. *Parthenium hysterophorus* L. (MI-1103/W)232. *Senecio chrysanthemoides* DC. (MI-1104/E)233. *Sigesbeckia orientalis* L. (MI-1105/WC)234. *Silybum marianum* (L.) Gaertn. (MI-1106/W)235. *Sonchus arvensis* L. (MI-1107/W)236. *S. asper* (L.) Hill (MI-1108/A, W)237. *S. oleraceus* L. (MI-1109, W)238. *Taraxacum officinale* F.H. Wigg (MI-1110/W, E)239. *Tragopogon pratensis* L. (MI-1111/D)240. *Xanthium strumarium* L. (MI-1112/W)**48. Balsaminaceae**241. *Impatiens bicolor* Royle (MI-1113/WC)242. *I. brachycentra* Kar. & Kir. (MI-1114/F)243. *I. edgeworthii* Hook. f. (MI-1115/F)244. *I. glandulifera* Royle (MI-1116/WC)245. *I. pallida* Nutt. (MI-1117/F, E)**49. Berberidaceae**246. *Berberis lycium* Royle (MI-1118/F, D)**50. Betulaceae**247. *Alnus nitida* (Spach) Endl.Gen. (MI-1119/WC)**51. Boraginaceae**248. *Anchusa arvensis* subsp. *orientalis* (L.) Nordh. (MI-1120/A)249. *Arnebia decumbens* (Vent.) Coss. & Kral (MI-1121/D)250. *Buglossoides arvensis* (L.) Johnston (MI-1122/A, W)251. *Cynoglossum lanceolatum* Forssk. (MI-1123/S)252. *Hackelia macrophylla* (Brand) I.M. Johnston (MI-1124/F)253. *Heliotropium europaeum* L. (MI-1125/D)254. *H. strigosum* Willd. (MI-1126/D, G)255. *Nonea edgeworthii* A. DC (MI-1127/F, A)256. *Onosma hispida* Wall. ex G. Don (MI-1128/D)257. *Trichodesma indicum* (L.) R. Br. (MI-1129/D)**52. Brassicaceae**258. *Alliaria petiolata* (M. Bieb.) Cavara & Grande (MI-1130/W, GY)259. *Arabidopsis himalaica* (Edgew.) O.E. Schulz (MI-1131/D, S)260. *A. thaliana* (L.) Heynh. (MI-1132/D, E)261. *Barbarea vulgaris* R.Br. (MI-1133/D)262. *Brassica juncea* (L.) Czern. et Coss. (MI-1134/A)263. **B. napus* L. (MI-1135/A)264. **B. rapa* subsp. *campestris* (L.) Clapham (MI-1136/A)265. *Capsella bursa-pastoris* (L.) Medik. (MI-1137/A, W)266. *Cardamine flexuosa* With. (MI-1138/W)267. *C. hirsuta* L. (MI-1139/W)268. *Coronopus didymus* (L.) Smith (MI-1140/W)269. *Lepidium apetalum* Willd. (MI-1141/A, W)270. **L. sativum* L. (MI-1142/A)271. *Nasturtium officinale* R. Br. (MI-1143/M)272. *Neslia paniculata* subsp. *thracica* (Velen.) Bornm. (MI-1144/A)

273. **Raphanus sativus* L. (MI-1145/A)
 274. *Rorippa indica* (L.) Hiern (MI-1146/WC)
 275. *R. islandica* (Oeder) Borbas (MI-1147/WC, M)
 276. *Sisymbrium altissimum* L. (MI-1148/W)
 277. *S. irio* L. (MI-1149/W)
 278. *S. orientale* L. (MI-1150/W)
 279. *Thlaspi arvense* L. (MI-1151/W)

53. Buddlejaceae

280. *Buddleja crispa* Benth. (MI-1152/D)

54. Buxaceae

281. *Buxus wallichiana* Baill. (MI-1153/F)
 282. *Sarcococca saligna* (D. Don) Muell.-Arg. (MI-1154/F)

55. Cactaceae

283. *Opuntia monacantha* Haw. (MI-1155/D, W)

56. Caesalpinaceae

284. *Caesalpinia decapetala* (Roth) Alston (MI-1156/WC)

57. Campanulaceae

285. *Campanula pallida* Wall (MI-1157/D)

58. Cannabaceae

286. *Cannabis sativa* L. (MI-1158/W)

59. Capparidaceae

287. *Cleome viscosa* L. (MI-1160/A, S)

60. Caprifoliaceae

288. *Lonicera myrtillus* Hook. f. & Thoms. (MI-1161/E)
 289. *Viburnum cotinifolium* D. Don (MI-1162/D)
 290. *V. grandiflorum* Wall. ex DC. (MI-1163/F)

61. Caryophyllaceae

291. *Arenaria serpyllifolia* L. (MI-1164/E)
 292. *Cerastium dahuricum* Fisch. (MI-1165/E)
 293. *C. fontanum* Baumg. (MI-1166/A, W)
 294. *C. glomeratum* Thuill. (MI-1167/A, S)
 295. *Dianthus crinitus* Sm. (MI-1168/D)
 296. *Silene conoidea* L. (MI-1169/A, S)
 297. *S. viscosa* (L.) Pers. (MI-1170/E)
 298. *S. vulgaris* (Moench) Garcke (MI-1171/F)
 299. *Stellaria media* (L.) Vill. (MI-1172/A)

62. Celastraceae

300. *Euonymus hamiltonianus* Wall. (MI-1173/F)
 301. *Maytenus royleanus* (Wall. ex Lawson) Cufodontis (MI-1174/D)

63. Chenopodiaceae

302. *Chenopodium album* L. (MI-1175/A, S)
 303. *C. ambrosioides* L. (MI-1176/W)
 304. *C. botrys* L. (MI-1177/S)
 305. *C. murale* L. (MI-1178/D, S)
 306. *Kochia scoparia* (L.) Schrad. (MI-1179/A)
 307. *Spinacia oleracea* L. (MI-1180/A)

64. Convolvulaceae

308. *Convolvulus arvensis* L. (MI-1187/A, W)
 309. *Ipomoea eriocarpa* R. Br. (MI-1188/A)
 310. *I. purpurea* (L.) Roth (MI-1189/A)

65. Cornaceae

311. *Cornus macrophylla* Wall. ex Roxb. (MI-1190/F)

66. Crassulaceae

312. *Hylotelephium ewersii* (Ledeb.) H. Ohba (MI-1191/C, R)
 313. *Sedum adenotrichum* Wall. ex Edgew. (MI-1192/R)

67. Cucurbitaceae

314. **Citrullus lanatus* (Thunb.) Mats. & Nakai (MI-1193/A)
 315. *Cucumis melo* subsp. *agrestis* (Naud.) Grebensch. (MI-1194/D, S)
 316. **C. sativus* L. (MI-1195/A)
 317. **Cucurbita maxima* Duch. ex Lam. (MI-1196/A)
 318. **Lagenaria siceraria* (Molina) Standley (MI-1197/A)
 319. **Luffa aegyptiaca* Mill. (MI-1198/A)
 320. **Momordica charantia* L. (MI-1199/A)
 321. *Solena amplexicaulis* (Lam.) Gandhi (MI-1200/D)
 322. **Trichosanthes cucumerina* L. (MI-1201/A)

68. Cuscutaceae

323. *Cuscuta europaea* L. (MI-1204/P)
 324. *C. reflexa* Roxb. (MI-1205/P)

69. Dipsacaceae

325. *Scabiosa candollei* DC. (MI-1226/D)

70. Ebenaceae

326. **Diospyros kaki* L. f (MI-1229/A, I)
 327. *D. lotus* L. (MI-1230/F, D)

71. Elaeagnaceae

328. *Elaeagnus umbellata* Thunb. (MI-1231/D)

72. Elatinaceae

329. *Bergia ammannioides* Heyne ex Roth (MI-1232/M)
 330. *B. capensis* L. (MI-1233/M)

73. Euphorbiaceae

331. *Andrachne cordifolia* (Wall. ex Decne.) Muell. Avg. (MI-1236/R)
 332. *Chrozophora tinctoria* (L.) Raf. (MI-1237/D)
 333. *Euphorbia granulata* Forssk. (MI-1238/A)
 334. *E. helioscopia* L. (MI-1239/A, W)
 335. *E. hirta* L. (MI-1240/W)
 336. *E. indica* Lam. (MI-1241/A)
 337. *E. prostrata* Ait. (MI-1242/D, A)
 338. *E. wallichii* Hook. f. (MI-1243/E)
 339. *Phyllanthus fraternus* Webster (MI-1244/A)
 340. **Ricinus communis* L. (MI-1245/D, I)

74. Fagaceae

341. *Quercus baloot* Griff. (MI-1246/F)
 342. *Q. dilatata* Royle (MI-1247/F)
 343. *Q. incana* Roxb. (MI-1248/D)
 344. *Q. semecarpifolia* Smith (MI-1249/F)

75. Fumariaceae

345. *Corydalis govaniiana* Wall. (MI-1250/F)
 346. *Fumaria indica* (Hausskn.) Pugsley (MI-1251/A)

76. Gentianaceae

347. *Gentianella umbellata* (M.Bieb.) Holub (MI-1252/D)
 348. *Swertia cordata* (G.Don) Clarke (MI-1253/E)

77. Geraniaceae

349. *Erodium cicutarium* (L.) L'Herit, ex Aiton (MI-1254/S)
 350. *Geranium lucidum* L. (MI-1255/F)
 351. *G. nepalense* Sweet (MI-1256/F)
 352. *G. rotundifolium* L. (MI-1257/W)
 353. *G. swatense* Schönb.-Tem. (MI-1258/F)
 354.* *Pelargonium zonale* L'Herit ex Soland. (MI-1259/GY, I)

78. Hamamelidaceae

355. *Parrotiopsis jacquemontiana* (Dcne.) Rehder (MI-1261/F)

79. Hippocastanaceae

356. *Aesculus indica* (Wall.ex Camb.) Hook.f. (MI-1262/F)

80. Hypericaceae

357. *Hypericum perforatum* L. (MI-1265/D)

81. Juglandaceae

358. **Juglans regia* L. (MI-1270/F, I)

82. Lamiaceae

359. *Ajuga bracteosa* Wall. ex Benth. (MI-1274/D)

360. *A. parviflora* Benth. (MI-1275/R)
 361. *Anisomeles indica* (L.) O. Kuntze (MI-1276/F)
 362. *Calamintha debilis* (Bunge) Benth. (MI-1277/S)
 363. *Clinopodium umbrosum* (M. Bieb.) C. Koch (MI-1278/W)
 364. *C. vulgare* L. (MI-1279/F)
 365. *Eremostachys superba* Royle ex Benth. (MI-1280/D)
 366. *Isodon rugosus* (Wall. ex Benth.) Codd (MI-1281/D)
 367. *Lamium album* L. (MI-1282/F)
 368. *L. amplexicaule* L. (MI-1283/A, W)
 369. *Leucas cephalotes* (Roth) Spreng (MI-1284/E)
 370. *L. lanata* Benth. (MI-1285/W)
 371. *Lycopus europaeus* L. (MI-1286/M, W)
 372. *Marrubium vulgare* L. (MI-1287/F)
 373. *Mentha longifolia* (L.) L. (MI-1288/M, S)
 374. *M. spicata* L. (MI-1289/A)
 375. *Micromeria biflora* (Buch.-Ham. ex D. Don) Benth. (MI-1290/D)
 376. *Nepeta erecta* (Boyle ex Benth.) Benth. (MI-1291/F)
 377. *N. laevigata* (D. Don) Hand.-Mazz (MI-1292/D)
 378. **Ocimum basilicum* L. (MI-1293/I)
 379. *Origanum vulgare* L. (MI-1294/D)
 380. *Otostegia limbata* (Benth.) Boiss. (MI-1295/D)
 381. *Prunella vulgaris* L. (MI-1296/WC)
 382. *Salvia lanata* Roxb. (MI-1297/D)
 383. *Salvia mocroftiana* Wall. ex Benth. (MI-1298/D)
 384. *S. nubicola* Wall. ex Sweet (MI-1299/F)
 385. *Scutellaria chamaedrifolia* Hedge & Paton (MI-1300/D)
 386. *Stachys parviflora* Benth. (MI-1301/D)
 387. *Teucrium stocksianum* Boiss. (MI-1302/D)
 388. *Thymus linearis* Benth. (MI-1303/D, E)

83. Loranthaceae

389. *Viscum album* L. (MI-1307/P)

84. Malvaceae

390. **Abelmoschus esculentus* (L.) Moench (MI-1308/A)
 391. **Alcea rosea* L. (MI-1309/I)
 392. **Hibiscus sabdariffa* L. (MI-1310/A)
 393. *H. syriacus* L. (MI-1311/I)
 394. *Malva neglecta* Wallr. (MI-1312/A, W)
 395. *M. parviflora* L. (MI-1313/A)
 396. *Malvastrum coromendelianum* (L.) Garcke (MI-1314/W, GY)

85. Meliaceae

397. *Melia azedarach* L. (MI-1316/A, GY)

86. Mimosaceae

398. *Acacia modesta* Wall. (MI-1317/D, GY)
 399. *A. nilotica* (L.) Delile (MI-1318/D, GY)

87. Molluginaceae

400. *Mollugo nudicaulis* Lamk. (MI-1319/A, S)

88. Moraceae

401. * *Broussonetia papyrifera* (L.) L'Herit. ex Vent. (MI-1320/I)
 402. *Ficus carica* L. (MI-1321/D)
 403. *F. palmata* Forssk. (MI-1322/D)
 404. *F. sarmentosa* Bush: Ham. ex J.E. Smith (MI-1323/C)
 405. *Morus alba* L. (MI-1324/A)
 406. *M. macroura* Miq. (MI-1325/A)
 407. *M. nigra* L. (MI-1326/A)

89. Myrsinaceae

408. *Myrsine africana* L. (MI-1327/F)

90. Myrtaceae

409. * *Eucalyptus camaldulensis* Dehnh. (MI-1328/I)
 410. *Myrtus communis* L. (MI-1329/WC)

91. Nyctaginaceae

411. *Boerhavia procumbens* Banks ex Roxb. (MI-1330/S)
 412. * *Mirabilis jalapa* L. (MI-1331/GY, I)

92. Oleaceae

413. *Jasminum humile* L. (MI-1332/D)
 414. *J. officinale* L. (MI-1333/F)
 415. *Olea ferruginea* Royle (MI-1334/D, GY)

93. Onagraceae

416. *Epilobium hirsutum* L. (MI-1335/M, WC)
 417. *Oenothera rosea* L' Her. ex Ait. (MI-1336/W, S)

94. Orobanchaceae

418. *Orobanche alba* Steph. (MI-1338/P)

95. Oxalidaceae

419. *Oxalis corniculata* L. (MI-1339/R, GY)

96. Paeoniaceae

420. *Paeonia emodi* Wall. ex Royle (MI-1340/F)

97. Papaveraceae

421. *Papaver rhoeas* L. (MI-1341/A)

98. Papilionaceae

422. *Astragalus congestus* Baker (MI-1342/E)
 423. *A. filicaulis* Kar. & Kir. (MI-1343/F)
 424. *A. frigidus* (L.) A. Gray (MI-1344/D)
 425. *Crotalaria medicaginea* Lamk. (MI-1345/D)
 426. * *Dalbergia sissoo* Roxb. (MI-1346/A)
 427. *Desmodium elegans* DC. (MI-1347/D)
 428. *Indigofera heterantha* var. *gerardiana* (Wall. ex Baker) Ali (MI-1348/F)

429. *I. heterantha* var. *heterantha* (Brandis) Baker (MI-1349/D)

430. * *Lablab purpureus* (L.) Sweet (MI-1350/A, I)
 431. *Lathyrus aphaca* L. (MI-1351/A)
 432. *L. hirsutus* L. (MI-1352/A)
 433. *L. pratensis* L. (MI-1353/F)
 434. * *Lens culinaris* Medic. (MI-1354/A)
 435. *Lespedeza juncea* (L.f.) Pers. (MI-1355/D)
 436. *Lotus corniculatus* L. (MI-1356/D)
 437. *Medicago lupulina* L. (MI-1357/E)
 438. *M. minima* (L.) L. (MI-1358/D)
 439. *Medicago orbicularis* (L.) Bart. (MI-1359/D)
 440. *M. polymorpha* L. (MI-1360/A)
 441. *Melilotus indica* (L.) All. (MI-1361/A, F)
 442. * *Phaseolus lunatus* L. (MI-1362/A)
 443. * *P. vulgaris* L. (MI-1363/A)
 444. * *Pisum sativum* L. (MI-1364/A)
 445. * *Robinia pseudo-acacia* L. (MI-1365/A, I)
 446. * *Trifolium alexandrianum* L. (MI-1366/A)
 447. *T. repens* L. (MI-1367/E, WC, W)
 448. * *T. resupinatum* L. (MI-1368/A)
 449. * *Trigonella foenum-graecum* L. (MI-1369/A)
 450. *Vicia sativa* L. (MI-1370/A)
 451. * *Vigna mungo* (L.) Hepper (MI-1371/A)
 452. * *V. radiata* (L.) Wilczek (MI-1372/A)
 453. * *V. unguiculata* (L.) Walp. (MI-1373/A)

99. Phytolaccaceae

454. *Phytolacca latbenia* (Moq.) Walter (MI-1374/D)

100. Plantaginaceae

455. *Plantago lanceolata* L. (MI-1380/A, E)
 456. *P. major* L. (MI-1381/S, WC)

101. Platanaceae

457. *Platanus orientalis* L. (MI-1382/WC)

102. Plumbaginaceae

458. *Limonium cabulicum* (Boiss.) O. Kuntze (MI-1383/D)

103. Podophyllaceae

459. *Podophyllum emodi* Wall. ex Royle (MI-1449/F)

104. Polygalaceae

460. *Polygala abyssinica* R.Br. ex Fresen (MI-1450/R)

105. Polygonaceae

461. *Bistorta amplexicaulis* (D. Don) Green (MI-1451/F)
 462. *Fallopia dumetorum* (L.) Holub (MI-1452/F)
 463. *Persicaria capitata* (Buch.-Ham. ex D. Don) H. Gross (MI-1453/WC)
 464. *P. glabra* (Willd.) M. Gómez (MI-1454/M)
 465. *P. hydropiper* (L.) Spach (MI-1455/M)
 466. *P. lapathifolia* (L.) S. F. Gray (MI-1456/M)

467. *P. maculosa* S. F. Gay (MI-1457/M)
 468. *P. mitis* (Schrank) Assenov (MI-1458/M)
 469. *P. nepalensis* (Meisn.) H. Gross (MI-1459/WC)
 470. *Polygonum aviculare* L. (MI-1460/W)
 471. *P. plebeium* R. Br. (MI-1461/S)
 472. *Rumex dentatus* L. (MI-1462/D)
 473. *R. hastatus* D. Don (MI-1463/D)
 474. *R. nepalensis* Spreng. (MI-1464/E)

106. Pontederiaceae

475. *Eichhornia crassipes* (Mart.) Solma (MI-1465/M)

107. Portulacaceae

476. *Portulaca oleracea* L. (MI-1466/A)

108. Primulaceae

477. *Anagallis arvensis* L. (MI-1470/A, W)
 478. *Androsace foliosa* Dcne. ex Duby (MI-1471/E)
 479. *A. rotundifolia* Hardwicke (MI-1472/R, C)
 480. *Primula denticulata* Smith (MI-1473/E, F)

109. Punicaceae

481. *Punica granatum* L. (MI-1476/D)

110. Ranunculaceae

482. *Aconitum heterophyllum* Wall. ex Royle (MI-1477/E, F)
 483. *Aquilegia pubiflora* Wall. ex Royle (MI-1478/F)
 484. *Caltha alba* Camb. (MI-1479/WC)
 485. *Clematis grata* Wall. (MI-1480/D, A)
 486. *Delphinium denudatum* Wall. ex Hook. & Thoms. (MI-1481/F)
 487. *Ranunculus arvensis* L. (MI-1482/A, W)
 488. *R. diffusus* DC. (MI-1483/S)
 489. *R. muricatus* L. (MI-1484/A, W)
 490. *R. sceleratus* L. (MI-1485/WC)
 491. *Thalictrum cultratum* Wall. (MI-1486/F)

111. Rhamnaceae

492. *Sageretia thea* (Osbeck) M.C. Johnston (MI-1487/D)
 493. *Ziziphus jujuba* Mill. (MI-1488/A)
 494. *Z. nummularia* (Burm. f.) Wight & Arn. (MI-1489/D)
 495. *Z. oxyphylla* Edgew. (MI-1490/D)
 496. *Z. spina-christi* (L.) Willd. (MI-1491/D)

112. Rosaceae

497. *Agrimonia eupatoria* L. (MI-1492/F)
 498. *Cotoneaster affinis* Lindl. (MI-1493/D)
 499. *C. integerrimus* Medic. (MI-1494/F)
 500. *C. microphyllus* Wall. ex Lindl. (MI-1495/D)
 501. **Cydonia oblonga* Mill. (MI-1496/A)
 502. *Duchesnea indica* (Andrews) Focke (MI-1497/W)
 503. **Eriobotrya japonica* (Thunb.) Lindl. (MI-1498/A)

504. *Fragaria nubicola* (Hook.f.) Lindl. ex Lacaita (MI-1499/F, E)
 505. *Geum elatum* Wall. ex G. Don (MI-1500/F)
 506. **Malus domestica* Borkh. (MI-1501/A)
 507. *Potentilla argentea* L. (MI-1502/D)
 508. *P. nepalensis* Hook. f. (MI-1503/F, E)
 509. *P. supina* L. (MI-1504/W, WC, S)
 510. *Prunus armeniaca* L. (MI-1505/A)
 511. *P. cerasoides* D. Don (MI-1506/F)
 512. *P. cornuta* (Wall. ex Royle) Steud. (MI-1507/F)
 513. **P. domestica* L. (MI-1508/A)
 514. **P. persica* (L.) Batsch (MI-1509/A)
 515. **Pyrus communis* L. (MI-1510/A)
 516. *P. pashia* Buch.-Ham. ex D. Don (MI-1511/D)
 517. *Rosa brunonii* Lindl. (MI-1512/F)
 518. **R. chinensis* Jacq. (MI-1513/A)
 519. *R. moschata* Herrm. (MI-1514/A)
 520. *R. webbiana* Wall. ex Royle (MI-1515/F)
 521. *Rubus ellipticus* Sm. (MI-1516/D)
 522. *R. niveus* Thunb. (MI-1517/D)
 523. *R. sanctus* Schreb. (MI-1518/F)
 524. *R. ulmifolius* Schott (MI-1519/A)
 525. *Sanguisorba filiformis* (Hook. f.) Hand.-Mazz. (MI-1520/W)
 526. *Sibbaldia procumbens* L. (MI-1521/E)
 527. *Sorbaria tomentosa* (Lindl.) Rehder (MI-1522/E)
 528. *Sorbus aria* L. (MI-1523/F)
 529. *Spiraea canescens* D. Don (MI-1524/D, R)

113. Rubiaceae

530. *Galium aparine* L. (MI-1525/A, W)
 531. *G. asperuloides* Edgew. (MI-1526/F)
 532. *G. divaricatum* Pourr. ex Lam. (MI-1527/W)
 533. *G. elegans* Wall. ex Roxb. (MI-1528/W)
 534. *Rubia cordifolia* L. (MI-1529/A)

114. Rutaceae

535. **Citrus sinensis* (L.) Osbeck (MI-1530/A)
 536. *Zanthoxylum armatum* DC. (MI-1531/D)

115. Salicaceae

537. **Populus ciliata* Wall. ex Royle (MI-1532/WC)
 538. **P. nigra* L. (MI-1533/WC)
 539. *Salix babylonica* L. (MI-1534/M)
 540. *S. tetrasperma* Roxb. (MI-1535/WC)

116. Sapindaceae

541. *Cardiospermum halicacabum* L. (MI-1536/D)
 542. *Dodonaea viscosa* (L.) Jacq. (MI-1537/D)

117. Sapotaceae

543. *Monothea buxifolia* (Falc.) A. DC. (MI-1538/D)

118. Saxifragaceae

544. *Bergenia ciliata* (Haw.) Sternb. (MI-1539/C)
 545. *Saxifraga sibirica* L. (MI-1540/D)

119. Scrophulariaceae

546. *Kickxia ramosissima* (Wall.) Janch. (MI-1541/R)
 547. *Mazus japonicus* (Thunb.) O. Kuntze (MI-1542/MS)
 548. *Scrophularia umbrosa* Dum. (MI-1543/D)
 549. *Verbascum thapsus* L. (MI-1544/D, S)
 550. *Veronica anagallis-aquatica* L. (MI-1545/M)
 551. *V. laxa* Benth. (MI-1546/F)
 552. *V. polita* Fries (MI-1547/A, W)
 553. *Wulfenia amherstiana* Benth. (MI-1548/R, C)

120. Simaroubaceae

554. *Ailanthus altissima* (Mill.) Swingle (MI-1549/A, I)

121. Solanaceae

555. **Capsicum annuum* L. (MI-1551/A)
 556. **C. frutescens* L. (MI-1552/A)
 557. **Cestrum nocturnum* L. (MI-1553/A)
 558. *Datura stramonium* L. (MI-1554/W, S)
 559. **Lycopersicon esculentum* Miller (MI-1555/A)
 560. **Nicotiana tabacum* L. (MI-1556/A)
 561. *Physalis divaricata* D. Don (MI-1557/S)
 562. *P. peruviana* L. (MI-1558/A, S)
 563. **Solanum melongena* L. (MI-1559/A)
 564. *S. nigrum* L. (MI-1560/A, GY, S, W)
 565. *S. pseudo-capsicum* L. (MI-1561/GY)
 566. *S. surattense* Burm. f. (MI-1562/D, S)
 567. **S. tuberosum* L. (MI-1563/A)
 568. *S. villosum* (L.) Moench (MI-1564/A, GY, S)
 569. *Withania somnifera* (L.) Dunal (MI-1565/D)

122. Thymelaeaceae

570. *Daphne mucronata* Royle (MI-1567/D)
 571. *Wikstroemia canescens* Meisn. (MI-1568/F)

123. Tiliaceae

572. *Corchorus olitorius* L. (MI-1569/A)
 573. *Grewia optiva* Drummond ex Burret (MI-1570/D)

124. Ulmaceae

574. *Celtis caucasica* Willd. (MI-1573/GY)
 575. *C. eriocarpa* Decne. (MI-1574/A)
 576. *C. tetrandra* Roxb. (MI-1575/GY)
 577. *Ulmus wallichiana* Planch. (MI-1576/F)

125. Urticaceae

578. *Debregeasia saeneb* (Forssk.) Hepper & J.R.I. Wood (MI-1577/WC)
 579. *Girardinia palmata* (Forssk.) Gaudich. (MI-1578/F)
 580. *Pilea umbrosa* Blume (MI-1579/WC)

581. *Urtica dioica* L. (MI-1580/W, S)

126. Valerianaceae

582. *Valeriana jatamansi* Jones (MI-1581/W, S)
 583. *V. pyrolifolia* Decne. (MI-1582/W, S)

127. Verbenaceae

584. *Lantana camara* L. (MI-1583/GY, I)
 585. *Phyla nodiflora* (L.) Greene (MI-1584/S)
 586. *Verbena officinalis* L. (MI-1585/W, S)
 587. *V. tenuisecta* Briq. (MI-1586/W)
 588. *Vitex negundo* L. (MI-1587/S, GY)

128. Violaceae

589. *Viola betonicifolia* Sm. (MI-1588/MS)
 590. *V. canescens* Wall. ex Roxb. (MI-1589/R)

129. Vitaceae

591. *Vitis Jacquemontii* Parker (MI-1590/D, F)
 592. **V. vinifera* L. (MI-1591/A)

130. Zygophyllaceae

593. *Tribulus terrestris* L. (MI-1593/A, W, S, D)

The number of vascular plant species in Kabal valley is higher than other areas of comparable size (Table 1). The total area of Tehsil Kabal is 40026 hectares (Anon., 1999) which constitute 0.05% of the total area of Pakistan (79.61 mill. Hec.), but the present list has 593 species which constitute 10.3% of the total 5783 species as reported by Stewart (1972). The area of tehsil Kabal is 7.5% of the total Swat district (533700 hec.) but the number of species is 40.3% of the total reported for the Swat state by Stewart (1967). The flora found in the area may be an interest model for future studies dealing with ecological, morphological, physiological, and reproductive aspects. Study of floristic composition of vegetation is crucial for conservation management by providing habitats for wildlife and contributing to the ecologically sustainable management of natural resources (Ahmad & Ehsan, 2012). The present list could be an easy source of material to ethnopharmacobotanical studies, since several of the recorded species have medicinal uses in tehsil Kabal (Ahmad *et al.*, 2011). Additional research should be conducted to evaluate the intrinsic ecological values of the local flora and to incorporate characteristics of species composition with ecological functions (Zhao *et al.*, 2010). This will provide a baseline for planning proper conservation measures to safeguard the phytodiversity in face of the ever growing biotic stress.

Table 1. Number of plant species in different groups and their comparison to number of plants in District Swat and Pakistan.

Plant group	Number of species			Percentage proportion of species compared to	
	Kabal valley (Area=40026hec.)	Swat district (Stewart, 1967) (Area=533700hec.)	Pakistan (Stewart, 1972) (Area=79.61mill. hec.)	Swat district (Area=7.5%)	Pakistan (Area=0.05%)
Pteridophytes	20	55	128	36.4	15.6
Gymnosperms	8	13	23	61.5	34.8
Monocotyledons	128	306	1140	41.8	11.2
Dicotyledons	437	1167	4492	37.4	9.7
Total	593	1541	5783	38.5	10.3

Acknowledgement

The present work is part of PhD thesis of the first author.

References

- Ahmad, S.S. and H. Ehsan. 2012. Analyzing the herbaceous flora of lohi bher wildlife park under variable environmental stress. *Pak. J. Bot.*, 44(1): 11-14.
- Ahmad, I., M. Ibrar, B. Ullah, and N. Ali. 2011. Ethnobotanical Study of Tehsil Kabal, Swat District, KPK, Pakistan. *Pak. J. Bot.*, 43(1): 1-9.
- Ali, S.I. and M. Qaiser (Eds.). 1995-2012. *Flora of Pakistan*. Department of Botany, University of Karachi.
- Ali, S.I. and Y.J. Nasir (Eds.). 1989-1992. *Flora of Pakistan*. Islamabad, Karachi.
- Anonymous. 1999. *District Census Report, Swat*. Population census organization, Statistics Division, Government of Pakistan, Islamabad. p. 198- 201.
- Anon. 2012a. *The International Plant Names Index (IPNI)*. <http://www.ipni.org>
- Anon. 2012b. *The Plant List; a working list of all plant species*. <http://www.theplantlist.org>
- Djaha, K., A. Y. C. Yves, K. K. Edouard, N. G. K. Edouard and A. Kouadio. 2008. Preliminary Floristic Inventory and Diversity in Azagny National Park (Côte D'Ivoire). *Eur. J. Sci. Res.*, 23(4): 537-547.
- Fazal, H., N. Ahmad, A. Rashid and S. Farooq. 2010. A checklist of phanerogamic flora of Haripur Hazara, Khyber Pakhtunkhwa, Pakistan. *Pak. J. Bot.*, 42(3): 1511-1522.
- Funk, V., T. Hollowell, P. Berry, C. Kelloff, and S. N. Alexander. 2007. Checklist of the Plants of the Guiana Shield (Venezuela: Amazonas, Bolivar, Delta Amacuro; Guyana, Surinam, French Guiana). *Contributions from the United States National Herbarium*, 55: 1- 84.
- Haq, F. U., H. Ahmad, M. Alam, I. Ahmad and R. Ullah. 2010. Species diversity of vascular plants of Nandiar Valley Western Himalaya, Pakistan. *Pak. J. Bot.*, 42(S.I.): 213-229.
- Hussain, F. and I. Ilahi, 1991. Ecology and Vegetation of Lesser Himalayas, Pakistan. Department of Botany, University of Peshawar. p. 187.
- Jafari, S. M. and H. Akhiani. 2008. Plants of Jahan Nama protected area, Golestan province, N. Iran. *Pak. J. Bot.*, 40(4): 1533-1554.
- Keith, D.A. 1988. Floristic lists of New South Wales (III). *Cunninghamia*, 2(1): 39-73.
- Nakaike, T. and S. Malik (Eds.). 1992-1993. *Cryptogrammic Flora of Pakistan*. National Science Museum, Tokyo.
- Nasir, E. and S. I. Ali (Eds.). 1970-1989. *Flora of Pakistan*, Islamabad, Karachi.
- Nazar, R., S. Begum, Azra Naz, R. Qureshi, R.A. Memon, A. K. Chaudhry and Z. Akram. 2008. Weed flora of Pir Mehr Ali Shah Agriculture University Rawalpindi: Winter Aspect. *Pak. J. Weed Sci. Res.*, 14(1-2): 55-72.
- Qureshi, R. 2008. Preliminary floristic list of Chotiari wetland Complex, Nawab Shah, Sindh, Pakistan. *Pak. J. Bot.*, 40(6): 2281-2288.
- Qureshi, R. and G.R. Bhatti. 2010. Floristic inventory of Pai forest, Nawab Shah, Sindh, Pakistan. *Pak. J. Bot.*, 42(4): 2215-2224.
- Qureshi, R., G.R. Bhatti and G. Shabbir. 2011a. Floristic inventory of Pir Mehr Ali Shah Arid Agriculture University Research Farm at Koont and its surrounding areas. *Pak. J. Bot.*, 43(3): 1679-1684.
- Qureshi, R., W.A. Khan, G.R. Bhatti, B. Khan, S. Iqbal, M.S. Ahmad and M. Abid. 2011b. First report on the biodiversity of Khunjerab National Park, Pakistan. *Pak. J. Bot.*, 43(2): 849-861.
- Rashid, A., F. Hussain and I. Ilahi. 1987. A checklist of the flora of Attock-Nizampur Valley, District Peshawar. In: (Eds.): I. Ilahi and F. Hussain. *Modern Trends of Plant Science Research in Pakistan Proc. 3rd National Conference Plant Scientists*. pp. 253-258.
- Saima, S., A.A. Dasti, F. Hussain, S.M. Wazir and S.A. Malik. 2009. Floristic compositions along an 18 – km long Transect in Ayubia National Park district Abbottabad, Pakistan. *Pak. J. Bot.*, 41(5): 2115-2127.
- Saima, S., A.A. Dasti, Q. Abbas and F. Hussain. 2010. Floristic diversity during monsoon in Ayubia National Park, District Abbottabad, Pakistan. *Pak. J. Pl. Sci.*, 16(1): 43-50.
- Stewart, R.R. 1967. Checklist of the plants of Swat state, Northwest Pakistan. *Pak. J. Forest.*, 17(4): 457-528.
- Stewart, R.R. 1972. An annotated catalogue of the vascular plants of West Pakistan and Kashmir. In: *Flora of West Pakistan*. (Eds.): E. Nasir & S.I. Ali. 1028 pp.
- Yalcin, E., M. Kilinc, H.G. Kutbay, A. Bilgin and H. Korkmaz. 2011. Floristic properties of lowland meadows in Central Black Sea Region of Turkey. *Eurasia J Biosci.*, 5: 54-63.
- Zhao, J., Z. Ouyang, H. Zheng, W. Zhou, X. Wang, W. Xu and Y. Ni. 2010. Plant species composition in green spaces within the built-up areas of Beijing, China. *Plant Ecol.*, 209: 189-204.

(Received for publication 17 September 2011)