

ADDITIONS TO THE AQUATIC AND MARSHY PLANTS OF HAMIRPUR AND MAHOBA DISTRICTS (U. P.) INDIA

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Hamirpur and Mahoba districts of Bundelkhand region U.P. are a rich source of natural water systems like rivers, streams, tributaries, lakes, ponds and irrigation canals. The districts have 120 aquatic plant species of 88 genera and 48 families of which 19 species are new additions to the area. The enumeration of these plants is given with family, brief description, phenology and ecology of each taxon.

Keywords : Aquatic & Marshy Plants; Bundelkhand region; Flora.

Hamirpur and Mahoba are the central districts of Bundelkhand region (U.P.) and situated between 25°7' and 26°7' N latitude and 79°17' and 80°21' E longitude. The district has many natural water systems including river Yamuna and their tributaries - Betwa, Dhasan and Ken. There are a number of minor streams, which are swollen to considerable dimensions during the rains, and later subside into narrow streams with a very small discharge. The stream Birma and Arjun both are tributary of river Betwa. A number of historical ponds were constructed chiefly in Mahoba, Charkhari, Kulpahar, Belatal, Modha etc. by erstwhile rulers. These include seven ponds of Charkhari, Vijaysagar, Bilki, and Pawa in Mahoba, Kandaura Tal of Thana and Paswara, Rohil Sagar near Mahoba, Kirat Sagar in the west of Mahoba and Belatal of Mahoba. Along with these a number of lakes and big ponds were constructed in historical period and a large number of irrigation canals and ephemeral water bodies are found in the district.

Bhattacharyya and Malhotra¹ have collected 89 aquatic plants especially from Mahoba. During reinvestigation, 19 species of aquatic and marshy plants are found to be new additions to the flora of Hamirpur and Mahoba district of U.P. The collected plants were identified with the help of published flora², Botanical Survey of India, Central Circle, Allahabad and Duthie Herbarium, Department of Botany, University of Allahabad, Allahabad. The plants are enumerated alphabetically along with family, brief description, phenology, ecology, locality and field number of each taxon. The specimens are deposited in Duthie Herbarium, Department of Botany, University of Allahabad, Allahabad.

SYSTEMATIC ENUMERATION

1. *Arundo donex* L., Sp. Pl. 81.1753. FBI. 7: 302. Raizada & Jain, Indian Forester 92 639. 1966. (Poaceae)
Perennial herbs. Lemmas villous, rachilla glabrous.
Occasional, in ravines and gardens.
Fl. & Fr.: August – November.

Charkhari, 12781.

2. *Bulbostylis barbata* (Rottb.) Clarke, Fl. Brit. India 6 651.1893. FUGP. 3 358. *Scirpus barbatus* Rottb., Descr. et Icon. 52. t. 17. f. 1773. (Cyperaceae)
Annuals. Inflorescence capitate, spikelets 10–25, glumes glabrous or slightly pubescent. Nut smooth, minutely reticulate.
Occasional on moist sandy places.
Fl. & Fr.: September – October.
Mahoba, 12014.
3. *Centella asiatica* (L.) Urban, Mart. Fl. Brass. 11: 287. t. 78.1879. *Hydrocotyle asiatica* L., Sp. Pl. 234. 1753. FBI. 2 669. FUGP 1: 391. (Apiaceae)
Creeping herbs, leaves orbicular, undivided with perennial root stock. Umbels simple.
Occasionally in wet places and near ponds.
Fl. & Fr.: July – January.
Mahoba, 12596.
4. *Cyperus pangorei* Rottb., Descr. et Ic. 31. t. 7. 3. 1773. FBI. 6 613. FUGP: 3: 334. (Cyperaceae)
Strongly aromatic perennial herbs. Lower bracts much exceeding the anthera.
Common along streams and on sandy soils.
Fl. & Fr.: August – September.
Mahoba, 12292.
5. *C. rotundas* subsp. *tuberosus* (Rottb.) Kuk., Pflanzenr. 101 113. 1936. Suppl. FUGP. 302. *C. tuberosus* Rottb., Descr. et Ic. 28. t. 7. f. 1. 1773. FBI. 6: 616. (Cyperaceae)
Rhizome bearing wiry stolon, ending in subglobose or ellipsoid tubers. Spikelets strongly compressed, glumes deep reddish brown.
Occasional along road sides and drains in partly shaded places.
Fl. & Fr.: May – September.
Mahoba, 12723.
6. *Eichhornia crassipes* (Mart.) Solms., DC. Monogr. Phan. 4 527. 1883. Suppl. FUGP. 279. *Pontederia*

- crassipes* Mart., Nov. Gen. Sp. Pl. 1: 9. t. 4. 1823. (Pontederiaceae)
A floating aquatic herb. Petioles mostly swollen into bladder like floats. Flowers sessile, zygomorphic. Perianth united. Stamens large and hairy.
Common in ponds and muds.
Fl. & Fr.: April – October.
Charkhari, 12624.
7. *Fimbristylis miliacea* (L.) Vahl, Enum. Pl. 2: 287. 1806. *Scirpus miliaceus* L., Syst. Nat. ed. 10. 868. 1759. *Fimbristylis quinqueangularis* (Vahl) Kunth, Enum. Pl. 2: 229. 1837. FBI. 6: 644. FUGP. 3: 356. (Cyperaceae)
Annual with fibrous roots. Stem acutely 4-5 angled. Spikelets angular, 1-1.5 mm wide, glumes distinctly keeled, apiculate by the shortly excurrent, midnerve .1 mm long.
Common in marshy places and along road sides.
Fl. & Fr.: September – February.
Mahoba, 12003.
8. *Nothosaerva brachiata* (L.) Wight., Ic. Pl. 6: 1. 1853. FBI. 4: 726. FUGP. 3: 17. *Achyranthes brachiata* L. Mant. 50. 1767. (Amaranthaceae)
Erect herbs, leaves membranous. Flowers all project without fascicled hooks. Stamens two, without staminodes. Anthers two celled.
Occasional on stone crevices with water channels.
Fl. & Fr.: September – February.
Supa, 12787.
9. *Paspalidium flavidum* (Retz.) A. Camus, Lecomte, Fl. Gen. Indo-Chine 7: 419. 1922. Raizada & Jain, Indian Forester Rec. Ser. 2. 5: 167. 1964. *Paspalum flavidum* Retz., Obs. Bot. 4: 15. 1786. FBI. 7: 28. (Poaceae)
Erect or creeping grass. Spikes shorter than the internodes. Spikelets globose.
Common on moist places.
Fl. & Fr.: August – December.
Kulpahar, 12631.
10. *Polygonum barbatum* var. *stagninum* (F. Ham. ex Meissn.) Stewart, Contr. Gray Herb. 88. 56. 1930. *P. stagninum* F. Ham. ex Meissn. in Wall. Pl. Asiat. Rar. 3: 56. 1832. FBI. 5: 37. FUGP. 3: 36. (Polygonaceae)
Erect aquatic herbs. Ochrea appressed pubescent, long ciliate at mouth. Bracts more or less hairy.
Common on marshy places and along ponds and ditches.
Fl. & Fr.: November – May.
Mahoba, 12444.
11. *Rorippa indica* (L.) Hiern., Cat. Afr. Pl. Welw. 1: 26. 1896. *Sisymbrium indicum* L., Sp. Pl. ed. 2: 917. 1763. *Nasturtium indicum* (L.) DC., Syst. Nat. 2: 199. 1821. FBI. 1: 134. *pp* excl. *syn. et* var. *benghalensis* DC., FUGP. 1: 39. (Brassicaceae)
Robust annual herbs. Pods compressed, parallel to septum and bearing seeds throughout their whole length. Seeds two seriate.
Common near water channels.
Fl.: October – March. Fr.: December – April.
Kulpahar, 12328.
12. *Saccharum spontaneum* L., Mont. Alt. 2: 183. 1771. FBI. 7: 118. Raizada *et al.*, Ind. For. Rec. Ser. 2. 4: 185. 1961. (Poaceae)
Culms erect, blade & sheath glabrous, ligule a fringe of hairs. Glumes reddish brown below middle and ciliate along margins.
Common on bunds of fields.
Fl. & Fr.: October – February.
Hamirpur, 12660.
13. *Sagittaria trifolia* L., Sp. Pl. 993. 1753. *S. sagittifolia* L., *auct.* Non L. 1753. FBI. 6: 561. FUGP. 3: 310. (Alismataceae)
Aquatic or marshy herbs. Leaf lobes acute. Stamens – 20.
Occasional in ponds and ditches.
Fl. & Fr.: November – March.
Mahoba, 12173, 12293.
14. *Scirpus lacustris* L., Sp. Pl. 48. 1753. FBI. 6: 658. FUGP. 3: 362. (Cyperaceae)
Hypogynous bristles 5-6, setaceous, retrorsely scabrous. Glumes distinctly ciliate.
Occasional in ponds & ditches.
Fl. & Fr.: August – February.
Mahoba, 12290.
15. *S. littoralis* Schrad., Fl. Germ. 1: 142. t. 5. 7. 1806. FBI. 6: 659. FUGP. 3: 362. (Cyperaceae)
Hypogynous scales usually four (3-5) ligulate – spathulate, plumosely fringed with antrorse hairs. Glumes only microscopically ciliate.
Occasional in ponds and on moist places.
Fl. & Fr.: August – December.
Hamirpur, 12682.
16. *S. roylei* (Nees) Parker, FUGP. 3: 361. 1929. *Isolepis roylei* Nees in Wight, Contrib. Bot. Ind. 107. 1834. *Scirpus quinquefarius* Buch. – Ham. ex Boeck. Linnæa 36: 701. 1870. FBI. 6: 659 (Cyperaceae)
Stem terete or slightly compressed. Inflorescence sessile. Glumes multistriate.
Occasional in moist and muddy places.
Fl. & Fr.: August – January.
Mahoba, 12131, Modha, 12734.
17. *Utricularia australis* R. Br., Prodr. 1: 430. 1810. *U. flexuosa* Benth. in FBI. 4: 329. *quoad syn. U. australis* R. Br. (Lentibulariaceae)
A submerged aquatic herbs. Turions (winter buds) of tightly clustered modified foliar segments present at the apex of some of the stolons.
Rare in swampy areas.

requirement during 2001. The carrying capacity value of egg computes 132438 which indicates the requirement is far ahead than that of the production. In comparison with 1991, the value of carrying capacity of 2001 increased from 37849 (i.e. 94589 to 132438). The finding supports the significance of carrying capacity value.

The carrying capacity of the district based on food production have great impact on the sustainable development of the district. Carrying capacity as being constrained by the current status of technology, physical, chemical, biological factors, and social, political, economic environment. A close look into the matter and prior planning for developmental work is must. Cotton⁸ rightfully claimed "the world is being required to accommodate not just more people but effectively larger people". The present finding vividly clarify the carrying capacity as essential tool to determine the basic component of management of the resources available from the nature or any other sources.

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